

# *Concorde*

## MAINTENANCE MANUAL

### CHAPTER 27

#### FLIGHT CONTROLS

#### LIST OF EFFECTIVE PAGES

N, R or D indicates pages which are New, Revised or Deleted respectively.

Remove and insert the affected pages and complete the Record of Revisions and the Record of Temporary Revisions as necessary.

<u>CH/SE/SU</u>	<u>C</u>	<u>PAGE</u>	<u>DATE</u>	<u>CH/SE/SU</u>	<u>C</u>	<u>PAGE</u>	<u>DATE</u>
L.E.P.	R	A	May 31/03	L.E.P.	R	20	May 31/03
L.E.P.	R	1	May 31/03	L.E.P.	R	21	May 31/03
L.E.P.	R	2	May 31/03	L.E.P.	R	22	May 31/03
L.E.P.	R	3	May 31/03	L.E.P.	R	23	May 31/03
L.E.P.	R	4	May 31/03	L.E.P.	R	24	May 31/03
L.E.P.	R	5	May 31/03	L.E.P.	R	25	May 31/03
L.E.P.	R	6	May 31/03	L.E.P.	R	26	May 31/03
L.E.P.	R	7	May 31/03	L.E.P.	R	27	May 31/03
L.E.P.	R	8	May 31/03	L.E.P.	R	28	May 31/03
L.E.P.	R	9	May 31/03	L.E.P.	R	29	May 31/03
L.E.P.	R	10	May 31/03	L.E.P.	R	30	May 31/03
L.E.P.	R	11	May 31/03	L.E.P.	R	31	May 31/03
L.E.P.	R	12	May 31/03	L.E.P.	R	32	May 31/03
L.E.P.	R	13	May 31/03	L.E.P.	R	33	May 31/03
L.E.P.	R	14	May 31/03	L.E.P.	R	34	May 31/03
L.E.P.	R	15	May 31/03	L.E.P.	R	35	May 31/03
L.E.P.	R	16	May 31/03	L.E.P.	D	36	
L.E.P.	R	17	May 31/03				
L.E.P.	R	18	May 31/03				
L.E.P.	R	19	May 31/03				

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S.B.LIST		1	Aug 30/79	T. of C.		28	Mar 31/00
S.B.LIST		2	May 30/81	T. of C.		29	Mar 31/00
S.B.LIST		3	May 30/81	T. of C.		30	Mar 31/00
S.B.LIST		4	Nov 30/81	T. of C.		31	Mar 31/00
S.B.LIST		5	Feb 28/81	T. of C.		32	Mar 31/00
S.B.LIST		6	Feb 28/81	T. of C.		33	Mar 31/00
S.B.LIST		7	Feb 28/81	T. of C.		34	Mar 31/00
S.B.LIST	R	8	May 31/03				
S.B.LIST	R	9	May 31/03	27-00-00		1	Aug 30/75
S.B.LIST	N	10	May 31/03	27-00-00		2	Aug 30/75
S.B.LIST	N	11	May 31/03	27-00-00		3	Aug 30/75
				27-00-00		4	Aug 30/75
T. of C.		1	Mar 31/00	27-00-00	R	5	May 31/03
T. of C.		2	Mar 31/00	27-00-00	R	6	May 31/03
T. of C.		3	Mar 31/00	27-00-00	R	7	May 31/03
T. of C.		4	Mar 30/01	27-00-00	R	8	May 31/03
T. of C.		5	Mar 31/00	27-00-00	N	8 A	May 31/03
T. of C.		6	Mar 31/00	27-00-00	N	8 B	May 31/03
T. of C.		7	Mar 31/00	27-00-00		9	Nov 30/78
T. of C.		8	Mar 31/00	27-00-00		10	Nov 30/78
T. of C.		9	Mar 31/00	27-00-00		11	Nov 30/78
T. of C.		10	Mar 31/00	27-00-00		12	Nov 30/78
T. of C.		11	Mar 31/00	27-00-00		13	Nov 30/78
T. of C.		12	Mar 30/01	27-00-00		14	Mar 27/97
T. of C.		13	Mar 31/00	27-00-00		14 A	Mar 27/97
T. of C.		14	Mar 31/00	27-00-00		14 B	Mar 27/97
T. of C.		15	Mar 31/00	27-00-00		15	Aug 30/75
T. of C.		16	Mar 31/00	27-00-00		16	Aug 30/75
T. of C.		17	Mar 31/00	27-00-00		17	Nov 30/78
T. of C.		18	Mar 31/00	27-00-00		18	Nov 30/78
T. of C.		19	Mar 31/00	27-00-00		19	Nov 30/78
T. of C.		20	Mar 31/00	27-00-00		20	Nov 30/78
T. of C.		21	Mar 31/00	27-00-00		21	Aug 30/75
T. of C.		22	Mar 31/00	27-00-00		22	Nov 30/78
T. of C.		23	Mar 31/00	27-00-00		23	Aug 30/75
T. of C.		24	Mar 31/00	27-00-00		24	Mar 27/97
T. of C.		25	Mar 31/00	27-00-00		301	Feb 28/81
T. of C.		26	Mar 31/00	27-00-00		302	Feb 28/81
T. of C.		27	Mar 31/00	27-00-00		303	Feb 28/81

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27-00-00		304	Feb 28/81	27-10-00		127	Nov 30/80
27-00-00		305	Feb 28/81	27-10-00		128	Nov 30/80
27-00-00		306	Feb 28/81	27-10-00		129	Nov 30/80
27-00-00		307	Nov 30/80	27-10-00		130	Nov 30/80
27-00-00		308	Nov 30/80	27-10-00		131	Nov 30/80
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27-00-01		207	Mar 27/97	27-10-00		140	Nov 30/80
27-00-01		401	Mar 27/97	27-10-00		141	Nov 30/80
27-00-01		402	Mar 27/97	27-10-00		112	Nov 30/80
				27-10-00		143	Nov 30/80
27-10-00		1	Jun 30/75	27-10-00		144	Nov 30/80
27-10-00		2	Jun 30/75	27-10-00		145	Nov 30/80
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27-10-00		125	Nov 30/80	27-10-00		175	Nov 30/80
27-10-00		126	Nov 30/80	27-10-00		176	Nov 30/80

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27-10-00		177	Nov 30/80	27-10-00		A128	Nov 30/80
27-10-00		178	Nov 30/80	27-10-00		A129	Nov 30/80
27-10-00		179	Nov 30/80	27-10-00		A130	Nov 30/80
27-10-00		180	Nov 30/80	27-10-00		A131	Nov 30/80
27-10-00		181	Nov 30/80	27-10-00		A132	Nov 30/80
27-10-00		182	Nov 30/80	27-10-00		A133	Nov 30/80
27-10-00		183	Nov 30/80	27-10-00		A134	Nov 30/80
27-10-00		184	Nov 30/80	27-10-00		A135	Nov 30/80
27-10-00		185	Nov 30/80	27-10-00		A136	Nov 30/80
27-10-00		186	Nov 30/80	27-10-00		A137	Nov 30/80
27-10-00		187	Nov 30/80	27-10-00		A138	Nov 30/80
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27-10-00		194	Nov 30/80	27-10-00		504	Feb 28/81
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27-10-00		197	Nov 30/80	27-10-00		507	Aug 30/79
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27-10-00		A104	Nov 30/80	27-10-00		513	Feb 28/81
27-10-00		A105	Nov 30/80	27-10-00		514	Feb 28/81
27-10-00		A106	Nov 30/80	27-10-00		515	Feb 28/81
27-10-00		A107	Nov 30/80	27-10-00		516	Aug 30/79
27-10-00		A108	Nov 30/80	27-10-00		517	Aug 30/79
27-10-00		A109	Nov 30/80	27-10-00		518	Aug 30/79
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27-10-00		A116	Nov 30/80	27-11-00		6	Nov 30/76
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27-10-00		A123	Nov 30/80	27-11-00		13	Nov 30/76
27-10-00		A124	Nov 30/80	27-11-00		14	Nov 30/76
27-10-00		A125	Nov 30/80	27-11-00		15	Nov 30/76
27-10-00		A126	Nov 30/80	27-11-00		16	Nov 30/76
27-10-00		A127	Nov 30/80	27-11-00		17	Nov 30/76

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27-11-00		19	Nov 30/76	27-11-00		147	Feb 28/78
27-11-00		20	Nov 30/76	27-11-00		148	Feb 28/78
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27-11-00		115	Feb 28/78	27-11-00		403	Jun 30/75
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27-11-00		145	Feb 28/78	27-11-00		515	Nov 30/80

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27-11-00		520	Nov 30/80	27-11-13		402	Feb 28/81
27-11-00		521	Nov 30/80	27-11-13		403	Feb 28/81
27-11-00		522	Nov 30/80	27-11-13		404	Feb 28/81
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27-11-00		524	Nov 30/80	27-11-13		406	Feb 28/81
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27-11-00		602	Feb 28/81	27-11-15		402	Feb 28/81
27-11-00		603	Feb 28/81	27-11-15		403	Feb 28/81
27-11-00		604	May 30/76	27-11-15		404	Feb 28/81
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27-11-00		607	Nov 30/80	27-11-15		407	Nov 30/80
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27-11-11		402	Nov 30/80	27-11-15		411	Feb 28/81
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27-11-11		501	Feb 28/81	27-11-15		603	Aug 30/75
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27-11-12		403	Feb 28/81	27-11-17		406	Nov 30/80
27-11-12		404	Feb 28/81	27-11-17		407	Feb 28/81
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27-11-12		406	Feb 28/81	27-11-17		409	Feb 28/81
27-11-12		407	Feb 28/81	27-11-17		410	Feb 28/81
27-11-12		408	Feb 28/81	27-11-17		601	May 30/77
27-11-12		601	Feb 28/81	27-11-17		602	May 30/77
27-11-12		602	Feb 28/81	27-11-17		603	May 30/77
27-11-12		603	Jun 30/75	27-11-19		401	Feb 28/81
27-11-12		604	Feb 28/81	27-11-19		402	Feb 28/81

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27-11-19		403	Feb 28/81	27-12-00		503	Mar 30/01
27-11-19		404	Aug 30/76	27-12-00		504	Mar 30/01
27-11-19		405	Feb 28/81	27-12-00		505	Mar 30/01
27-11-19		406	Feb 28/81	27-12-00		506	Mar 30/01
27-11-19		601	Nov 30/75	27-12-00		507	Mar 30/01
27-11-19		602	Nov 30/75	27-12-00		508	Mar 30/01
27-11-21		401	Feb 28/81	27-12-00		509	Mar 30/01
27-11-21		402	Feb 28/81	27-12-00		510	Mar 28/02
27-11-21		403	Feb 28/81	27-12-00		511	Mar 30/01
27-11-21		404	Aug 30/75	27-12-00		512	Mar 30/01
27-11-21		405	Feb 28/81	27-12-00		513	Mar 30/01
27-11-21		501	May 30/76	27-12-00		514	Mar 30/01
27-11-21		502	Aug 30/77	27-12-00		515	Mar 30/01
27-11-21		503	Aug 30/77	27-12-00		516	Mar 30/01
27-11-21		601	Nov 30/75	27-12-00		517	Mar 30/01
				27-12-00		518	Mar 30/01
27-12-00		1	Nov 30/76	27-12-00		519	Mar 30/01
27-12-00		2	Nov 30/76	27-12-00		520	Mar 30/01
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27-12-00		4	Nov 30/76	27-12-12		402	Feb 28/81
27-12-00		5	Nov 30/76	27-12-12		403	Nov 30/82
27-12-00		6	Nov 30/76	27-12-12		404	Nov 30/82
27-12-00		7	Nov 30/76	27-12-12		405	Nov 30/82
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27-12-00		9	Aug 30/76	27-12-12		602	Feb 28/77
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27-12-00		18	Nov 30/76	27-12-13		408	Feb 28/81
27-12-00		19	Nov 30/76				
27-12-00		101	Feb 28/81	27-13-00		1	Jun 30/75
27-12-00		102	Feb 28/81	27-13-00		2	Jun 20/75
27-12-00		103	Nov 30/80	27-13-00		3	Jun 30/75
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27-12-00		105	Nov 30/80	27-13-00		5	Jun 30/75
27-12-00		106	Nov 30/80	27-13-00		101	Feb 28/81
27-12-00		107	Nov 30/80	27-13-00		102	Feb 28/81
27-12-00		108	Nov 30/80	27-13-00		103	Feb 28/81
27-12-00		109	Nov 30/80	27-13-00		104	Nov 30/80
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27-12-00		111	Nov 30/80	27-13-00		106	Nov 30/80
27-12-00		112	Nov 30/80	27-13-00		107	Nov 30/80
27-12-00		113	Nov 30/80	27-13-00		108	Nov 30/80
27-12-00		501	Mar 30/01	27-13-00		109	Nov 30/80
27-12-00		502	Mar 30/01	27-13-00		501	Feb 28/81

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27-13-00		502	Feb 28/81	27-14-00		25	Nov 30/76
27-13-00		503	Feb 28/81	27-14-00		26	Nov 30/76
27-13-00		504	Nov 30/80	27-14-00		27	Nov 30/76
27-13-00		505	Nov 30/80	27-14-00		28	Nov 30/79
27-13-00		506	Nov 30/80	27-14-00		29	Nov 30/76
27-13-00		507	Nov 30/80	27-14-00		30	Nov 30/76
27-13-00		508	Nov 30/80	27-14-00		31	Nov 30/76
27-13-00		509	Feb 28/81	27-14-00		32	Nov 30/76
27-13-00		510	Feb 28/81	27-14-00		33	Nov 30/76
27-13-11		401	Feb 28/81	27-14-00		34	Nov 30/76
27-13-11		402	Nov 30/80	27-14-00		35	Nov 30/76
27-13-11		403	Nov 30/80	27-14-00		36	Nov 30/76
27-13-11		404	Nov 30/80	27-14-00		37	Nov 30/76
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27-13-11		406	Nov 30/80	27-14-00		39	Nov 30/76
27-13-11		407	Nov 30/80	27-14-00		40	May 30/78
27-13-12		401	Feb 28/81	27-14-00		41	Nov 30/79
27-13-12		402	Feb 28/81	27-14-00		42	Nov 30/79
27-13-12		403	Feb 28/81	27-14-00		43	Nov 30/79
27-13-12		404	Feb 28/81	27-14-00		44	Nov 30/79
27-13-12		405	Aug 30/76	27-14-00		45	Nov 30/79
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27-13-12		408	Nov 30/80	27-14-00		103	Feb 28/81
27-13-12		409	Nov 30/80	27-14-00		104	Feb 28/81
				27-14-00		105	Feb 28/81
27-14-00		1	Nov 30/76	27-14-00		106	Feb 28/81
27-14-00		2	Nov 30/76	27-14-00		107	Feb 28/81
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27-14-00		11	Nov 30/76	27-14-00		116	Feb 28/81
27-14-00		12	Jun 30/75	27-14-00		117	Feb 28/81
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27-14-00		20	Nov 30/76	27-14-00		125	Feb 28/81
27-14-00		21	Nov 30/76	27-14-00		126	Feb 28/81
27-14-00		22	Nov 30/76	27-14-00		127	Feb 28/81
27-14-00		23	Nov 30/76	27-14-00		128	Feb 28/81
27-14-00		24	Nov 30/76	27-14-00		129	Feb 28/81

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27-14-00		130	Feb 28/81	27-14-00		512	Nov 30/81
27-14-00		131	Feb 28/81	27-14-00		513	Nov 30/81
27-14-00		132	Sep 30/92	27-14-00		514	Nov 30/81
27-14-00		132 A	Sep 30/92	27-14-00		515	Sep 30/86
27-14-00		132 B	Sep 30/92	27-14-00		516	Nov 30/81
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27-14-00		134	Feb 28/81	27-14-00		518	Nov 30/81
27-14-00		135	Feb 28/81	27-14-00		519	Nov 30/81
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27-14-00		144	Sep 30/92	27-14-00		528	Nov 30/81
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27-14-00		510	Nov 30/81	27-14-12		610	Feb 28/81
27-14-00		511	Nov 30/81	27-14-13		301	Mar 29/96

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27-14-13		302	Mar 29/96	27-15-00		505	May 30/77
27-14-13		303	Sep 30/92				
27-14-13		304	Mar 29/96	27-16-00		1	Nov 30/76
27-14-13		305	Sep 30/92	27-16-00		2	Aug 30/76
27-14-13		401	Feb 28/81	27-16-00		3	Mar 27/97
27-14-13		402	Feb 28/81	27-16-00		4	Aug 30/76
27-14-13		403	Feb 28/81	27-16-00		5	Nov 30/76
27-14-13		404	Aug 30/76	27-16-00		6	Aug 30/76
27-14-13		405	Feb 28/81	27-16-00		7	Nov 30/76
27-14-13		501	Feb 28/81	27-16-00		8	Nov 30/76
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27-14-15		301	Mar 29/96	27-16-00		12	Nov 30/76
27-14-15		302	Mar 29/96	27-16-00		101	Feb 28/81
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27-14-15		304	Mar 29/96	27-16-00		103	Feb 28/81
27-14-15		305	Sep 30/92	27-16-00		104	Nov 30/75
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27-14-15		405	Feb 28/81	27-16-00		109	Nov 30/75
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27-14-15		501	Mar 31/00	27-16-00		111	Nov 30/75
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27-14-15		503	Mar 31/00	27-16-00		113	Nov 30/75
27-14-15		504	Mar 31/00	27-16-00		114	Nov 30/75
				27-16-00		115	Feb 28/78
27-15-00		1	Aug 30/77	27-16-00		116	Feb 28/78
27-15-00		2	May 30/77	27-16-00		117	Feb 28/78
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27-15-00		503	May 30/77	27-16-00		509	Feb 28/78
27-15-00		504	May 30/77	27-16-00		510	Feb 28/79

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27-16-00		511	Feb 28/79	27-17-00		122	May 30/77
27-16-00		512	Feb 28/79	27-17-00		123	May 30/77
27-16-00		513	Feb 28/79	27-17-00		124	May 30/77
27-16-11		401	Feb 28/81	27-17-00		125	May 30/77
27-16-11		402	Feb 28/81	27-17-00		126	May 30/77
27-16-11		403	Feb 28/81	27-17-00		127	May 30/77
27-16-11		404	Aug 30/76	27-17-00		128	May 30/77
27-16-11		405	Aug 30/76	27-17-00		129	May 30/77
27-16-11		406	Feb 28/81	27-17-00		130	May 30/77
27-16-11		601	Jun 30/75	27-17-00		131	May 30/77
				27-17-00		132	May 30/77
27-17-00		1	Nov 30/76	27-17-00		133	May 30/77
27-17-00		2	Nov 30/76	27-17-00		134	May 30/77
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27-17-00		4	Nov 30/76	27-17-00		136	May 30/77
27-17-00		5	Aug 30/76	27-17-00		137	May 30/77
27-17-00		6	Nov 30/76	27-17-00		138	May 30/77
27-17-00		7	Aug 30/76	27-17-00		139	May 30/77
27-17-00		8	Nov 30/76	27-17-00		140	May 30/77
27-17-00		9	Nov 30/76	27-17-00		141	May 30/77
27-17-00		10	Aug 30/76	27-17-00		142	May 30/77
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27-17-00		14	Aug 30/76	27-17-00		146	May 30/77
27-17-00		15	Aug 30/76	27-17-00		147	May 30/77
27-17-00		16	Aug 30/76	27-17-00		148	May 30/77
27-17-00		17	Aug 30/76	27-17-00		149	May 30/77
27-17-00		18	Aug 30/76	27-17-00		150	May 30/77
27-17-00		101	Feb 28/81	27-17-00		151	May 30/77
27-17-00		102	Feb 28/81	27-17-00		152	May 30/77
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27-17-00		120	May 30/77	27-17-00		170	May 30/77
27-17-00		121	May 30/77	27-17-00		171	May 30/77

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27-17-00		172	May 30/77	27-17-00		503	Feb 28/81
27-17-00		173	May 30/77	27-17-00		504	Feb 28/81
27-17-00		174	May 30/77	27-17-00		505	Nov 30/80
27-17-00		175	May 30/77	27-17-00		506	Feb 28/81
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27-17-00		502	Feb 28/81	27-17-00		552	Nov 30/80

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27-17-00		553	Nov 30/80	27-17-00		A503	Nov 30/80
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27-17-00		A502	Nov 30/80	27-20-00		5	Jun 30/75

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27-20-00		6	Jun 30/75	27-21-00		130	Nov 30/80
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27-20-00		101	Nov 30/75	27-21-00		402	Feb 28/81
				27-21-00		403	Feb 28/77
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27-21-00		2	Jun 30/75	27-21-00		405	Feb 28/81
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27-21-00		128	Nov 30/80	27-21-00		609	Mar 31/00
27-21-00		129	Nov 30/80	27-21-11		401	Feb 28/81

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27-21-11		402	Feb 28/81	27-21-15		403	Nov 30/75
27-21-11		403	Feb 28/81	27-21-15		404	Nov 30/75
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27-21-12		603	Aug 30/75	27-21-42		603	May 30/86
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27-21-15		402	Aug 30/75	27-21-44		409	May 30/79

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27-21-44		601	Feb 28/81	27-22-00		5	Nov 30/76
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27-21-44		604	Nov 30/80	27-22-00		8	Nov 30/76
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27-22-00		4	Nov 30/76	27-22-00		518	Mar 30/01

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27-22-00		519	Mar 30/01	27-23-11		512	Feb 28/81
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27-22-12		601	Feb 28/77	27-23-12		406	Feb 28/81
27-22-12		602	Feb 28/77	27-23-12		407	Feb 28/81
27-22-12		603	Feb 28/77				
27-22-13		401	Feb 28/81	27-24-00		1	Nov 30/76
27-22-13		402	Feb 28/81	27-24-00		2	Nov 30/76
27-22-13		403	Feb 28/81	27-24-00		3	Nov 30/76
27-22-13		404	Nov 30/80	27-24-00		4	Nov 30/76
27-22-13		405	Nov 30/80	27-24-00		5	Nov 30/76
27-22-13		406	Feb 28/81	27-24-00		6	Nov 30/76
27-22-13		407	Nov 30/80	27-24-00		7	Nov 30/79
27-22-13		408	Feb 28/81	27-24-00		8	Nov 30/76
				27-24-00		9	Nov 30/76
27-23-00		1	Aug 30/75	27-24-00		10	Nov 30/76
27-23-00		2	Aug 30/75	27-24-00		11	Nov 30/76
27-23-00		3	Aug 30/75	27-24-00		12	Jun 30/75
27-23-00		4	Aug 30/75	27-24-00		13	Nov 30/76
27-23-00		5	Aug 30/75	27-24-00		14	Nov 30/76
27-23-00		101	Feb 28/81	27-24-00		15	Nov 30/76
27-23-00		102	Feb 28/81	27-24-00		16	Jun 30/75
27-23-00		103	Feb 28/81	27-24-00		17	Nov 30/76
27-23-00		104	Nov 30/80	27-24-00		18	Nov 30/76
27-23-00		105	Nov 30/80	27-24-00		19	Nov 30/76
27-23-00		106	Nov 30/80	27-24-00		20	Nov 30/76
27-23-00		107	Nov 30/80	27-24-00		21	Nov 30/76
27-23-00		108	Nov 30/80	27-24-00		22	Nov 30/76
27-23-00		109	Nov 30/80	27-24-00		23	Nov 30/76
27-23-00		501	Feb 28/81	27-24-00		24	Nov 30/76
27-23-00		502	Feb 28/81	27-24-00		25	Nov 30/76
27-23-00		503	Feb 28/81	27-24-00		26	Nov 30/76
27-23-00		504	Nov 30/80	27-24-00		27	Nov 30/76
27-23-00		505	Nov 30/80	27-24-00		28	Nov 30/76
27-23-00		506	Nov 30/80	27-24-00		29	Nov 30/76
27-23-00		507	Nov 30/80	27-24-00		30	Nov 30/76
27-23-00		508	Nov 30/80	27-24-00		31	Nov 30/76
27-23-00		509	Nov 30/80	27-24-00		32	Nov 30/76
27-23-00		510	Nov 30/80	27-24-00		33	Nov 30/76
27-23-00		511	Feb 28/81	27-24-00		34	Nov 30/76

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27-24-00		35	Nov 30/76	27-24-12		606	Nov 30/80
27-24-00		26	Nov 30/76	27-24-12		607	Nov 30/80
27-24-00		37	Nov 30/76	27-24-12		608	Nov 30/80
27-24-00		38	Nov 30/79	27-24-12		609	Nov 30/80
27-24-00		39	Nov 30/76	27-24-12		610	Nov 30/80
27-24-00		40	Nov 30/76	27-24-13		301	Mar 29/96
27-24-00		41	Nov 30/79	27-24-13		302	Mar 29/96
27-24-00		42	Nov 30/79	27-24-13		303	Sep 30/92
27-24-00		43	Nov 30/79	27-24-13		304	Mar 29/96
27-24-00		44	Nov 30/79	27-24-13		305	Sep 30/92
27-24-00		45	Nov 30/79	27-24-13		401	Feb 28/81
27-24-00		101	Sep 30/88	27-24-13		402	Feb 28/81
27-24-00		102	May 30/79	27-24-13		403	Feb 28/81
27-24-00		501	Mar 31/00	27-24-13		404	Aug 30/76
27-24-11		301	Mar 29/96	27-24-13		405	Feb 28/81
27-24-11		302	Mar 29/96	27-24-13		501	Feb 28/81
27-24-11		303	Sep 30/92	27-24-13		502	Feb 28/81
27-24-11		304	Mar 29/96	27-24-13		503	Feb 28/81
27-24-11		305	Sep 30/92	27-24-13		504	Feb 28/81
27-24-11		401	Feb 28/81	27-24-31		401	Mar 31/00
27-24-11		402	Feb 28/81	27-24-31		402	Mar 31/00
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27-24-11		406	Feb 28/81	27-24-31		406	Nov 30/80
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27-24-11		502	Feb 28/81	27-24-31		408	Feb 28/81
27-24-11		503	Feb 28/81	27-24-31		409	Feb 28/81
27-24-11		504	Feb 28/81	27-24-31		410	Nov 30/84
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27-24-12		402	Feb 28/81	27-24-31		412	Nov 30/81
27-24-12		403	Feb 28/81	27-24-31		413	Nov 30/84
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27-24-12		405	Nov 30/76	27-24-31		415	Nov 30/81
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27-24-12		409	Nov 30/80	27-24-31		419	Sep 30/91
27-24-12		410	Mar 31/98	27-24-31		419 A	Sep 30/91
27-24-12		411	Mar 31/99	27-24-31		419 B	Sep 30/91
27-24-12		412	Mar 31/98	27-24-31		420	Sep 30/91
27-24-12		501	Feb 29/76	27-24-31		421	Nov 30/81
27-24-12		502	Feb 28/79	27-24-31		422	Nov 30/81
27-24-12		503	Feb 28/79	27-24-31		423	Nov 30/81
27-24-12		504	Feb 28/79	27-24-31		424	Mar 29/96
27-24-12		601	Feb 28/81	27-24-31		425	Nov 30/81
27-24-12		602	Feb 28/81	27-24-31		426	Nov 30/81
27-24-12		603	Feb 28/81	27-24-31		427	Mar 31/98
27-24-12		604	Feb 28/81	27-24-31		428	Mar 31/98
27-24-12		605	Nov 30/80	27-24-31		429	Mar 31/98

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27-24-31		430	Nov 30/81	27-26-00		6	Aug 30/76
27-24-31		431	Nov 30/81	27-26-00		7	Aug 30/76
27-24-31		432	Nov 30/81	27-26-00		8	Aug 30/76
27-24-31		433	Nov 30/81	27-26-00		9	Aug 30/76
27-24-31		434	Nov 30/81	27-26-00		10	Aug 30/76
27-24-31		435	Nov 30/81	27-26-00		11	Aug 30/76
27-24-31		436	Nov 30/81	27-26-00		101	Nov 30/75
27-24-31		437	Nov 30/81	27-26-00		501	May 30/76
27-24-31		438	Nov 30/81	27-26-11		401	Feb 28/81
27-24-31		439	Nov 30/81	27-26-11		402	Feb 28/81
27-24-31		440	Nov 30/81	27-26-11		403	Feb 28/81
27-24-31		441	Nov 30/81	27-26-11		404	Aug 30/75
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27-24-31		502	Feb 28/81	27-26-11		406	Feb 28/81
27-24-31		503	Feb 28/81	27-26-11		601	Jun 30/75
27-24-31		504	Feb 28/81				
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27-24-31		506	Feb 28/81	27-27-00		2	Nov 30/76
27-24-31		507	Feb 28/81	27-27-00		3	Aug 30/76
27-24-31		508	Feb 28/81	27-27-00		4	Nov 30/76
27-24-31		509	Feb 28/81	27-27-00		5	Aug 30/76
27-24-31		510	Nov 30/80	27-27-00		6	Aug 30/76
27-24-31		511	Nov 30/80	27-27-00		7	Aug 30/76
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27-24-31		602	Feb 28/81	27-27-00		9	Aug 30/76
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27-24-31		604	Feb 28/81	27-27-00		11	Aug 30/76
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27-24-31		606	Feb 28/81	27-27-00		13	Aug 30/76
27-24-31		607	Feb 28/81	27-27-00		14	Aug 30/76
27-24-31		608	Feb 28/81	27-27-00		101	Feb 28/81
27-24-31		609	Feb 28/81	27-27-00		102	Feb 28/81
27-24-31		610	Feb 28/81	27-27-00		103	Nov 30/80
27-24-31		611	Feb 28/81	27-27-00		104	Nov 30/80
				27-27-00		105	Nov 30/80
27-25-00		1	Aug 30/77	27-27-00		106	Nov 30/80
27-25-00		2	May 30/77	27-27-00		107	Nov 30/80
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27-25-00		101	Aug 30/79	27-27-00		113	Nov 30/80
27-25-00		501	May 30/77	27-27-00		114	Nov 30/80
				27-27-00		115	Nov 30/80
27-26-00		1	Aug 30/76	27-27-00		116	Nov 30/80
27-26-00		2	Aug 30/76	27-27-00		117	Nov 30/80
27-26-00		3	Aug 30/76	27-27-00		118	Nov 30/80
27-26-00		4	Aug 30/76	27-27-00		119	Nov 30/80
27-26-00		5	Aug 30/76	27-27-00		120	Nov 30/80

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27-27-00		121	Nov 30/80	27-31-00		9	Nov 30/76
27-27-00		122	Nov 30/80	27-31-00		10	Nov 30/76
27-27-00		123	Nov 30/80	27-31-00		11	Nov 30/76
27-27-00		124	Nov 30/80	27-31-00		12	Nov 30/76
27-27-00		125	Nov 30/80	27-31-00		13	Nov 30/76
27-27-00		126	Nov 30/80	27-31-00		14	Nov 30/76
27-27-00		127	Nov 30/80	27-31-00		15	Nov 30/76
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27-27-00		130	Nov 30/80	27-31-00		18	Nov 30/76
27-27-00		111	Nov 30/80	27-31-00		19	Jun 30/75
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27-27-00		134	Nov 30/80	27-31-00		22	Feb 28/77
27-27-00		135	Nov 30/80	27-31-00		23	Nov 30/76
27-27-00		136	Nov 30/80	27-31-00		24	Nov 30/76
27-27-00		137	Nov 30/80	27-31-00		25	Nov 30/76
27-27-00		138	Nov 30/80	27-31-00		101	Feb 28/81
27-27-00		139	Nov 30/80	27-31-00		102	Nov 30/80
27-27-00		140	Nov 30/80	27-31-00		103	Nov 30/80
27-27-00		141	Nov 30/80	27-31-00		104	Nov 30/80
27-27-00		142	Nov 30/80	27-31-00		105	Nov 30/80
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27-27-00		152	Nov 30/80	27-31-00		115	Nov 30/80
27-27-00		501	Nov 30/80	27-31-00		116	Nov 30/80
				27-31-00		117	Nov 30/80
27-30-00		1	Jun 30/75	27-31-00		118	Nov 30/80
27-30-00		2	Jun 30/75	27-31-00		119	Nov 30/80
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27-30-00		7	Jun 30/75	27-31-00		124	Nov 30/80
27-30-00		101	Nov 30/75	27-31-00		125	Nov 30/80
				27-31-00		126	Nov 30/80
27-31-00		1	Nov 30/76	27-31-00		127	Nov 30/80
27-31-00		2	Feb 28/77	27-31-00		128	Nov 30/80
27-31-00		3	Nov 30/76	27-31-00		129	Nov 30/80
27-31-00		5	Nov 30/76	27-31-00		130	Nov 30/80
27-31-00		6	Nov 30/76	27-31-00		131	Nov 30/80
27-31-00		7	Nov 30/76	27-31-00		132	Nov 30/80
27-31-00		8	Nov 30/76	27-31-00		133	Nov 30/80

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27-31-00		134	Nov 30/80	27-31-00		516	Aug 30/81
27-31-00		135	Nov 30/80	27-31-00		517	Aug 30/81
27-31-00		136	Nov 30/80	27-31-00		518	Aug 30/81
27-31-00		137	Nov 30/80	27-31-00		519	Aug 30/81
27-31-00		138	Nov 30/80	27-31-00		520	Aug 30/81
27-31-00		139	Nov 30/80	27-31-00		521	Aug 30/81
27-31-00		140	Nov 30/80	27-31-00		522	Aug 30/81
27-31-00		141	Nov 30/80	27-31-00		523	Aug 30/81
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27-31-00		150	Nov 30/80	27-31-00		602	Feb 28/81
27-31-00		401	Feb 28/81	27-31-00		603	Feb 28/81
27-31-00		402	Feb 28/81	27-31-00		604	May 30/76
27-31-00		403	Jun 30/75	27-31-00		605	Feb 28/81
27-31-00		404	Feb 28/81	27-31-00		606	Feb 28/81
27-31-00		405	Feb 28/81	27-31-00		607	Nov 30/80
27-31-00		406	Feb 28/81	27-31-00		608	Nov 30/80
27-31-00		407	Feb 28/77	27-31-00		609	Feb 28/81
27-31-00		408	Feb 28/81	27-31-11		401	Aug 30/81
27-31-00		409	Feb 28/77	27-31-11		402	Feb 28/81
27-31-00		410	Feb 28/77	27-31-11		403	Feb 28/81
27-31-00		411	Nov 30/80	27-31-11		404	Feb 28/81
27-31-00		412	Nov 30/80	27-31-11		405	Feb 28/81
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27-31-00		414	Feb 28/77	27-31-11		407	Feb 28/81
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27-31-00		416	Nov 30/80	27-31-11		409	Feb 28/81
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27-31-00		511	Feb 28/81	27-31-11		512	Feb 28/81
27-31-00		512	Feb 28/81	27-31-12		401	Feb 28/81
27-31-00		513	Aug 30/81	27-31-12		402	Feb 28/81
27-31-00		514	Nov 30/80	27-31-12		403	Feb 28/81
27-31-00		515	Aug 30/81	27-31-12		404	Feb 28/81

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27-31-12		405	Feb 28/81	27-31-21		401	Feb 28/81
27-31-12		406	Feb 28/81	27-31-21		402	Nov 30/80
27-31-12		407	Feb 28/81	27-31-21		403	Nov 30/80
27-31-12		408	Feb 28/81	27-31-21		404	Aug 30/78
27-31-13		401	Aug 30/76	27-31-21		405	Nov 30/80
27-31-13		402	Aug 30/76	27-31-21		501	Feb 28/81
27-31-13		403	Feb 29/76	27-31-21		502	Feb 28/81
27-31-13		601	May 30/76	27-31-21		503	Nov 30/80
27-31-13		602	May 30/76	27-31-21		504	Nov 30/80
27-31-13		603	May 30/76	27-31-21		601	Feb 28/81
27-31-13		604	May 30/76	27-31-21		602	Feb 28/81
27-31-13		605	May 30/76	27-31-21		603	Feb 28/81
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27-31-14		402	Feb 28/81	27-31-32		402	Feb 28/81
27-31-14		403	Nov 30/80	27-31-32		403	Feb 28/81
27-31-14		404	Aug 30/76	27-31-32		404	Feb 28/81
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27-31-14		406	Jun 30/75	27-31-32		406	Aug 30/76
27-31-14		407	Nov 30/80	27-31-32		407	Feb 28/81
27-31-14		601	Feb 28/81	27-31-32		408	Aug 30/76
27-31-14		602	Feb 28/81	27-31-32		409	Nov 30/77
27-31-15		401	Feb 28/81	27-31-32		410	Feb 28/81
27-31-15		402	Feb 28/81	27-31-32		411	Feb 28/81
27-31-15		403	Nov 30/80	27-31-32		412	Aug 30/76
27-31-15		404	Nov 30/80	27-31-37		401	Feb 28/81
27-31-15		405	Aug 30/76	27-31-37		402	Feb 28/81
27-31-15		406	Nov 30/75	27-31-37		403	Feb 28/81
27-31-15		407	Nov 30/80	27-31-37		404	Feb 28/81
27-31-15		408	Nov 30/75	27-31-37		405	Feb 28/81
27-31-15		409	Nov 30/80	27-31-37		406	Feb 28/81
27-31-15		410	Nov 30/80	27-31-38		401	Feb 28/81
27-31-15		601	Feb 28/81	27-31-38		402	Feb 28/81
27-31-15		602	Feb 28/81	27-31-38		403	Feb 28/81
27-31-15		603	Feb 28/81	27-31-38		404	Nov 30/80
27-31-15		604	Feb 28/81	27-31-38		405	Nov 30/80
27-31-16		401	Aug 30/76	27-31-38		406	Nov 30/80
27-31-16		402	Aug 30/76	27-31-38		407	Nov 30/80
27-31-16		403	Aug 30/75	27-31-38		408	Nov 30/80
27-31-16		404	Aug 30/76	27-31-38		409	May 30/77
27-31-17		401	Feb 28/81	27-31-38		410	May 30/77
27-31-17		402	Nov 30/80	27-31-38		411	Nov 30/80
27-31-17		403	Nov 30/80	27-31-38		412	Nov 30/80
27-31-17		404	Nov 30/80	27-31-38		413	Nov 30/80
27-31-17		405	Nov 30/80	27-31-39		401	Feb 28/81
27-31-17		406	Nov 30/80	27-31-39		402	Nov 30/80
27-31-17		407	Nov 30/80	27-31-39		403	Nov 30/80
27-31-17		601	Feb 28/81	27-31-39		404	Nov 30/80
27-31-17		602	Feb 28/81	27-31-39		405	Nov 30/80
27-31-19		401	May 30/81	27-31-41		401	Feb 28/81
27-31-19		402	May 30/81	27-31-41		402	Feb 28/81

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27-31-41		403	Feb 28/81	27-31-61		407	Aug 30/81
27-31-41		404	Nov 30/80	27-31-61		408	Aug 30/81
27-31-41		405	Nov 30/80	27-31-61		409	Aug 30/81
27-31-42		401	Feb 28/81	27-31-61		410	Aug 30/81
27-31-42		402	Feb 28/81	27-31-61		411	Mar 31/00
27-31-42		403	Feb 28/81	27-31-61		412	Mar 31/00
27-31-42		404	Nov 30/80	27-31-61		601	Feb 28/81
27-31-42		405	Feb 28/81	27-31-61		602	Feb 28/81
27-31-43		401	Feb 28/81	27-31-61		603	Feb 28/81
27-31-43		402	Nov 30/80	27-31-61		604	Aug 30/80
27-31-43		403	Nov 30/80	27-31-61		605	Feb 28/81
27-31-43		404	Nov 30/80	27-31-61		606	Nov 30/80
27-31-43		405	Nov 30/80	27-31-61		801	Aug 30/76
27-31-44		401	Mar 31/00	27-31-61		802	Aug 30/76
27-31-44		402	Mar 31/00	27-31-61		803	Nov 30/82
27-31-44		403	Feb 28/81	27-31-61		804	Nov 30/82
27-31-44		404	Sep 30/91	27-31-61		805	Aug 30/76
27-31-44		405	Sep 30/91	27-31-61		806	Aug 30/76
27-31-44		406	Feb 28/81	27-31-61		807	Aug 30/76
27-31-45		401	Feb 28/81	27-31-61		808	Aug 30/76
27-31-45		402	Feb 28/81	27-31-61		809	Aug 30/76
27-31-45		403	Feb 28/81	27-31-61		810	Aug 30/76
27-31-45		404	Nov 30/80	27-31-61		811	Aug 30/76
27-31-45		405	Feb 28/81	27-31-61		812	Aug 30/76
27-31-45		406	Nov 30/80	27-31-61		813	Sep 30/90
27-31-45		407	Feb 28/81	27-31-61		814	Aug 30/76
27-31-45		408	Feb 28/81	27-31-61		815	Aug 30/76
27-31-46		401	Feb 28/81	27-31-61		816	Aug 30/76
27-31-46		402	Feb 28/81	27-31-61		817	Aug 30/76
27-31-46		403	Feb 28/81	27-31-61		818	Aug 30/76
27-31-46		404	Nov 30/80	27-31-61		819	Aug 30/76
27-31-46		405	Feb 28/81	27-31-61		820	Aug 30/76
27-31-46		406	Feb 28/81	27-31-62		401	Feb 28/81
27-31-47		401	Feb 28/81	27-31-62		402	Feb 28/81
27-31-47		402	Feb 28/81	27-31-62		403	Mar 31/00
27-31-47		403	Feb 28/81	27-31-62		404	Mar 31/00
27-31-47		404	Feb 28/81	27-31-62		405	Mar 31/00
27-31-47		405	Aug 30/76	27-31-62		406	Mar 31/00
27-31-47		406	Feb 28/81	27-31-62		406 A	Mar 28/02
27-31-47		407	Feb 28/81	27-31-62		406 B	Sep 30/93
27-31-47		408	Feb 28/81	27-31-62		407	Aug 30/81
27-31-47		409	Feb 28/81	27-31-62		408	Aug 30/81
27-31-61		401	Feb 28/81	27-31-62		409	Aug 30/81
27-31-61		402	Feb 28/81	27-31-62		410	Aug 30/81
27-31-61		403	Mar 31/00	27-31-62		411	Mar 31/00
27-31-61		404	Mar 31/00	27-31-62		412	Mar 31/00
27-31-61		405	Sep 30/93	27-31-62		601	Feb 28/81
27-31-61		406	Sep 30/93	27-31-62		602	Feb 28/81
27-31-61		406 A	Mar 28/02	27-31-62		603	Feb 28/81
27-31-61		406 B	Sep 30/93	27-31-62		604	Aug 30/80

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27-31-62		605	Feb 28/81	27-32-00		105	Aug 30/77
27-31-62		606	Feb 28/81	27-32-00		106	Aug 30/77
27-31-62		801	Aug 30/76	27-32-00		107	Aug 30/77
27-31-62		802	Aug 30/76	27-32-00		108	Aug 30/77
27-31-62		803	Nov 30/82	27-32-00		109	Aug 30/77
27-31-62		804	Nov 30/82	27-32-00		110	Aug 30/77
27-31-62		805	Aug 30/76	27-32-00		111	Aug 30/77
27-31-62		806	Aug 30/76	27-32-00		112	Aug 30/77
27-31-62		807	Aug 30/76	27-32-00		113	Aug 30/77
27-31-62		808	Aug 30/76	27-32-00		114	Aug 30/77
27-31-62		809	Aug 30/76	27-32-00		115	Aug 30/77
27-31-62		810	Aug 30/76	27-32-00		116	Aug 30/77
27-31-62		811	Aug 30/76	27-32-00		501	Aug 30/80
27-31-62		812	Aug 30/76	27-32-00		502	Aug 30/80
27-31-62		813	Aug 30/76	27-32-00		503	Aug 30/80
27-31-62		814	Aug 30/76	27-32-00		504	Aug 30/80
27-31-62		815	Aug 30/76	27-32-00		505	Aug 30/80
27-31-62		816	Aug 30/76	27-32-00		506	Aug 30/80
27-31-62		817	Aug 30/76	27-32-00		507	Aug 30/80
27-31-62		818	Aug 30/76	27-32-00		508	Aug 30/80
27-31-62		819	Aug 30/76	27-32-00		509	Aug 30/80
27-31-62		820	Aug 30/76	27-32-00		510	Aug 30/80
27-31-62		821	Aug 30/76	27-32-00		511	Nov 30/80
				27-32-00		512	Nov 30/80
27-32-00		1	Nov 30/76	27-32-00		513	Aug 30/80
27-32-00		2	Nov 30/76	27-32-00		514	Aug 30/80
27-32-00		3	Nov 30/76	27-32-00		515	Aug 30/80
27-32-00		4	Nov 30/76	27-32-00		516	Aug 30/80
27-32-00		5	Nov 30/76	27-32-00		517	Aug 30/80
27-32-00		6	Nov 30/76	27-32-00		518	Aug 30/80
27-32-00		7	Nov 30/76	27-32-00		519	Aug 30/80
27-32-00		8	Nov 30/76	27-32-00		520	Aug 30/80
27-32-00		9	Nov 30/76	27-32-00		521	Aug 30/80
27-32-00		10	Nov 30/76	27-32-00		522	Aug 30/80
27-32-00		11	Nov 30/76	27-32-00		523	Aug 30/80
27-32-00		12	Nov 30/76	27-32-00		524	Aug 30/80
27-32-00		13	Nov 30/76	27-32-11		401	Feb 28/81
27-32-00		14	Nov 30/76	27-32-11		402	Feb 28/81
27-32-00		15	Nov 30/76	27-32-11		403	Feb 28/81
27-32-00		16	Nov 30/76	27-32-11		404	Feb 28/81
27-32-00		17	Nov 30/76	27-32-11		405	Feb 28/81
27-32-00		18	Nov 30/76	27-32-11		501	Feb 28/81
27-32-00		19	Nov 30/76	27-32-11		502	Feb 28/81
27-32-00		20	Nov 30/76	27-32-11		503	Feb 28/81
27-32-00		21	Nov 30/76	27-32-11		504	Feb 28/81
27-32-00		22	Nov 30/76	27-32-12		401	Feb 28/81
27-32-00		101	Feb 28/81	27-32-12		402	Feb 28/81
27-32-00		102	Feb 28/81	27-32-12		403	Nov 30/82
27-32-00		103	Feb 28/81	27-32-12		404	Nov 30/82
27-32-00		104	Aug 30/77	27-32-12		405	Nov 30/82

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27-32-12		601	Feb 28/77	27-33-00		511	Feb 28/81
27-32-12		602	Feb 28/77	27-33-11		401	Feb 28/81
27-32-12		603	Feb 28/77	27-33-11		402	Feb 28/81
27-32-14		401	Feb 28/81	27-33-11		403	Feb 28/81
27-32-14		402	Feb 28/81	27-33-11		404	Nov 30/80
27-32-14		403	Feb 28/81	27-33-11		405	Feb 28/81
27-32-14		404	Nov 30/76	27-33-11		406	Feb 28/81
27-32-14		405	Nov 30/76	27-33-11		407	Feb 28/81
27-32-14		406	Feb 28/81	27-33-13		401	Feb 28/81
27-32-14		407	Nov 30/80	27-33-13		402	Feb 28/81
27-32-14		408	Feb 28/81	27-33-13		403	Feb 28/81
27-32-41		401	Aug 30/77	27-33-13		404	Feb 28/81
27-32-41		402	Aug 30/77	27-33-13		405	Aug 30/76
27-32-41		403	May 30/77	27-33-13		406	Feb 28/81
27-32-41		501	Aug 30/77	27-33-13		407	Feb 28/81
27-32-41		502	Aug 30/77	27-33-13		408	Feb 28/81
27-32-41		503	Aug 30/77	27-33-13		409	Feb 28/81
27-32-44		401	Aug 30/77				
27-32-44		402	Nov 30/85	27-34-00		1	Nov 30/76
27-32-44		501	Mar 30/01	27-34-00		2	Nov 30/76
27-32-44		502	Mar 30/01	27-34-00		3	Nov 30/76
27-32-44		503	Mar 30/01	27-34-00		4	Nov 30/76
27-32-44		504	Mar 30/01	27-34-00		5	Nov 30/76
27-32-44		505	Mar 30/01	27-34-00		6	Nov 30/76
27-32-44		506	Mar 30/01	27-34-00		7	Nov 30/76
				27-34-00		8	Nov 30/76
27-33-00		1	Jun 30/75	27-34-00		9	Nov 30/76
27-33-00		2	Jun 30/75	27-34-00		10	Nov 30/76
27-33-00		3	Jun 30/75	27-34-00		11	Nov 30/76
27-33-00		4	Jun 30/75	27-34-00		12	Jun 30/75
27-33-00		5	Jun 30/75	27-34-00		13	Nov 30/76
27-33-00		101	Feb 28/81	27-34-00		14	Nov 30/76
27-33-00		102	Feb 28/81	27-34-00		15	Nov 30/76
27-33-00		103	Feb 28/81	27-34-00		16	Jun 30/75
27-33-00		104	Feb 28/81	27-34-00		17	Nov 30/76
27-33-00		105	Feb 28/81	27-34-00		18	Nov 30/76
27-33-00		106	Feb 28/81	27-34-00		19	Jun 30/75
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27-33-00		108	Feb 28/81	27-34-00		21	Nov 30/76
27-33-00		109	Feb 28/81	27-34-00		22	Nov 30/76
27-33-00		501	Feb 28/81	27-34-00		23	Nov 30/76
27-33-00		502	Feb 28/81	27-34-00		24	Nov 30/76
27-33-00		503	Feb 28/81	27-34-00		25	Nov 30/76
27-33-00		504	Nov 30/80	27-34-00		26	Nov 30/76
27-33-00		505	Nov 30/80	27-34-00		27	Nov 30/76
27-33-00		506	Nov 30/80	27-34-00		28	Nov 30/76
27-33-00		507	Nov 30/80	27-34-00		29	Nov 30/76
27-33-00		508	Nov 30/80	27-34-00		30	Nov 30/76
27-33-00		509	Nov 30/80	27-34-00		31	Nov 30/76
27-33-00		510	Feb 28/81	27-34-00		32	Nov 30/76

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27-34-00		33	Nov 30/76	27-34-14		404	Feb 28/81
27-34-00		34	Nov 30/76	27-34-14		405	Nov 30/76
27-34-00		35	Nov 30/79	27-34-14		406	Nov 30/84
27-34-00		36	Nov 30/79	27-34-14		407	Nov 30/80
27-34-00		37	Nov 30/79	27-34-14		408	Nov 30/80
27-34-00		38	Nov 30/79	27-34-14		409	Nov 30/79
27-34-00		39	Nov 30/79	27-34-14		410	Mar 31/99
27-34-00		40	Nov 30/76	27-34-14		411	Mar 31/98
27-34-00		41	Nov 30/79	27-34-14		412	Mar 31/98
27-34-00		42	Nov 30/79	27-34-14		501	Feb 28/79
27-34-00		43	Nov 30/79	27-34-14		502	Feb 28/79
27-34-00		44	Nov 30/79	27-34-14		503	Feb 28/79
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27-34-00		101	Sep 30/88	27-34-14		601	Feb 28/81
27-34-00		102	Nov 30/84	27-34-14		602	Feb 28/81
27-34-00		501	Mar 31/00	27-34-14		603	Feb 28/81
27-34-11		301	Mar 29/96	27-34-14		604	Feb 28/81
27-34-11		302	Mar 29/96	27-34-14		605	Feb 28/81
27-34-11		303	Sep 30/92	27-34-14		606	Feb 28/81
27-34-11		304	Mar 29/96	27-34-14		607	Feb 28/81
27-34-11		305	Sep 30/92	27-34-14		608	Feb 28/81
27-34-11		401	Feb 28/81	27-34-14		609	Feb 28/81
27-34-11		402	Feb 28/81	27-34-14		610	Feb 28/81
27-34-11		403	Feb 28/81	27-34-15		401	Feb 28/81
27-34-11		404	Feb 28/81	27-34-15		402	Feb 28/81
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27-34-11		501	Aug 30/80	27-34-15		405	Nov 30/80
27-34-11		502	Aug 30/80	27-34-15		501	Feb 28/81
27-34-11		503	Aug 30/80	27-34-15		502	Feb 28/81
27-34-11		504	Nov 30/80	27-34-15		503	Feb 28/81
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27-34-13		401	Feb 28/81	27-34-16		403	Sep 30/90
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27-34-13		403	Feb 28/81	27-34-16		405	Sep 30/90
27-34-13		404	Feb 28/81	27-34-51		401	Feb 28/81
27-34-13		405	Aug 30/76	27-34-51		402	Feb 28/81
27-34-13		406	Feb 28/81	27-34-51		403	Feb 28/81
27-34-13		501	Feb 28/81	27-34-51		404	Nov 30/80
27-34-13		502	Feb 28/81	27-34-51		405	Feb 28/81
27-34-13		503	Feb 28/81	27-34-51		501	Feb 28/81
27-34-13		504	Feb 28/81	27-34-51		502	Feb 28/81
27-34-14		401	Feb 28/81	27-34-51		503	Sep 30/93
27-34-14		402	Feb 28/81	27-34-51		504	Feb 28/81
27-34-14		403	Feb 28/81	27-34-52		401	Nov 30/85

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27-34-52		402	Feb 28/81	27-34-52		450	Nov 30/80
27-34-52		403	Feb 28/81	27-34-52		451	Nov 30/80
27-34-52		404	Nov 30/80	27-34-52		452	Nov 30/80
27-34-52		405	Sep 30/91	27-34-52		453	Nov 30/80
27-34-52		405 A	Sep 30/91	27-34-52		454	Nov 30/80
27-34-52		405 B	Sep 30/91	27-34-52		455	Nov 30/80
27-34-52		406	Feb 28/77	27-34-52		456	Nov 30/80
27-34-52		407	Aug 30/78	27-34-52		501	Feb 28/81
27-34-52	R	408	May 31/03	27-34-52		502	Feb 28/81
27-34-52		409	Nov 30/80	27-34-52		503	Nov 30/81
27-34-52		410	Nov 30/80	27-34-52		504	Sep 29/89
27-34-52		411	Nov 30/84	27-34-52		505	Nov 30/80
27-34-52		412	Nov 30/80	27-34-52		506	Nov 30/80
27-34-52		413	Nov 30/84	27-34-52		507	Nov 30/80
27-34-52	R	414	May 31/03	27-34-52		508	Nov 30/80
27-34-52		415	Nov 30/80	27-34-52		509	Nov 30/80
27-34-52		416	Nov 30/80	27-34-52		510	Nov 30/80
27-34-52		417	Nov 30/80	27-34-52		601	Feb 28/81
27-34-52		418	Nov 30/80	27-34-52		602	Feb 28/81
27-34-52	R	419	May 31/03	27-34-52		603	Feb 28/81
27-34-52		420	Nov 30/80	27-34-52		604	Feb 28/81
27-34-52		421	Nov 30/80	27-34-52		605	Nov 30/80
27-34-52		422	Nov 30/80	27-34-52		606	Nov 30/80
27-34-52		423	Nov 30/80	27-34-52		607	Nov 30/80
27-34-52	R	424	May 31/03	27-34-52		608	Nov 30/80
27-34-52	R	425	May 31/03	27-34-52		609	Nov 30/80
27-34-52		426	Nov 30/80	27-34-52		610	Nov 30/80
27-34-52		427	Nov 30/80	27-34-52		611	Nov 30/80
27-34-52		428	Nov 30/80	27-34-53		401	Feb 28/81
27-34-52		429	Nov 30/80	27-34-53		402	Feb 28/81
27-34-52	R	430	May 31/03	27-34-53		403	Feb 28/81
27-34-52		431	Nov 30/80	27-34-53		404	Feb 28/81
27-34-52		432	Nov 30/80	27-34-53		405	Feb 28/81
27-34-52		433	Sep 30/86	27-34-53		406	Feb 28/77
27-34-52	R	434	May 31/03	27-34-53		407	Aug 30/78
27-34-52		435	Nov 30/80	27-34-53	R	408	May 31/03
27-34-52		436	Nov 30/80	27-34-53		409	Feb 28/81
27-34-52		437	Mar 31/98	27-34-53		410	Feb 28/81
27-34-52		438	Mar 31/99	27-34-53		411	Nov 30/84
27-34-52		439	Mar 31/98	27-34-53		412	Nov 30/84
27-34-52		440	Nov 30/80	27-34-53	R	413	May 31/03
27-34-52		441	Nov 30/80	27-34-53	R	414	May 31/03
27-34-52		442	Nov 30/80	27-34-53		415	Feb 29/80
27-34-52		443	Nov 30/80	27-34-53		416	Feb 29/80
27-34-52		444	Nov 30/80	27-34-53		417	Aug 30/80
27-34-52		445	Nov 30/80	27-34-53	R	418	May 31/03
27-34-52		446	Nov 30/80	27-34-53	R	419	May 31/03
27-34-52		447	Nov 30/80	27-34-53		420	Aug 30/80
27-34-52		448	Nov 30/80	27-34-53		421	Aug 30/80
27-34-52		449	Nov 30/80	27-34-53		422	Aug 30/80

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27-34-53		423	Aug 30/80	27-34-53		605	Nov 30/80
27-34-53	R	424	May 31/03	27-34-53		606	Nov 30/80
27-34-53		425	Aug 30/80	27-34-53		607	Nov 30/80
27-34-53		426	Feb 29/80	27-34-53		608	Nov 30/80
27-34-53		427	Feb 29/80	27-34-53		609	Nov 30/80
27-34-53		428	Sep 30/91	27-34-53		610	Nov 30/80
27-34-53		428 A	Sep 30/91	27-34-53		611	Nov 30/80
27-34-53		428 B	Sep 30/91	27-34-54		401	Feb 28/81
27-34-53	R	429	May 31/03	27-34-54		402	Feb 28/81
27-34-53	R	430	May 31/03	27-34-54		403	Sep 30/90
27-34-53		431	Aug 30/80	27-34-54		404	Feb 28/81
27-34-53		432	Aug 30/80	27-34-54		405	Sep 30/90
27-34-53	R	433	May 31/03	27-34-54		501	Nov 30/81
27-34-53	R	434	May 31/03	27-34-54		502	Feb 28/81
27-34-53		435	Feb 29/80	27-34-54		503	Feb 28/81
27-34-53		436	Feb 29/80	27-34-54		504	Feb 28/81
27-34-53		437	Mar 31/98	27-34-58		401	Feb 28/81
27-34-53		438	Mar 31/98	27-34-58		402	Feb 28/81
27-34-53		439	Mar 31/98	27-34-58		403	Feb 28/81
27-34-53		440	Feb 29/80	27-34-58		404	Feb 28/81
27-34-53		441	Feb 29/80	27-34-58		501	Feb 28/81
27-34-53		442	Feb 29/80	27-34-58		502	Nov 30/80
27-34-53		443	Feb 29/80	27-34-58		503	Nov 30/80
27-34-53		444	Feb 29/80	27-34-71		401	May 30/76
27-34-53		445	Feb 29/80	27-34-71		402	May 30/76
27-34-53		446	Feb 29/80	27-34-71		501	Feb 28/81
27-34-53		447	Feb 29/80	27-34-71		502	Feb 28/81
27-34-53		448	Feb 29/80	27-34-71		503	Feb 28/81
27-34-53		449	Feb 29/80	27-34-71		504	Feb 28/81
27-34-53		450	Feb 29/80	27-34-71		505	Feb 28/81
27-34-53		451	Feb 29/80	27-34-71		506	Feb 28/81
27-34-53		452	Feb 29/80	27-34-72		401	Mar 29/96
27-34-53		453	Feb 29/80	27-34-72		402	Mar 29/96
27-34-53		454	Feb 29/80	27-34-72		403	Mar 29/96
27-34-53		455	Feb 29/80	27-34-72		501	Mar 31/00
27-34-53		456	Feb 29/80	27-34-72		502	Mar 31/00
27-34-53		501	Feb 28/81	27-34-72		503	Mar 31/00
27-34-53		502	Feb 28/81	27-34-72		504	Mar 31/00
27-34-53		503	Feb 28/81	27-34-72		505	Mar 31/00
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27-34-53		505	Nov 30/80	27-34-73		402	May 30/76
27-34-53		506	Nov 30/80	27-34-73		501	Feb 28/81
27-34-53		507	Nov 30/80	27-34-73		502	Feb 28/81
27-34-53		508	Nov 30/80	27-34-73		503	Feb 28/81
27-34-53		509	Nov 30/80	27-34-74		401	Nov 30/76
27-34-53		510	Nov 30/80	27-34-74		402	Nov 30/76
27-34-53		601	Feb 28/81	27-34-74		403	Nov 30/76
27-34-53		602	Feb 28/81	27-34-74		501	Feb 28/79
27-34-53		603	Feb 28/81	27-34-74		502	Feb 28/79
27-34-53		604	Feb 28/81				

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27-35-00		1	Aug 30/77	27-36-13		501	Feb 28/81
27-35-00		2	May 30/77	27-36-13		502	Feb 28/81
27-35-00		3	Aug 30/77	27-36-13		503	Feb 28/81
27-35-00		4	Aug 30/77	27-36-15		401	Aug 30/76
27-35-00		5	Nov 30/79	27-36-15		402	Aug 30/76
27-35-00		6	Nov 30/79	27-36-15		403	Aug 30/76
27-35-00		7	Aug 30/77	27-36-15		501	Feb 28/81
27-35-00		101	Aug 30/79	27-36-15		502	Nov 30/80
27-35-00		501	May 30/77	27-36-15		503	Nov 30/80
27-35-11		401	Feb 28/77	27-36-15		504	Nov 30/80
27-35-11		402	Mar 29/96	27-36-16		401	Feb 28/77
27-35-11		403	Feb 28/77	27-36-16		402	Feb 28/77
27-35-11		404	Mar 29/96	27-36-16		403	Feb 28/77
27-35-11		501	May 30/77	27-36-16		404	Feb 28/77
27-35-11		502	May 30/77	27-36-17		401	Feb 28/77
27-35-12		401	Feb 28/77	27-36-17		402	Feb 28/77
27-35-12		402	Mar 29/96	27-36-17		403	Feb 28/77
27-35-12		403	Feb 28/77				
27-35-12		404	Mar 29/96	27-37-00		1	Nov 30/76
27-35-12		501	Aug 30/77	27-37-00		2	Nov 30/76
27-35-12		502	May 30/77	27-37-00		3	Aug 30/76
27-35-12		503	May 30/77	27-37-00		4	Nov 30/76
				27-37-00		5	Aug 30/76
27-36-00		1	May 30/81	27-37-00		6	Nov 30/76
27-36-00		2	May 30/81	27-37-00		7	Aug 30/76
27-36-00		3	May 30/81	27-37-00		8	Nov 30/76
27-36-00		4	May 30/81	27-37-00		9	Nov 30/76
27-36-00		5	May 30/81	27-37-00		10	Aug 30/76
27-36-00		6	May 30/81	27-37-00		11	Aug 30/76
27-36-00		7	May 30/81	27-37-00		12	Aug 30/76
27-36-00		8	May 30/81	27-37-00		13	Aug 30/76
27-36-00		9	May 30/81	27-37-00		14	Aug 30/76
27-36-00		10	May 30/81	27-37-00		15	Aug 30/76
27-36-00		11	May 30/81	27-37-00		16	Aug 30/76
27-36-00		12	May 30/81	27-37-00		17	Aug 30/76
27-36-00		13	May 30/81	27-37-00		18	Aug 30/76
27-36-00		101	Nov 30/75	27-37-00		101	Feb 29/76
27-36-00		501	May 30/77	27-37-00		501	May 30/76
27-36-11		401	Feb 28/81	27-37-11		401	May 30/77
27-36-11		402	Feb 28/81	27-37-11		402	Feb 28/77
27-36-11		403	Feb 28/81	27-37-11		403	Feb 28/77
27-36-11		404	Nov 30/80	27-37-11		404	Feb 28/77
27-36-11		405	Nov 30/80	27-37-12		401	Feb 28/77
27-36-11		406	Feb 28/81	27-37-12		402	Feb 28/77
27-36-11		407	Feb 28/81	27-37-12		403	Feb 28/77
27-36-11		601	Jun 30/75	27-37-12		501	Feb 28/81
27-36-13		401	May 30/78	27-37-12		502	Feb 28/81
27-36-13		402	May 30/77	27-37-12		503	Feb 28/81
27-36-13		403	Feb 28/77				
27-36-13		404	May 30/77	27-38-00		1	Feb 28/81

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27-38-00		2	Nov 30/80	27-38-00		516	May 30/77
27-38-00		3	Nov 30/80	27-38-00		517	May 30/77
27-38-00		4	Nov 30/80	27-38-00		518	May 30/77
27-38-00		5	May 30/76	27-38-00		519	May 30/77
27-38-00		6	May 30/76	27-38-00		520	May 30/77
27-38-00		7	Aug 30/77	27-38-11		401	Nov 30/81
27-38-00		101	May 30/76	27-38-11		402	Nov 30/81
27-38-00		102	May 30/76	27-38-11		403	Nov 30/81
27-38-00		103	May 30/76	27-38-11		501	May 30/77
27-38-00		104	May 30/76				
27-38-00		105	May 30/76	27-39-00		1	May 30/81
27-38-00		106	May 30/76	27-39-00		2	May 30/77
27-38-00		107	May 30/76	27-39-00		3	May 30/76
27-38-00		108	May 30/76	27-39-00		4	May 30/76
27-38-00		109	May 30/76	27-39-00		5	May 30/77
27-38-00		110	May 30/76	27-39-00		6	May 30/77
27-38-00		111	May 30/76	27-39-00		7	May 30/77
27-38-00		112	May 30/76	27-39-00		8	May 30/77
27-38-00		113	May 30/76	27-39-00		9	May 30/76
27-38-00		114	May 30/76	27-39-00		10	May 30/76
27-38-00		115	May 30/76	27-39-00		11	Nov 30/78
27-38-00		401	May 30/76	27-39-00		12	May 30/76
27-38-00		402	May 30/76	27-39-00		13	Nov 30/78
27-38-00		403	May 30/76	27-39-00		14	Nov 30/78
27-38-00		404	May 30/76	27-39-00		15	Nov 30/78
27-38-00		405	May 30/76	27-39-00		16	Nov 30/78
27-38-00		406	May 30/76	27-39-00		17	Nov 30/78
27-38-00		407	May 30/76	27-39-00		18	Nov 30/78
27-38-00		408	May 30/76	27-39-00		19	Nov 30/78
27-38-00		409	May 30/76	27-39-00		20	Nov 30/78
27-38-00		410	May 30/76	27-39-00		21	Nov 30/78
27-38-00		411	May 30/76	27-39-00		22	Nov 30/78
27-38-00		412	May 30/76	27-39-00		23	Nov 30/78
27-38-00		413	May 30/76	27-39-00		24	Nov 30/78
27-38-00		414	May 30/76	27-39-00		25	Nov 30/78
27-38-00		501	May 30/77	27-39-00		26	Nov 30/78
27-38-00		502	May 30/77	27-39-00		27	Nov 30/78
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27-38-00		504	Aug 30/77	27-39-00		29	Nov 30/78
27-38-00		505	May 30/77	27-39-00		30	Nov 30/78
27-38-00		506	May 30/77	27-39-00		101	Feb 28/81
27-38-00		507	May 30/77	27-39-00		102	Feb 28/81
27-38-00		508	May 30/77	27-39-00		103	Feb 28/81
27-38-00		509	Aug 30/77	27-39-00		104	Nov 30/80
27-38-00		510	Aug 30/80	27-39-00		105	Nov 30/80
27-38-00		511	Nov 30/79	27-39-00		106	Nov 30/80
27-38-00		512	Nov 30/79	27-39-00		107	Nov 30/80
27-38-00		513	Nov 30/79	27-39-00		108	Nov 30/80
27-38-00		514	Nov 30/79	27-39-00		109	Nov 30/80
27-38-00		515	Nov 30/79	27-39-00		110	Nov 30/80

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27-39-00		111	Nov 30/80	27-39-00		507	May 30/77
27-39-00		112	Nov 30/80	27-39-00		508	Nov 30/79
27-39-00		113	Nov 30/80	27-39-00		509	Nov 30/79
27-39-00		114	Nov 30/80	27-39-00		510	Nov 30/79
27-39-00		115	Nov 30/80	27-39-00		511	Nov 30/79
27-39-00		116	Nov 30/80	27-39-00		512	Nov 30/79
27-39-00		117	Nov 30/80	27-39-00		513	Aug 30/78
27-39-00		118	Nov 30/80	27-39-00		514	Nov 30/79
27-39-00		119	Nov 30/80	27-39-00		515	Nov 30/79
27-39-00		120	Nov 30/80	27-39-00		516	Nov 30/79
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27-39-00		131	Nov 30/80	27-39-00		527	Nov 30/79
27-39-00		132	Nov 30/80	27-39-00		528	Aug 30/78
27-39-00		133	Nov 30/80	27-39-00		529	Aug 30/78
27-39-00		134	Nov 30/80	27-39-00		530	Aug 30/78
27-39-00		135	Nov 30/80	27-39-00		531	Aug 30/78
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27-39-00		403	Nov 30/83	27-39-00		548	Nov 30/79
27-39-00		404	Nov 30/83	27-39-00		549	Nov 30/79
27-39-00		405	Nov 30/83	27-39-00		550	Nov 30/79
27-39-00		501	Feb 28/81	27-39-00		551	Nov 30/79
27-39-00		502	Feb 28/81	27-39-00		552	Nov 30/79
27-39-00		503	Feb 28/81	27-39-00		553	Nov 30/79
27-39-00		504	Nov 30/80	27-39-00		554	Nov 30/79
27-39-00		505	Feb 28/81	27-39-00		555	Nov 30/79
27-39-00		506	Feb 28/81	27-39-00		556	Nov 30/79

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27-39-00		557	Nov 30/79	27-39-71		406	Nov 30/77
27-39-00		558	Nov 30/79	27-39-71		407	Nov 30/80
27-39-00		559	Nov 30/79	27-39-71		408	Nov 30/80
27-39-00		560	Nov 30/79	27-39-71		409	Nov 30/80
27-39-00		561	Nov 30/79	27-39-71		501	Feb 28/81
27-39-00		562	Nov 30/79	27-39-71		502	Feb 28/81
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27-39-00		564	Nov 30/79	27-39-71		504	Feb 28/81
27-39-00		565	Nov 30/79	27-39-72		401	May 30/78
27-39-00		566	Nov 30/79	27-39-72		402	May 30/78
27-39-00		567	Nov 30/79	27-39-72		403	May 30/78
27-39-00		568	Nov 30/79	27-39-72		404	May 30/78
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27-39-00		571	Nov 30/79	27-61-00		2	Jun 30/75
27-39-00		572	Nov 30/79	27-61-00		3	Jun 30/75
27-39-00		573	Nov 30/79	27-61-00		4	Jun 30/75
27-39-00		574	Nov 30/79	27-61-00		5	Jun 30/75
27-39-00		575	Nov 30/79	27-61-00		6	Jun 30/75
27-39-00		576	Nov 30/79	27-61-00		7	Jun 30/75
27-39-00		577	Nov 30/79	27-61-00		8	Feb 28/79
27-39-00		578	Nov 30/79	27-61-00		9	Jun 30/75
27-39-00		579	Feb 28/81	27-61-00		10	Jun 30/75
27-39-00		580	Feb 28/81	27-61-00		11	Nov 30/78
27-39-00		581	Nov 30/80	27-61-00		12	Nov 30/78
27-39-00		582	Feb 28/81	27-61-00		13	Nov 30/78
27-39-00		583	Nov 30/80	27-61-00		14	Nov 30/81
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27-39-00		585	Nov 30/80	27-61-00		16	Feb 28/79
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27-39-00		587	Nov 30/80	27-61-00		18	Nov 30/78
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27-39-11		401	May 30/77	27-61-00		103	May 30/79
27-39-11		402	May 30/77	27-61-00		104	May 30/79
27-39-11		403	May 30/77	27-61-00		105	Feb 28/79
27-39-11		404	May 30/77	27-61-00		106	Feb 28/79
27-39-11		501	Feb 28/81	27-61-00		107	Feb 28/79
27-39-11		502	feb 28/81	27-61-00		108	Feb 28/79
27-39-11		503	Nov 30/80	27-61-00		109	Feb 28/79
27-39-11		504	Nov 30/80	27-61-00		110	May 30/79
27-39-11		505	Nov 30/80	27-61-00		111	May 30/79
27-39-11		506	Nov 30/80	27-61-00		112	May 30/79
27-39-71		401	Nov 30/76	27-61-00		113	May 30/79
27-39-71		402	Nov 30/80	27-61-00		114	May 30/79
27-39-71		403	Nov 30/80	27-61-00		115	May 30/79
27-39-71		404	Nov 30/80	27-61-00		116	May 30/79
27-39-71		405	Nov 30/80	27-61-00		117	May 30/79

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## MAINTENANCE MANUAL

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27-61-00		118	May 30/79	27-61-00		513	Feb 29/80
27-61-00		119	May 30/79	27-61-00		514	Feb 29/80
27-61-00		120	May 30/79	27-61-00		515	Feb 29/80
27-61-00		121	May 30/79	27-61-00		516	May 30/80
27-61-00		122	May 30/79	27-61-00		517	May 30/80
27-61-00		123	May 30/79	27-61-00		518	May 30/80
27-61-00		124	May 30/79	27-61-00		519	May 30/80
27-61-00		125	May 30/79	27-61-00		520	Aug 30/80
27-61-00		126	May 30/79	27-61-00		521	May 30/80
27-61-00		127	May 30/79	27-61-00		522	May 30/80
27-61-00		128	May 30/79	27-61-00		523	May 30/80
27-61-00		129	May 30/79	27-61-00		524	May 30/80
27-61-00		130	May 30/79	27-61-00		525	May 30/80
27-61-00		131	May 30/79	27-61-00		526	May 30/80
27-61-00		132	Nov 30/79	27-61-00		527	Nov 30/84
27-61-00		133	Nov 30/79	27-61-00		528	Nov 30/81
27-61-00		134	Nov 30/79	27-61-00		529	May 30/80
27-61-00		135	Nov 30/79	27-61-00		530	Nov 30/84
27-61-00		136	May 30/79	27-61-00		531	Nov 30/84
27-61-00		137	May 30/79	27-61-00		532	May 30/80
27-61-00		301	Feb 29/76	27-61-00		533	May 30/80
27-61-00		302	Feb 29/76	27-61-00		534	May 30/80
27-61-00		303	Feb 29/76	27-61-00		535	May 30/80
27-61-00		304	Feb 29/76	27-61-00		536	May 30/80
27-61-00		401	May 30/76	27-61-00		601	Aug 30/78
27-61-00		402	May 30/76	27-61-00		602	Aug 30/78
27-61-00		403	May 30/76	27-61-00		603	Nov 30/75
27-61-00		404	May 30/76	27-61-00		604	Aug 30/78
27-61-00		405	Aug 30/77	27-61-00		605	Aug 30/78
27-61-00		406	May 30/76	27-61-11		401	May 30/80
27-61-00		407	May 30/76	27-61-11		402	May 30/80
27-61-00		408	Aug 30/77	27-61-11		403	Jun 30/75
27-61-00		409	May 30/76	27-61-11		404	May 30/77
27-61-00		410	May 30/76	27-61-11		405	Jun 30/75
27-61-00		411	Sep 30/90	27-61-11		406	May 30/80
27-61-00		412	Feb 28/78	27-61-11		407	May 30/77
27-61-00		413	May 30/76	27-61-11		408	Jun 30/75
27-61-00		414	Feb 28/78	27-61-11		409	May 30/79
27-61-00		501	Feb 29/80	27-61-11		410	May 30/79
27-61-00		502	Feb 29/80	27-61-11		411	May 30/79
27-61-00		503	Jun 30/75	27-61-11		412	May 30/79
27-61-00		504	Feb 29/80	27-61-11		413	Feb 29/80
27-61-00		505	Aug 30/75	27-61-11		414	Feb 29/80
27-61-00		506	Jun 30/75	27-61-11		415	Feb 29/80
27-61-00		507	Feb 29/80	27-61-12		401	Nov 30/77
27-61-00		508	Feb 29/80	27-61-12		402	Nov 30/77
27-61-00		509	May 30/77	27-61-12		403	Jun 30/75
27-61-00		510	Feb 29/80	27-61-12		404	Jun 30/75
27-61-00		511	Feb 29/80	27-61-12		405	Nov 30/77
27-61-00		512	Feb 29/80	27-61-12		406	Nov 30/77

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27-61-12		407	Nov 30/77	27-61-17		406	Aug 30/75
27-61-12		408	Nov 30/77	27-61-17		407	Aug 30/75
27-61-12		409	Nov 30/77	27-61-17		408	Feb 28/79
27-61-12		410	Nov 30/77	27-61-17		409	Aug 30/75
27-61-12		411	Nov 30/77	27-61-26		401	Feb 28/79
27-61-12		412	Nov 30/77	27-61-26		402	Feb 28/79
27-61-12		413	Nov 30/77	27-61-26		403	Feb 28/79
27-61-12		414	Nov 30/77	27-61-26		404	Feb 28/79
27-61-12		415	Nov 30/77	27-61-26		405	Feb 28/79
27-61-12		416	Nov 30/77	27-61-26		406	Feb 28/79
27-61-12		417	Nov 30/77	27-61-26		407	Sep 30/86
27-61-12		418	Nov 30/77	27-61-26		408	Sep 30/86
27-61-12		419	Nov 30/77	27-61-26		409	Feb 28/79
27-61-12		420	Nov 30/77	27-61-26		410	Feb 28/79
27-61-12		421	Jun 30/75	27-61-26		411	Feb 28/79
27-61-12		422	Nov 30/77	27-61-26		412	Feb 28/79
27-61-12		423	Nov 30/77	27-61-26		413	Feb 28/79
27-61-12		424	Nov 30/77	27-61-26		414	Feb 28/79
27-61-12		425	Nov 30/77	27-61-26		501	Feb 29/80
27-61-13		401	Feb 29/80	27-61-26		502	Feb 29/76
27-61-13		402	Feb 28/81	27-61-26		503	Nov 30/77
27-61-13		403	Jun 30/75	27-61-26		504	Feb 29/80
27-61-13		404	Feb 29/80	27-61-26		505	Feb 29/76
27-61-13		405	Jun 30/75	27-61-26		506	Feb 29/80
27-61-13		406	Feb 29/80	27-61-26		507	Feb 29/76
27-61-13		407	Feb 29/80	27-61-31		401	Nov 30/75
27-61-14		401	May 30/78	27-61-31		402	May 30/80
27-61-14		402	May 30/78	27-61-31		403	Nov 30/75
27-61-14		403	Jun 30/75	27-61-31		404	Nov 30/75
27-61-14		404	May 30/78	27-61-31		405	May 30/80
27-61-14		405	May 30/78	27-61-31		406	May 30/80
27-61-14		406	May 30/78	27-61-31		407	May 30/80
27-61-14		407	May 30/78	27-61-31		408	May 30/80
27-61-15		401	Feb 28/79	27-61-31		409	May 30/80
27-61-15		402	Feb 28/79	27-61-31		410	May 30/80
27-61-15		403	Feb 28/79	27-61-31		411	May 30/80
27-61-15		404	Jun 30/75	27-61-31		412	Nov 30/75
27-61-15		405	Feb 28/79	27-61-31		413	May 30/80
27-61-15		406	Feb 28/79	27-61-31		414	May 30/80
27-61-15		407	Jun 30/75	27-61-31		415	Nov 30/75
27-61-15		408	Feb 28/79	27-61-31		416	May 30/80
27-61-16		401	Feb 28/79	27-61-31		417	May 30/80
27-61-16		402	feb 28/79	27-61-31		418	Nov 30/75
27-61-16		403	Feb 28/79	27-61-31		419	May 30/80
27-61-16		404	Feb 28/79	27-61-33		401	Nov 30/79
27-61-17		401	Feb 28/79	27-61-33		402	Nov 30/79
27-61-17		402	feb 28/79	27-61-33		403	Nov 30/79
27-61-17		403	Feb 28/79	27-61-33		404	Nov 30/79
27-61-17		404	Feb 28/79	27-61-33		405	Nov 30/79
27-61-17		405	Jun 30/75	27-61-33		406	Nov 30/79

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27-61-33		407	Nov 30/75	27-62-00		12	May 30/76
27-61-33		408	Nov 30/79	27-62-00		13	May 30/76
27-61-33		409	Nov 30/75	27-62-00		14	May 30/76
27-61-33		410	Nov 30/79	27-62-00		15	May 30/76
27-61-33		411	Nov 30/79	27-62-00		16	Feb 28/77
27-61-33		412	Nov 30/79	27-62-00		17	Feb 28/77
27-61-33		413	Nov 30/79	27-62-00		18	Feb 28/77
27-61-33		414	Nov 30/79	27-62-00		19	Feb 28/77
27-61-33		415	Nov 30/79	27-62-00		401	Mar 31/00
27-61-36		401	Feb 29/76	27-62-00		402	Mar 31/00
27-61-36		402	Feb 29/76	27-62-00		403	Mar 31/00
27-61-36		403	May 30/77	27-62-00		404	Mar 31/00
27-61-36		404	Feb 29/76	27-62-00		405	Mar 31/00
27-61-36		405	Feb 29/76	27-62-00		406	Mar 31/00
27-61-37		401	May 30/78	27-62-00		501	May 30/76
27-61-37		402	May 30/78	27-62-00		502	May 30/76
27-61-37		403	May 30/78	27-62-00		503	May 30/76
27-61-37		404	May 30/78	27-62-00		504	Nov 30/81
27-61-37		405	May 30/78	27-62-00		505	May 30/76
27-61-37		406	May 30/78	27-62-00		506	Nov 30/77
27-61-37		407	May 30/78	27-62-00		507	Nov 30/77
27-61-51		401	Aug 30/80	27-62-00		508	May 30/76
27-61-51		402	Aug 30/80	27-62-00		509	May 30/76
27-61-51		403	Aug 30/80	27-62-00		510	May 30/76
27-61-51		404	Aug 30/80	27-62-00		511	Nov 30/77
27-61-51		405	Nov 30/78	27-62-00		512	Nov 30/77
27-61-51		406	Aug 30/80	27-62-00		513	Nov 30/77
27-61-51		501	Feb 29/80	27-62-00		514	Nov 30/77
27-61-51		502	Feb 29/80	27-62-00		515	Nov 30/77
27-61-51		503	Feb 29/80	27-62-11		401	May 30/78
27-61-51		504	Feb 29/80	27-62-11		402	May 30/78
27-61-51		505	Feb 29/80	27-62-11		403	Sep 30/90
27-61-51		506	Feb 29/80	27-62-11		404	May 30/78
27-61-51		507	Feb 29/80	27-62-12		401	May 30/78
27-61-53		401	May 30/79	27-62-12		402	May 30/78
27-61-53		402	May 30/79	27-62-12		403	May 30/78
27-61-53		403	May 30/79	27-62-12		404	May 30/78
27-61-53		404	May 30/79	27-62-12		405	May 30/78
				27-62-13		401	Feb 28/79
27-62-00		1	May 30/76	27-62-13		402	Feb 28/79
27-62-00		2	Feb 28/77	27-62-13		403	Jun 30/75
27-62-00		3	Feb 28/77	27-62-13		404	Feb 28/79
27-62-00		4	Feb 28/77	27-62-13		405	Feb 28/79
27-62-00		5	May 30/76	27-62-13		406	Feb 28/79
27-62-00		6	Feb 28/77	27-62-14		401	Feb 28/79
27-62-00		7	May 30/76	27-62-14		402	Feb 28/79
27-62-00		8	May 30/76	27-62-14		403	Jun 30/75
27-62-00		9	May 30/76	27-62-14		404	Feb 28/79
27-62-00		10	May 30/76	27-62-14		405	Feb 28/79
27-62-00		11	May 30/76	27-62-16		401	Feb 29/80

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27-62-16		402	May 30/80				
27-62-16		403	May 30/80				
27-62-16		404	Feb 28/79				
27-62-16		405	Feb 29/80				
27-62-16		501	Feb 28/79				
27-62-16		502	Feb 28/79				
27-62-16		503	Feb 28/79				
27-62-16		504	Feb 28/79				
27-62-16		505	Feb 28/79				
27-62-16		506	Feb 28/79				
27-62-17		401	May 30/76				
27-62-17		402	Nov 30/77				
27-62-17		403	Nov 30/77				
27-62-17		404	May 30/76				
27-62-17		405	May 30/76				
27-62-17		406	May 30/76				
27-62-17		407	May 30/76				
27-62-17		408	May 30/76				
27-62-17		409	May 30/76				
27-62-17		410	May 30/76				
27-62-17		411	May 30/76				
27-62-17		412	May 30/76				
27-62-17		413	Nov 30/81				
27-62-18		401	Mar 31/00				
27-62-18		402	Mar 31/00				
27-62-18		403	Mar 31/00				
27-62-18		404	Mar 31/00				
27-62-19		401	Feb 28/77				
27-62-19		402	Feb 28/77				
27-62-19		403	Feb 28/77				
27-62-19		404	Feb 28/77				
27-62-19		405	Feb 28/77				
27-62-19		406	Feb 28/77				
27-62-19		407	Feb 28/77				
27-62-21		401	Nov 30/77				
27-62-21		402	Nov 30/77				
27-62-21		403	Nov 30/77				
27-62-21		404	Nov 30/77				
27-62-21		405	Nov 30/77				
27-62-22		401	Feb 28/79				
27-62-22		402	Feb 28/79				
27-62-22		403	Aug 30/75				
27-62-22		404	Feb 28/79				
27-62-22		601	Feb 28/79				
27-62-22		602	Aug 30/75				

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### SERVICE BULLETIN LIST

In the following service bulletin list, SB indicates an aircraft manufacturers bulletin, AEB indicates an airline engineering bulletin and OL indicates an engine manufacturers bulletin (complete identification OL.593-XX-XXX).

*				*
*	R	INC.		*
*SB/AEB NO	E	IN	DESCRIPTION	*
*	V	REVISION		*
*				*
-----				
SB 27-001			No effect Flight controls -To change the build material of the power flight control unit resolver box housings.	
SB 27-002		May 30/76	Embodied	
SB 27-002	01	Nov 30/76	Embodied	
SB 27-003			No effect Flight controls -Protection of static monitoring change-over unit in case of bus-bar failure.	
SB 27-003	01		No effect Flight controls -Protection of static monitoring change-over unit in case of bus-bar failure.	
SB 27-004		Nov 30/76	Embodied Flight controls -Relay jack and power flight control unit electro valves with increased bias.	
SB 27-004	01		No effect Flight controls - Relay jack and power flight control unit electro valves with increased bias (Dowty Boulton Paul Service Bulletins P286-27-003, P285-27-003, P287-27-003 and P289-27-002)	
SB 27-004	02		No effect Flight controls -Relay jack and power flight control unit electro valves with increased bias (Dowty Boulton Paul Service Bulletins P286-27-003, P285-27-003, P287-27-003 and P289-27-002)	
SB 27-005			Not applicable	
SB 27-006			Embodied Flight controls -Drainage of flight control bellcrank assemblies at ribs 3 and 9.	
SB 27-006	01		No effect Flight controls -Drainage of flight control bellcrank assemblies at ribs 3 and 9.	
SB 27-006	02		No effect Flight controls -Drainage of flight control	

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### SERVICE BULLETIN LIST

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\* \* \* \* \*  
\* SB/AEB NO R E INC. DESCRIPTION \*  
\* V IN \*  
\* REVISION \*  
\* \* \* \* \*

SB 27-007 bellcrank assemblies at ribs 3 and 9.  
No effect  
Flight controls -Modification to the S.F.C. computers to preclude inadvertent disconnection of the autostabs.

SB 27-008 Nov 30/76 Embodied  
Flight controls -Deletion of S.F.C. inhibition on the ground below 60 kts.

SB 27-008 01 No effect  
Flight controls -Deletion of S.F.C. inhibition on the ground below 60 kts.

SB 27-009 No effect  
Flight controls -Actuator rod attachment bolts on elevons

SB 27-009 01 No effect  
Flight controls -Actuator rod attachment bolts on elevons

SB 27-010 No effect  
Flight controls. To replace "Honeywell" microswitches by "Crouzet" microswitches on the servo-control H.P. switches.

SB 27-010 01 No effect  
Flight controls. To replace "Honeywell" microswitches by "Crouzet" microswitches on the servo-control H.P. switches.

SB 27-010 02 No effect  
Flight Controls - To replace "Honeywell" microswitches by "Crouzet" microswitches on the servocontrol H.P. switches

R SB 27-010 03 No effect  
Flight Controls - To replace "Honeywell" microswitches by "Crouzet" microswitches on the servocontrol H.P. switches

SB 27-011 Nov 30/76 Embodied  
Flight controls. Reversed installation of bolt attaching the inner PFCU to the front spring rod.

SB 27-011 01 No effect  
Flight controls. Reversed installation of bolt attaching the inner PFCU to the front spring rod.

SB 27-012 No effect  
Flight controls -Artificial feel jack  
electrovalves replacement of brazed sleeves

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### SERVICE BULLETIN LIST

*					*
*	R	INC.			*
*SB/AEB NO	E	IN		DESCRIPTION	*
*	V	REVISION			*
*					*

SB 27-012	01		by integrally built sleeves No effect Flight controls -Artificial feel jack electrovalves replacement of brazed sleeves by integrally built sleeves
SB 27-012	02		No effect Flight controls -Artificial feel jack electrovalves replacement of brazed sleeves by integrally built sleeves
SB 27-013			No effect Flight controls -Rib9, RH side -To intro- duce a lock-plate to locate union on blue return line to elevon servo-control
SB 27-014			Embodied Flight controls -Emergency flight con- trol force detectors replacement of bonded washer by shouldered bush or installation of a long bodied type force detector
SB 27-015			No effect Flight controls -Inspection of power flight control unit fail safe components
SB 27-015	01		No effect Flight controls -Inspection of power flight control unit fail safe components
SB 27-015	02		No effect Flight Controls - Inspection of Power Light Control Unit fail safe components
SB 27-015	03		No effect Flight controls -Inspection of power flight control unit fail safe components
SB 27-015	04		No effect Flight controls -Inspection of power flight control unit fail safe components
SB 27-016			No effect Flight controls -Increase time delay of pitch artificial feel monitoring
R SB 27-016	01		No effect Flight controls -Increase time delay of pitch artificial feel monitoring
SB 27-017		May 30/77	Embodied
SB 27-018			Embodied Flight controls -Check of servo control shuttle valves for transfer of hydraulic
SB 27-018	01		No effect

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### SERVICE BULLETIN LIST

-----				
*				*
*	R	INC.		*
*SB/AEB NO	E	IN	DESCRIPTION	*
*	V	REVISION		*
-----				*
			Flight controls -Check of servo control shuttle valves for transfer of hydraulic fluid from one system to another	
SB 27-018	02		No effect	
			Flight controls -Check of servo control shuttle valves for transfer of hydraulic fluid from one system to another	
SB 27-019			Not applicable	
SB 27-019	01		Not applicable	
SB 27-020			No effect	
			Flight controls -Pitch and Roll jam detection struts -To change type of cable used on microswitches	
SB 27-020	01		No effect	
			Flight Controls. Pitch and Roll Jam Detection Struts - To change type of cable used on microswitches	
SB 27-021			No effect	
			Flight controls - Modify feedback lever and power flight controls unit shuttle valve body	
			(DOWTY BOULTON PAUL SB's P285-27-004 & -008, P286-27-004 & -008, P287-27-004)	
SB 27-021	01		No effect	
			Flight controls - Modify feedback lever and power flight controls unit shuttle valve body	
			(DOWTY BOULTON PAUL SB's P285-27-004 & -008, P286-27-004 & -008, P287-27-004)	
SB 27-021	02		No effect	
			Flight controls - Modify feedback lever and power flight controls unit shuttle valve body	
			(DOWTY BOULTON PAUL SB's P285-27-004 & -008, P286-27-004 & -008, P287-27-004)	
SB 27-021	03		No effect	
			Flight controls - Modify feedback lever and power flight control unit shuttle valve body	
SB 27-022			No effect	
			Flight Controls - Elevon Servo Control - To simplify removal of the input linkage	
SB 27-023			No effect	
			Flight controls -Yaw mechanical control	

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### SERVICE BULLETIN LIST

*					*
*		R	INC.		*
*SB/AEB NO	E		IN	DESCRIPTION	*
*	V	REVISION			*
*					*

between relay jack and PFCU -Revised  
scheduled maintenance requirement

SB 27-024 Not applicable

SB 27-025 Not applicable

SB 27-026 No effect

Flight controls -Upper rudder PFCU, lower  
rudder PFCU, LH outboard elevon PFCU, RH  
outboard elevon PFCU, LH middle elevon  
PFCU, RH middle elevon PFCU, LH inboard  
elevon PFCU, RH inboard elevon PFCU

SB 27-027 May 30/77 Embodied

SB 27-028 No effect

Flight controls -Modify flight controls  
hydraulic system to avoid fluid transfer at  
servo controls

SB 27-028 01 No effect

Flight controls - Modify flight controls  
hydraulic system to avoid fluid transfer  
at servo controls.

SB 27-028 02 No effect

Flight Controls - Modify flight controls  
hydraulic system to avoid fluid transfer  
at servo controls

SB 27-029 Nov 30/78 Embodied

Flight controls. Droop nose. To introduce  
a new standard of position indicator unit  
and fitment of strut catcher

SB 27-029 01 Applicable

Flight controls. Droop nose. To introduce  
a new standard of position indicator unit  
and fitment of strut catcher

SB 27-029 02 Nov 30/79 Embodied

Flight controls. Droop nose. To introduce  
a new standard of position indicator unit  
and fitment of strut catcher

SB 27-030 Aug 30/78 Embodied

Flight Controls. Safety Flight Control Sys-  
tem - To introduce a new design retaining  
plate for the frangible cover on pilots  
handwheel

SB 27-031 Not applicable

SB 27-032 No effect

Flight controls - Modify relay jack by-  
pass valves

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-----				
*				*
*	R	INC.		*
*SB/AEB NO	E	IN	DESCRIPTION	*
*	V	REVISION		*
-----				*
SB 27-032	01		(DOWTY BOULTON PAUL SB P289-27-004) No effect Flight controls - Modify relay jack by-pass valves	
SB 27-033			(DOWTY BOULTON PAUL SB P289-27-004) No effect Flight Controls - Reduce Leakage rate of leakage indicator orifice on Servo Control Electrovalve Motor Cap	
SB 27-033	01		No effect Flight Controls - Reduce Leakage rate of leakage indicator orifice on Servo Control Electrovalve Motor Cap	
SB 27-034			No effect Flight Controls - Improve insulation between electrical circuits in PFCU Hydraulic Supply Selector Unit	
SB 27-035			No effect Flight Controls - To introduce a fourth retention point at rudder PFCU input lock assy/centre body joint	
SB 27-035	01		No effect Flight Controls - To introduce a fourth retention point at rudder PFCU input lock assy/centre body joint	
SB 27-035	02		No effect Flight Controls - To introduce a fourth retention point at rudder PFCU input lock assy/centre body joint	
SB 27-036		Feb 28/79	Embodied Flight Controls - Add retaining plate over threaded plugs at end of Relay Jack input lever lock mechanism piston sleeves	
SB 27-036	01		No effect Flight Controls - Add retaining plate over threaded plugs at end of Relay Jack input lever lock mechanism piston sleeves	
SB 27-036	02		Embodied Flight Controls - Add retaining plate over threaded plugs at end of Relay Jack input lever lock mechanism piston sleeves	
SB 27-037			No effect Flight Controls - PFCU Sampling	
SB 27-037	01		No effect	

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*				*
*SB/AEB	R	INC.		*
NO	E	IN	DESCRIPTION	*
*	V	REVISION		*
-----				*
SB 27-038			Flight Controls - PFCU Sampling No effect	
SB 27-038	01		Flight Controls - Reinforce shaft connecting failsafe slider assembly to centre body on elevon and rudder PFCU's No effect	
SB 27-038	02		Flight Controls - Reinforce shaft connecting failsafe slider assembly to centre body on elevon and rudder PFCU's No effect	
SB 27-039			Flight Controls - Reinforce shaft connecting failsafe slider assembly to centre body on elevon and rudder PFCU's No effect	
SB 27-040			Flight Controls - Standardization of elevon PFCU telescopic tube antirotation pegs No effect	
SB 27-040	01		Flight Controls. Servo control - Inspec- tion for detection of cracks on various critical components. No effect	
SB 27-040	02		Flight Controls. Servo control - Inspec- tion for detection of cracks on various critical components. No effect	
SB 27-041			Flight Controls. Servo control - Inspec- tion for detection of cracks on various critical components. Embodied	
SB 27-041	01		Flight Controls - Inspect for hydraulic fluid transfer due to cracks at servo controls. Embodied	
SB 27-042		Nov 30/79	Flight Controls - Inspect for hydraulic fluid transfer due to cracks at servo controls. Embodied	
SB 27-042	01		Flight Controls - Modify PFCU hydraulic supply selector unit Logic to prevent transient pressure loss on servo controls in the event of fluid transfer Embodied	
			Flight Controls - Modify PFCU hydraulic supply selector unit Logic to prevent	

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<hr/>					
				transient pressure loss on servo controls in the event of fluid transfer	
SB 27-042	02	May 30/79	Embodied		
			Flight Controls - Modify PFCU hydraulic supply selector unit Logic to prevent transient pressure loss on servo controls in the event of fluid transfer		
SB 27-042	03		No effect		
			Flight Controls - Modify PFCU hydraulic supply selector unit Logic to prevent transient pressure loss on servo controls in the event of fluid transfer		
SB 27-043			No effect		
			Flight Controls - Improve maintenance of hydraulic supply selector unit by segregating supply of relays K14 and K15 from that of JAM and LOW pressure caption lights		
SB 27-044			No effect		
			Flight Controls - Incorporate a non return valve in PFCU standby selector valve		
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			Flight Controls - Incorporate a non return valve in PFCU standby selector valve		
SB 27-044	02		No effect		
			Flight Controls - Incorporate a non return valve in PFCU standby selector valve		
SB 27-045			Not applicable		
SB 27-047			No effect		
			Flight Controls - PFCU Seals		
SB 27-048			No effect		
			Flight Controls - Introduce new seals on Dowty Boulton Paul servo control actuators		
SB 27A002			Embodied		
			Flight Controls - Relay jack and power flight control unit electro valves		
SB 27A002	01		Embodied		
			Flight Controls - Relay jack and power flight control unit electro valves		
SB 27A002	02		Embodied		
			Flight Controls - Relay jack and power flight control unit electro valves		

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*					*
*	R	INC.			*
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*	V	REVISION			*
*					*
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	SB 27A017			Embodied	
				Flight Controls - Replacement of frangible guard cover on Captain's handwheel	
	SB 27A017	01		No effect	
				Flight Controls - Replacement of frangible guard cover on Captain's handwheel	
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				Flight Controls - Replacement of frangible guard cover on Captain's handwheel	
	SB 27A027			Embodied	
				Flight Controls - Droop nose position transmitter	
	SB 27A046			No effect	
				Flight Controls - Droop nose position transmitter	
R	SB27A053			Embodied	
R				Flight Controls - Artificial feel jack	
R				electro-valve test	
R	SB27A053	01 Mar 29/96		Embodied	
R				Flight Controls - Artificial feel jack	
R				electro-valve test	
	SB 32-001	Feb 29/76		Embodied	
				Landing gear - Modification to ground safety system for the nose landing gear telescopic strut	
	SB 33-024	Nov 30/79		Embodied	
				Lights. Filament test (Roof panel) - Improved circuit isolation	
	SB 55-002	May 30/78		Embodied	
				Stabilizers. Vertical stabilizer - Rudder and elevons - To reduce aerodynamic drag of stabilizers under supersonic flight conditions	

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### CHAPTER 27

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	Close-Up			114	ALL
	Adjustment/Test			501	ALL
	General			501	ALL
R	Operational Test			502	ALL
R	Functional Test, using Equipment			511	ALL
	TE3098000				
R	Functional Test, Without Equipment			517	ALL
	TE3098000				
	YAW DEFLECTION SENSOR	27-22-11			
	Removal/Installation			401	ALL
	General			401	ALL
	Yaw Deflection Sensor			401	ALL
	SPRING ROD	27-22-12			
	Removal/Installation			401	ALL
	General			401	ALL
	Spring Rod			401	ALL
	Inspection/Check			601	ALL
	General			601	ALL
	Spring Rod			601	ALL
	ARTIFICIAL FEEL JACK ROCKER ARM	27-22-13			
	Removal/Installation			401	ALL
	General			401	ALL
	Artificial Feel Jack Rocker Arm			401	ALL
	TRIM CONTROL	27-23-00			
	Description and Operation			1	ALL
	General			1	ALL
	Functional Description			3	ALL
	Trouble Shooting			101	ALL
	General			101	ALL
	Yaw Trim			101	ALL
	Adjustment/Test			501	ALL
	Operational Test			501	ALL
	System Test			504	ALL
	System Load Application Test			510	ALL
	TRIM GEARBOX ASSEMBLY IN CENTRE CONSOLE	27-23-11			
	Removal/Installation			401	ALL
	General			401	ALL
	Gearbox Assy in Centre Console			401	ALL
	INTEGRAL TRIM ASSEMBLY	27-23-12			
	Removal/Installation			401	ALL
	General			401	ALL
	Integral Trim Assembly			401	ALL

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General			1	ALL
Selector Valves - PFCU Electro			3	ALL
Hydraulic				
Selector Valves - Relay Jack			7	ALL
Electro-Hydraulic				
Valve - Pressure Maintaining			9	ALL
Jack - Artificial Feel			11	ALL
Relay Jack (RJ)			15	ALL
Power Flight Control Unit (PFCU)			21	ALL
Monitoring and Indicating			27	ALL
Operation			30	ALL
Electrical Power Supply			44	ALL
Trouble Shooting			101	ALL
General			101	ALL
Procedures (BA - Mod 27C083)			101	ALL
Adjustment/Test			501	ALL
General			501	ALL
ARTIFICIAL FEEL JACK (GREEN, YAW)	27-24-11			
Servicing			301	ALL
General			301	ALL
De-activation of Artificial Feel Jack			301	ALL
(Green)				
Removal/Installation			401	ALL
General			401	ALL
Artificial Feel jack - Green System			401	ALL
Adjustment/Test			501	ALL
General			501	ALL
Test			501	ALL
RELAY JACK	27-24-12			
Removal/Installation			401	ALL
General			401	ALL
Relay Jack Removal			401	ALL
Green or Blue Electrovalve Removal			409	ALL
Adjustment/Test			501	ALL
Functional Test of Jamming			501	ALL
Microswitches				
Inspection/check			601	ALL
General			601	ALL
Relay Jack External Hydraulic Leakage			601	ALL
Internal Hydraulic Leakage Between			603	ALL
Relay Jack Chambers				
Permissible Load Applied to End of			605	ALL
Relay Jack Input Lever				
Visual Check of Relay jacks			607	ALL
Check of Relay Jack Locking Mechanism			610	ALL
Safety Springbox				

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General			301	ALL
De-activation of Artificial Feel Jack (Blue)			301	ALL
Removal/Installation			401	ALL
General			401	ALL
Artificial Feel Jack - Blue System			401	ALL
Adjustment/Test			501	ALL
General			501	ALL
RUDDER POWER FLIGHT CONTROL UNIT	27-24-31			
Removal/Installation			401	ALL
General			401	ALL
Power Flight Control Unit Removal with Test Set TE3016000			401	ALL
Power Flight Control Unit Removal without Test Set TE3016000			417	ALL
Green or Blue Electrovalve Removal			425	ALL
Synchro Pack Removal			430	ALL
Resolver Feedback Linkage Removal			431	ALL
Removal of Shuttle Valve Assembly			436	ALL
Adjustment/Test			501	ALL
General			501	ALL
Operational Test			501	ALL
Jamming Microswitch Functional Test			506	ALL
Inspection/Check			601	ALL
General			601	ALL
PFCU External Hydraulic Leakage			601	ALL
Internal Hydraulic Leakage Between Chambers of PFCUs			603	ALL
Permissible Loads Applied to End of PFCU Input Lever			605	ALL
Visual Check of PFCU			607	ALL
26V, 1800 Hz GENERATION	27-25-00			
Description and Operation			1	ALL
General			1	ALL
Description			1	ALL
Static Inverters			1	ALL
Protection Units			3	ALL
Control Unit			3	ALL
Operation			4	ALL
Electrical Power Supply			7	ALL
Trouble Shooting			101	ALL
General			101	ALL
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General			1	ALL
Description			4	ALL
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CT Receiver Resolvers on Servo-Controls			8	ALL
Amplifiers			8	ALL
Panel - PFCU Control and Monitoring (Flight Control Unit)			8	ALL
Indicator - Flight Control Surface Position (ICOVOL Indicator)			9	ALL
Electrical Supply			11	ALL
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General			101	ALL
Adjustment/Test			501	ALL
General			501	ALL
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General			401	ALL
Synchro Pack			401	ALL
Inspection/Check			601	ALL
General			601	ALL
Synchro Pack			601	ALL
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General			1	ALL
Description			4	ALL
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General			101	ALL
Prepare			102	ALL
Trouble Shooting			103	ALL
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General			501	ALL
<b>PITCH CONTROL</b>	<b>27-30-00</b>			
Description and Operation			1	ALL
General			1	ALL
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Description			1	ALL
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Cable Tension Regulator			8	ALL
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Operation of Each Control Section			21	ALL
Operation			24	ALL
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General			101	ALL
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Trouble Shooting, Downstream of the			108	ALL
Relay Jack				
Control Surfaces (Elevons) do not			125	ALL
return to Neutral				
Removal/Installation			401	ALL
General			401	ALL
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System Test			524	ALL
Neutral Tolerance (dead play) Test			527	ALL
Inspection/Check			601	ALL
General			601	ALL
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CONTROL COLUMN - LH/RH	27-31-11			
Removal/Installation			401	ALL
General			401	ALL
Control Column - LH/RH			401	ALL
Adjustment/Test			501	ALL
General			501	ALL
TORQUE TUBES - (CAPTAIN AND FIRST OFFICER)	27-31-12			
Removal/Installation			401	ALL
General			401	ALL
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SHOCK ABSORBER ASSEMBLY (PITCH)	27-31-13			
Removal/Installation			401	ALL
General			401	ALL
Pitch Shock Absorber Assembly			401	ALL
Inspection/Check			601	ALL
General			601	ALL
Shock Absorber Level Check			601	ALL
Shock Absorber Inspection/Check			603	ALL

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Load Limiting Mechanism			401	ALL
Inspection/Check			601	ALL
General			601	ALL
Load Limiting Mechanism			601	ALL
CABLE TENSION REGULATOR	27-31-15			
Removal/Installation			401	ALL
General			401	ALL
Cable Tension Regulator			401	ALL
Inspection/Check			601	ALL
General			601	ALL
Cable Tension Regulator			601	ALL
SHOCK ABSORBER LEVER	27-31-16			
Removal/Installation			401	ALL
General			401	ALL
Shock Absorber Lever			401	ALL
AUTO PILOT FORCE LIMITER	27-31-17			
Removal/Installation			401	ALL
General			401	ALL
Auto Pilot Force Limiter			401	ALL
Inspection/Check			601	ALL
General			601	ALL
AP Force Limiter			601	ALL
SPRING POT ASSEMBLY - ELEVON DEFLECTION LIMITING	27-31-19			
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General			401	ALL
Jam Detection Strut			401	ALL
Adjustment/Test			501	ALL
General			501	ALL
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Inspection/Check			601	ALL
General			601	ALL
Jam Detection Strut			601	ALL
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General			401	ALL
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CONTROL ROD AND BELLCRANK AT WING RIB24	27-31-38			
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General			401	ALL
Control Rod and Bellcrank at Wing RIB24			401	all
CONTROL ROD AND IDLER ARM AT WING RIB22	27-31-39			
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General			401	ALL
Control Rod and Bellcrank at Wing RIB22			401	ALL
CONTROL ROD AND BELLCRANK AT WING RIB19	27-31-41			
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General			401	ALL
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CONTROL ROD AND BELLCRANK AT WING RIB15	27-31-42			
Removal/Installation			401	ALL
General			401	ALL
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General			401	ALL
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CONTROL ROD AND BELLCRANK AT WING RIB9	27-31-44			
Removal/Installation			401	ALL
General			401	ALL
Control Rod and Bellcrank at Wing Rib 9			401	ALL
CONTROL ROD AND BELLCRANK AT WING RIB6	27-31-45			
Removal/Installation			401	ALL
General			401	ALL
Control Rod and Bellcrank at Wing RIB 6			401	ALL
CONTROL ROD AND BELLCRANK AT WING RIB3	27-31-46			
Removal/Installation			401	ALL
General			401	ALL
Control Rod and Bellcrank at Wing Rib 3			401	ALL
BULKHEAD PRESSURE SEAL CONNECTION	27-31-47			
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General			401	ALL
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ELEVONS 1, 2 AND 3, 4	27-31-62			
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Approved Repairs			801	ALL
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ARTIFICIAL FEEL	27-32-00			
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General			1	ALL
Description			2	ALL
Assembly - Integral Trim			5	ALL
Spring Rod			5	ALL
Jack - Artificial Feel			5	ALL
Computers - Artificial Feel			8	ALL
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Electronic Operation			13	ALL
Controls and Indicating			21	ALL
Electrical Supply			22	ALL
Trouble Shooting			101	ALL
General			101	ALL
Prepare			102	ALL
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Adjustment/Test			501	ALL
General			502	ALL
Operational Test			502	ALL
Function Test Using Equipment			513	ALL
TE3098000				
Function Test Without Equipment			519	ALL
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TRIM DEFLECTION SENSOR	27-32-11			
Removal/Installation			401	ALL
General			401	ALL
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Adjustment/Test			501	ALL
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Test			501	ALL

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Spring Rod			601	ALL
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General			401	ALL
Artificial Feel Jack Rocker Arm			401	ALL
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General			401	ALL
Engage Switch Unit			401	ALL
Adjustment/Test			501	ALL
General			501	ALL
Test			501	ALL
COMPUTER	27-32-44			
Removal/Installation			401	ALL
General			401	ALL
Artificial Feel Computer			401	ALL
Adjustment/Test			501	ALL
General			501	ALL
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Description and Operation			1	ALL
General			1	ALL
Operation			3	ALL
Trouble Shooting			101	ALL
General			101	ALL
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Operational Test			501	ALL
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INTEGRAL TRIM ASSEMBLY	27-33-13			
Removal/Installation			401	ALL
General			401	ALL
Integral Trim Assembly			401	ALL

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General			1	ALL
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Selector Valve - Relay Jack			7	ALL
Electro-Hydraulic				
Valve - Pressure Maintaining			9	ALL
Jack - Artificial Feel;			11	ALL
Relay Jack (RJ)			15	ALL
Power Flight Control Unit 9PFCU)			21	ALL
Monitoring and Indicating			27	ALL
Operation			30	ALL
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General			101	ALL
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Adjustment/Test			501	ALL
ARTIFICIAL FEEL JACK (BLUE, PITCH)	27-34-11			
Servicing			301	ALL
General			301	ALL
De-activation of Artificial Feel Jack			301	ALL
(Blue)				
Removal/Installation			401	ALL
General			401	ALL
Artificial Feel Jack - Blue System			401	ALL
Adjustment/Test			501	ALL
General			502	ALL
Test			502	ALL
ARTIFICIAL FEEL JACK (GREEN, PITCH)	27-34-13			
Servicing			301	ALL
General			301	ALL
De-activation of Artificial Feel Jack			301	ALL
(Green)				
Removal/Installation			401	ALL
General			401	ALL
Artificial Feel Jack - Green System			401	ALL
Adjustment/Test			501	ALL
General			501	ALL
Test			501	ALL
RELAY JACK	27-34-14			
Removal/Installation			401	ALL
General			401	ALL
Relay Jack Removal			401	ALL
Green or Blue Electrovalve Removal			409	ALL
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Functional Test of Jamming			501	ALL
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Relay Jack Chambers				
Permissible Load Applied to End of			605	ALL
Relay Jack Input Lever				
Visual Check of Relay Jacks			607	ALL
Check of Relay Jack Locking Mechanism			610	ALL
Safety Springbox				
RELAY JACK SELECTOR VALVE	27-34-15			
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General			401	ALL
Relay Jack Selector Valve			401	ALL
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General			501	ALL
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General			401	ALL
Removal of Power Flight Control Unit,			401	ALL
Set in Electrical Mode				
Removal of Power Flight Control Unit			415	ALL
(Set in Mechanical Mode with Test Set				
TE3016000)				
Power Flight Control Unit Removal/			426	ALL
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Green or Blue Electrovalve Removal			435	ALL
Synchro Pack Removal			440	ALL
Resolver Feedback Linkage Removal			446	ALL
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Operational Test			501	ALL
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PFCU External Hydraulic Leakage			601	ALL
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Permissible loads applied to end of			605	ALL
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General			401	ALL
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(Set in Mechanical Mode With Test Set				
TE3016000)				
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Green or Blue Electrovalve Removal			435	ALL
Synchro Pack Removal			440	ALL
Resolver Feedback Linkage Removal			446	ALL
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PFCU External Hydraulic Leakage			601	ALL
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UNIT)				
Removal/Installation			401	ALL
General			401	ALL
Selector Unit			401	ALL
Adjustment/Test			501	ALL
Operational Test			501	ALL
RELAY JACK HYDRAULIC SUPPLY SELECTOR	27-34-72			
UNIT				
Removal/Installation			401	ALL
General			401	ALL
Relay Jack Hydraulic Supply			401	ALL
Selector Unit				
Adjustment/Test			501	ALL
General			501	ALL
Operational Test			501	ALL
RELAY JACK SWITCH	27-34-73			
Removal/Installation			401	ALL
General			401	ALL
Relay Jack Switch			401	ALL
Adjustment/Test			501	ALL
General			501	ALL
Operational Test			501	ALL
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General			401	ALL
Relay Jack Jamming Caption Lights			401	ALL
Adjustment/Test			501	ALL
General			501	ALL
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26V, 1800 Hz GENERATION	27-35-00			
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Description			1	ALL
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General			401	ALL
Static Inverter			401	ALL
Adjustment/Test			501	ALL
General			501	ALL
Test			501	ALL
INVERTER PROTECTION UNIT	27-35-12			
Removal/Installation			401	ALL
General			401	ALL
Inverter Protection Unit			401	ALL
Adjustment/Test			501	ALL
General			501	ALL
Test			501	ALL
ELECTRICAL CONTROL CHANNELS	27-36-00			
Description and Operation			1	ALL
General			1	ALL
Description			3	ALL
Synchro Pack - Pitch			5	ALL
CT Resolvers on PFCU's			7	ALL
Amplifiers			7	ALL
Computers - Neutralization			7	ALL
Panel - PFCU Control and Monitoring			9	ALL
(Flight Control Unit)				
Indicator - Flight Control Surface			10	ALL
Position (ICOVOL)				
Electrical Power Supply			12	ALL
Trouble Shooting			101	ALL
General			101	ALL
Adjustment/Test			501	ALL
General			501	ALL
SYNCHRO PACK	27-36-11			
Removal/Installation			401	ALL
General			401	ALL
Synchro Pack			401	ALL
Inspection/Check			601	ALL
General			601	ALL
Synchro Pack			601	ALL
FLIGHT CONTROL SURFACE POSITION INDICATOR	27-36-13			
(ICOVOL INDICATOR)				
Removal/Installation			401	ALL
General			401	ALL
ICOVOL Indicator			401	ALL

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Adjustment/Test			501	ALL
General			501	ALL
Test			501	ALL
P.F.C.U. CONTROL AND MONITORING PANEL	27-36-15			
(FLIGHT CONTROL UNIT)				
Removal/Installation			401	ALL
General			401	ALL
P.F.C.U. Control and Monitoring Panel			501	ALL
(Flight Control Unit)				
Adjustment/Test			501	ALL
General			501	ALL
Test			501	ALL
OUTER ELEVON NEUTRALIZATION COMPUTER	27-36-16			
Removal/Installation			401	ALL
General			401	ALL
Outer Elevon Neutralization Computer			401	ALL
POWER FLIGHT CONTROL SYSTEM SHUNT BOX	27-36-17			
Removal/Installation			401	ALL
General			401	ALL
Power Flight Control System Shunt Box			401	ALL
(C110)				
ELECTRICAL MONITORING CHANNELS	27-37-00			
Description and Operation			1	ALL
General			1	ALL
Description			6	ALL
Resolvers			8	ALL
Transducers - Linear Displacement			11	ALL
Comparators			11	ALL
Change-Over Unit - Static Monitoring			14	ALL
Indicator - Flight Control Surface			15	ALL
Position (ICOVOL)				
Electrical Power Supply			18	ALL
Trouble Shooting			101	ALL
General			101	ALL
Adjustment/Test			501	ALL
General			501	ALL
FLIGHT CONTROL SURFACE MONITORING	27-37-11			
COMPARATOR				
Removal/Installation			401	ALL
General			401	ALL
Flight Control Surface Monitoring			401	ALL
Comparator				

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STATIC MONITORING CHANGE-OVER UNIT	27-37-12			
Removal/Installation			401	ALL
General			401	ALL
Static Monitoring Change-over Unit			401	ALL
Adjustment/Test			501	ALL
General			501	ALL
Test			501	ALL
 STALL WARNING	 27-38-00			
Description and Operation			1	ALL
General			1	ALL
Description			1	ALL
Operation			3	ALL
Electrical Power Supplies			7	ALL
Trouble Shooting			101	ALL
General			101	ALL
Prepare			101	ALL
Trouble Shooting			102	ALL
Close-Up			115	ALL
Removal/Installation			401	ALL
General			401	ALL
Stall Warning Horn			401	ALL
Modulator			403	ALL
Relay			405	ALL
Delay Timers			407	ALL
Diode Assemblies			410	ALL
Adjustment/Test			501	ALL
General			501	ALL
Test - High Angle of Attack Mode			501	ALL
Test - VLA Mode			504	ALL
Test - C.G. Positioning Mode			510	ALL
Test - Wobbler Mode			516	ALL
 STICK SHAKER	 27-38-11			
Removal/Installation			401	ALL
General			401	ALL
Stick Shaker			401	ALL
Adjustment/Test			501	ALL
General			501	ALL
Test			501	ALL

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SAFETY FLIGHT CONTROL SYSTEM	27-39-00			
Description and Operation			1	ALL
General			1	ALL
Description			2	ALL
Computers			5	ALL
Anti-Stall Control Unit			7	ALL
Emergency Flight Control Components			8	ALL
Force Detectors			8	ALL
Operation			11	ALL
Electrical Power Supply			30	ALL
Trouble Shooting			101	ALL
General			101	ALL
Prepare			102	ALL
Trouble Shooting - Faults detected when energizing system and during ITEM (Integrated Test and Maintenance system) Test sequence			104	ALL
Trouble Shooting - Faults of Anti-Stall Functions			108	ALL
Trouble Shooting - Faults of Emergency Flight Control Mode			125	ALL
Trouble Shooting - Faults of OVERSPEED Warning Activation Function			142	ALL
Close-Up			148	ALL
Removal/Installation			401	ALL
General			401	ALL
Frangible Guard Cover			401	ALL
Adjustment/Test			501	ALL
General			501	ALL
Operational Test of SFC Computer using ITEM			502	ALL
Wobbler Warning Operational Test			507	ALL
Superstabilization Operational Test (4° Nose Down Function)			513	ALL
Autopilot Disconnection (for and angle of attack greater than 18°) Operational Test			518	ALL
Auto Trim Inhibit Function Operational Test			520	ALL
Emergency Flight Control Mode Operational Test			522	ALL
Wobbler Warning Functional Test			525	ALL
Functional Test of Superstabilization Function			542	ALL
Check of Logic Conditions Common to Both SFC			565	ALL
Emergency Flight Control Mode Functional Test			573	ALL
Functional Test of Overspeed Warning Activation Function			584	ALL

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SAFETY FLIGHT CONTROL (SFC) COMPUTER	27-39-11			
Removal/Installation			401	ALL
General			401	ALL
Safety Flight Control Computer			401	ALL
Adjustment/Test			501	ALL
General			501	ALL
Test			501	ALL
FORCE DETECTOR	27-39-71			
Removal/Installation			401	ALL
General			401	ALL
Adjustment/Test			501	ALL
General			501	ALL
Test			501	ALL
EMERGENCY FLIGHT CONTROL SYSTEM ENGAGE	27-39-72			
SWITCH - (EMERG CONT SWITCH)				
Removal/Installation			401	ALL
General			401	ALL
EMERG CONT Switch			401	ALL

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VISOR AND DROOP NOSE SYSTEM	27-61-00			
Description and Operation			1	ALL
General			1	ALL
Visor Mechanism			1	ALL
Visor Uplock			2	ALL
Visor Spring Assisting Mechanism			3	ALL
Visor Emergency Relief			3	ALL
Droop Nose Mechanism			3	ALL
Nose Uplocks			3	ALL
Nose Position Transmitter Unit			8	ALL
Nose Emergency Release System			8	ALL
Operation			8	ALL
Trouble Shooting			101	ALL
General			101	ALL
Preparation			101	ALL
Trouble Shooting			103	ALL
Fault Isolation Chart Index			136	ALL
Servicing			301	ALL
General			301	ALL
Nose Fairing and Forward Equipment			301	ALL
Bay - Entry and Close-Up				
Removal/Installation			401	ALL
General			401	ALL
RH Dash Panel Sub-Panel 2-212-6			401	ALL
Components				
Aft Centre Console, Sub-panel 9-211-3,			406	ALL
Components				
Underfloor Rack Panel (2-123, 3-123)			412	ALL
Components				
Adjustment/Test			501	ALL
General			501	ALL
Nose Uplock Pins - Adjustment			501	ALL
Visor Emergency Release Mechanism -			507	ALL
Adjustment				
Nose Emergency Release Mechanism			511	ALL
Adjustment				
Nose Position Transmitter Unit Link			516	ALL
Rod - Adjustment				
Visor and Droop Nose Operational Test			525	ALL
- Normal System				
Visor and Droop Nose Operational Test			531	ALL
- Standby System				
Visor and Droop Nose Operational Test			532	ALL
- Emergency Release System				
Resetting procedure for Droop Nose			533	ALL
and Visor System after Standby or				
Emergency Lowering				

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Test Windshield Wipers Override Switch			534	ALL
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General			601	ALL
Visor and Droop Nose Mechanism -			601	ALL
Inspection/Check				
VISOR	27-61-11			
Removal/Installation			401	ALL
General			401	ALL
Visor			401	ALL
Install Replacement Visor			411	ALL
VISOR MECHANISM	27-61-12			
Removal/Installation			401	ALL
General			401	ALL
Tracking Legs			401	ALL
Operating Leg			406	ALL
A-Frame			419	ALL
Struts			423	ALL
VISOR CARRIAGE	26-61-13			
Removal/Installation			401	ALL
General			401	ALL
Visor Carriage			401	ALL
VISOR UPLOCK	27-61-14			
Removal/Installation			401	ALL
General			401	ALL
Visor Uplock			401	ALL
VISOR GUIDE RAILS	27-61-15			
Removal/Installation			401	ALL
General			401	ALL
Visor Guide Rails			401	ALL
INTERACTION LEVER	27-61-16			
Removal/Installation			401	ALL
General			401	ALL
Interaction Lever			401	ALL
VISOR SPRING ASSISTOR MECHANISM	27-61-17			
Removal/Installation			401	ALL
General			401	ALL
Spring-pot - Removal/Installation			401	ALL
Cable - Removal/Installation			403	ALL
Lever			406	ALL
VISOR AND DROOP NOSE MICROSWITCHES	27-61-26			
Removal/Installation			401	ALL
Nose Uplock Microswitches M23, M24			401	ALL
Nose Uplock Microswitches M25, M26			404	ALL
Visor Uplock Microswitch M32			406	ALL
Visor 'Up' Microswitches M37			408	ALL
Visor 'Down' Microswitch M34, M60			410	ALL
Nose Emergency Release Uplock			412	ALL
Microswitch M21, M54				

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Test - Microswitches M23, M24			501	ALL
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VARIABLE DROOP NOSE	27-61-31			
Removal/Installation			401	ALL
General			401	ALL
Variable Droop Nose			401	ALL
DROOP NOSE GUIDE RAIL AND CARRIAGE	27-61-33			
Removal/Installation			401	ALL
General			401	ALL
Droop Nose Guide Rail and Carriage			401	ALL
SIDE LOAD LINKS	27-61-36			
Removal/Installation			401	ALL
General			401	ALL
Side Load Links			401	ALL
DROOP NOSE UPLOCK	27-61-37			
Removal/Installation			401	ALL
General			401	ALL
Droop Nose Uplock			401	ALL
NOSE POSITION TRANSMITTER UNIT	27-61-51			
Removal/Installation			401	ALL
General			401	ALL
Nose Position Transmitter Unit			401	ALL
Adjustment/Test			501	ALL
General			501	ALL
Tests to Prove Operation of Transmitter Unit			501	ALL
VISOR AND DROOP NOSE SELECTOR SWITCH	27-61-53			
Removal/Installation			401	ALL
General			401	ALL
Visor and Droop Nose Selector Switch			401	ALL
Lamp Housing			403	ALL
HYDRAULIC SYSTEM (VISOR AND DROOP NOSE)	27-62-00			
Description and Operation			1	ALL
General			1	ALL
Droop Nose Actuator			7	ALL
Nose Uplock Units			10	ALL
Visor Jack			10	ALL
Visor Uplock Jack			11	ALL
Visor Selector Valve			11	ALL
Visor Standby Selector Valve			14	ALL
Lock Selector Valves			14	ALL
Non-return Valves			16	ALL
Visor Supply Shut-off Valve			16	ALL
Hydraulic Swivel Units			18	ALL
Operation			18	ALL

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General			401	ALL
Hydraulic Piping			401	ALL
Adjustment/Test			501	ALL
General			501	ALL
Air Bleeding			501	ALL
Function Test Visor Hydraulic System			509	ALL
Function Test Visor and Droop Nose			512	ALL
Hydraulic System				
Emergency System Function Test			514	ALL
VISOR SELECTOR VALVE	27-62-11			
Removal/Installation			401	ALL
General			401	ALL
Visor Selector Valve			401	ALL
VISOR STANDBY SELECTOR VALVE	27-62-12			
Removal/Installation			401	ALL
General			401	ALL
Visor Standby Selector Valve			401	ALL
VISOR JACK	27-62-13			
Removal/Installation			401	ALL
General			401	ALL
Visor Jack			401	ALL
VISOR UPLOCK JACK	27-62-14			
Removal/Installation			401	ALL
General			401	ALL
Visor Uplock Jack			401	ALL
HYDRAULIC SWIVEL UNITS	27-62-16			
Removal/Installation			401	ALL
General			401	ALL
Hydraulic Swivel Units			401	ALL
Adjustment/Test			501	ALL
General			501	ALL
Hydraulic Swivel Units			501	ALL
Pressure/Leakage Test				
DROOP NOSE ACTUATOR	27-62-17			
Removal/Installation			401	ALL
General			401	ALL
Droop Nose Actuator			401	ALL
DROOP NOSE UPLOCK JACK	27-62-18			
Removal/Installation			401	ALL
General			401	ALL
Droop Nose Uplock Jack			401	ALL

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HYDRAULIC NON-RETURN VALVES	27-62-19			
Removal/Installation			401	ALL
General			401	ALL
Non-return Valve (Ident No. 1157)			401	ALL
Hydraulic Green System				
Non-return Valve (Ident No. 5137)			405	ALL
Hydraulic Yellow System				
Non-return Valve (Ident No. 0489)			405	ALL
Hydraulic Yellow System				
Non-return Valve (Ident No. 0487)			407	ALL
Hydraulic Green System				
LOCK SELECTOR VALVES	27-62-21			
Removal/Installation			401	ALL
General			401	ALL
Lock Selector Valves			401	ALL
VISOR SUPPLY SHUT-OFF VALVE	27-62-22			
Removal/Installation			401	ALL
General			401	ALL
Visor Supply Shut-off Valve			401	ALL
Inspection/Check			601	ALL
General			601	ALL
Inspection/Check			601	ALL

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### GENERAL - DESCRIPTION AND OPERATION

#### 1. General (Ref. Fig.001 and 002)

The delta wing design results in the utilization of control surfaces known as the elevons for both pitch and roll axes.

Dual and independent conventional flight controls (i.e. control column and rudder pedals) are installed at the Captain's and First Officer's stations.

Each wing has six elevons coupled in pairs and each pair of elevons is operated by one twin-body electro-hydraulic power flight control unit (PFCU).

The twelve elevons control roll and pitch.

The rudder comprises two independent sections each operated by one PFCU.

The failure of one elevon or one rudder section has no major effect on the flight which continues with the remaining control surfaces.

An emergency flight control system enables the aircraft to be controlled normally especially during take-off and landing, if the mechanical controls should jam upstream of the relay jacks.

#### R 2. Operation

The pilot's commands are electrically transmitted to the power flight control units (PFCU).

In the event of electrical failure, the commands are transmitted mechanically by three relay jacks.

Each of the three axes (roll, pitch and yaw) is controlled by two electrical channels (Blue and Green) and by a mechanical mode.

In normal operation, the Blue electrical channel is in control, automatically changing over to the Green channel in the event of failure : with automatic change-over to the mechanical mode if the Green channel fails.

A flight control surface position indicator (ICOVOL) on the dash panel shows the pilot the positions of the control surfaces and which mode (Blue, Green or mechanical) is in use. The driving of the mechanical mode by the relay jacks cancels all piloting loads inherent in the linkages.

On auto-pilot (AP), the relay jacks also transmit the auto-pilot signals to the PFCU's.

#### R 3. Hydraulic System

Hydraulic power is provided by a main group comprising the

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R Green and Blue systems, a standby group consisting of the  
R Yellow system. In the event of a failure of the four engines,  
an emergency system pressurizes the Green and Yellow Systems.

Each relay jack comprises a body unit moving on two pistons in tandem.

In normal operation the aft body unit is supplied by the Blue hydraulic system and the front body unit by the Green hydraulic system.

Any pressure drop in a system is signalled to the pilot by warnings. The pilot then replaces the faulty system by the Yellow system using a servo-controls selector switch.

The selector switches also allow a main system to be isolated.

### R 4. Artificial Feel (Ref. Fig. 001 )

As the servo-controls are irreversible, no feed back is transmitted to the pilot regardless of the load on the control surface.

The feel, similar to conventional feel, is artificially reproduced by a system interposed in each of the three control axis.

The system comprises essentially a mechanical differential, a spring rod and two electro-hydraulic jacks.

In normal operation, each of the two jacks is fed and slaved in load to the flight conditions.

A monitoring system ensures that the received signals are correctly executed by each of the jacks. If a fault occurs, the jack in the faulty system is connected to reservoir return and the other jack continues to operate.

Should both jacks fail, the load restored to the pilot by the spring rod remains acceptable for subsonic flight.

In certain conditions dangerous to the aircraft structure, the artificial feel system limits the pilot's authority by imposing considerable loads on his controls.

### R 5. Trim

On each of the three axis, a mechanical trim control can cancel out the loads provided by the artificial feel by displacing the neutral position of the flight controls.

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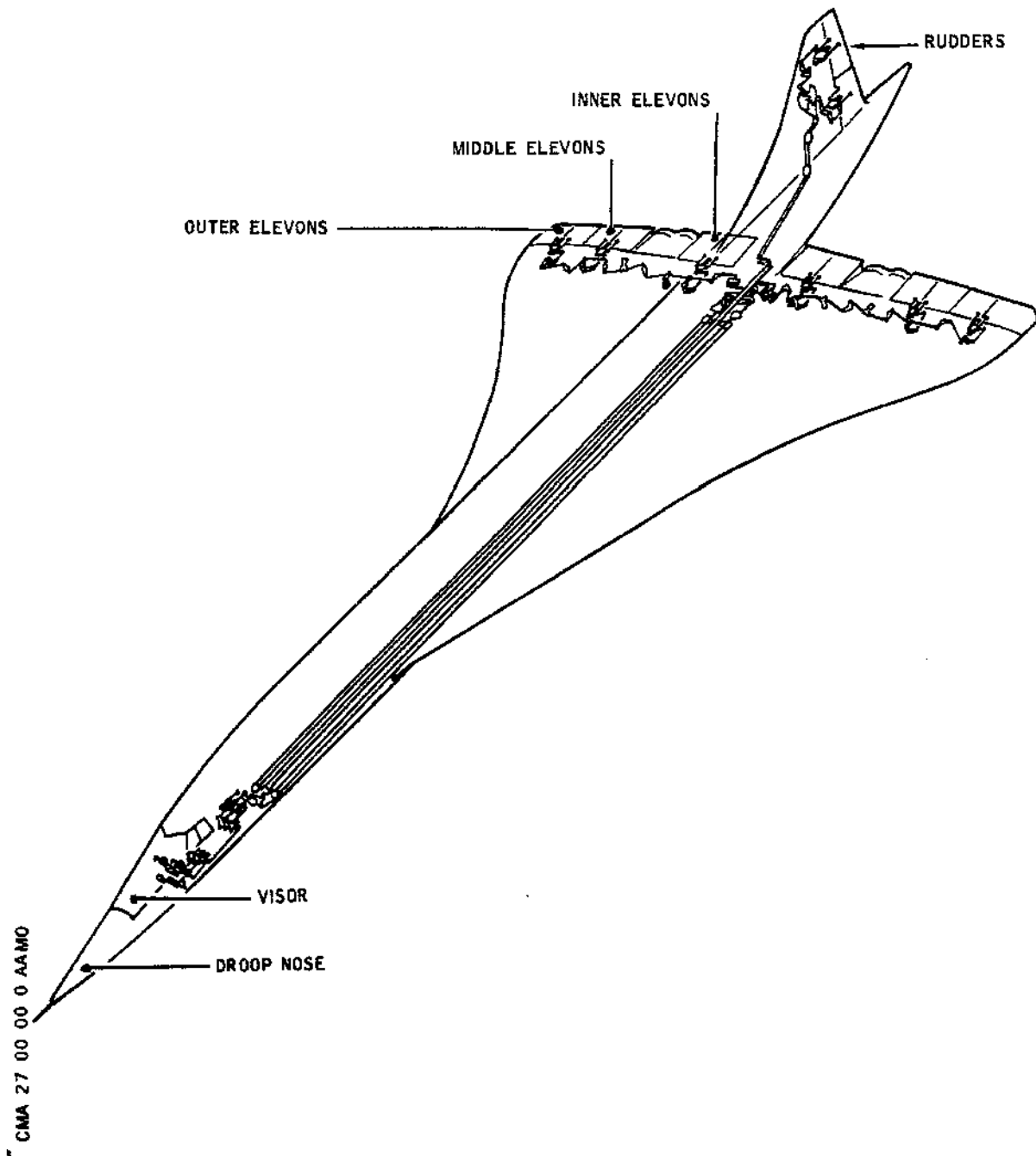
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## MAINTENANCE MANUAL



Flight Controls Assembly  
Figure 001

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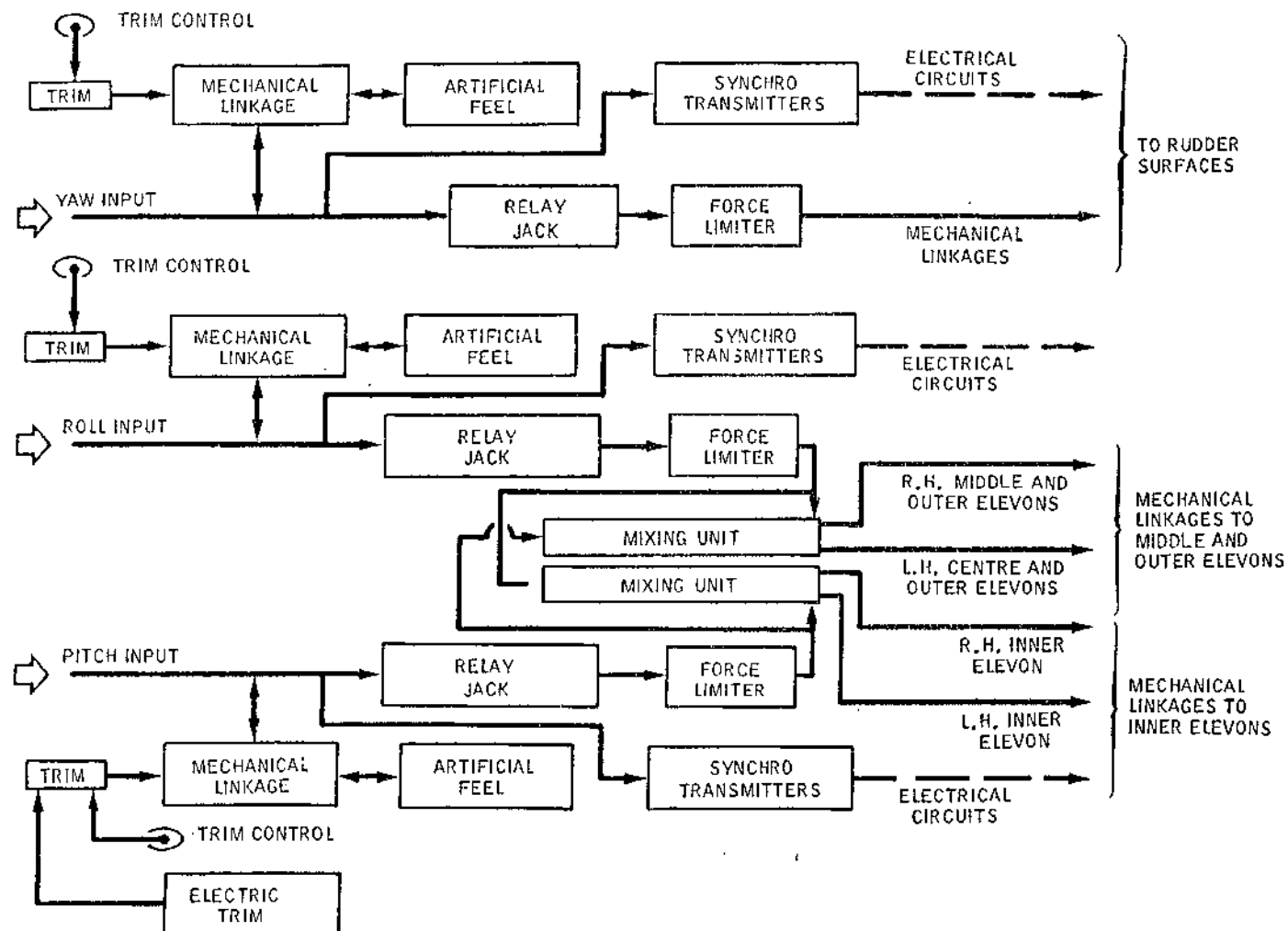
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Flight Controls - Schematic  
Figure 002

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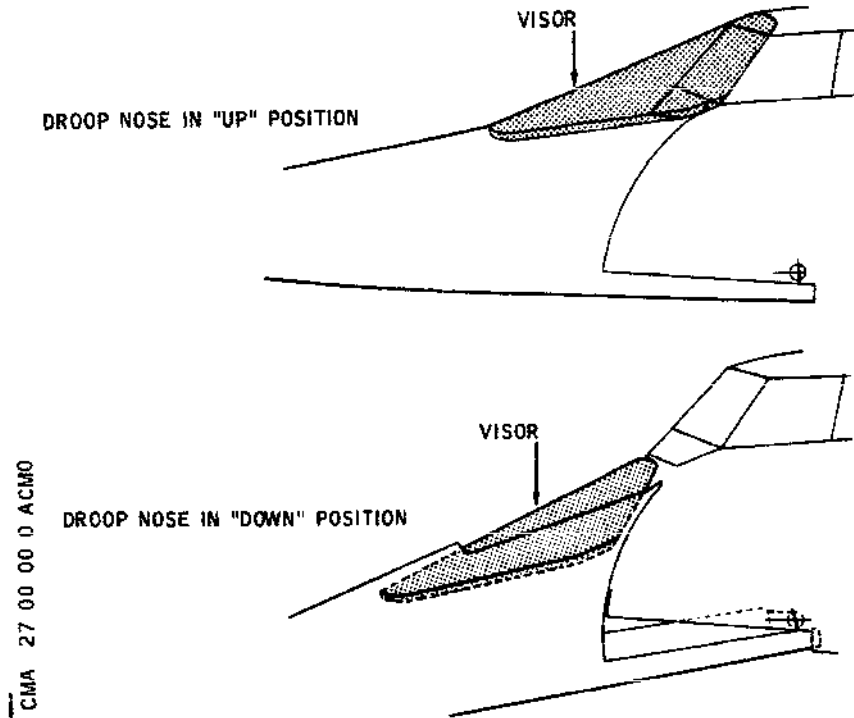
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The pitch axis alone is controlled electrically (electric trim) enabling it to take the place of the mechanical trim and also carrying into effect the following functions :

- Mach trim
- Incidence trim
- Auto-throttle trim
- Auto trim (in the AP mode)

### R 6. Droop Nose - Visor (Ref. Fig. 003 )



Droop Nose and Visor  
Figure 003

In order to improve visibility, the fuselage section forward of the windshield is lowered during take-off and landing.

To ensure a perfect aerodynamic shape with the nose raised the windshield is covered with a visor, which also serves to protect it against the effects of kinetic heating.

In normal operation the nose-visor assembly is operated by jacks supplied by the Green hydraulic system.

R

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In standby operation, the Yellow hydraulic system unlocks and lowers the visor, releases the uplock hooks. The lock bushing is locked to the droop nose jack and the nose lowers under its own weight.

In emergency operation, a mechanical system unlocks the nose/visor assembly which lowers under its own weight.

### 7. Controls and Indicating

Controls and indicators relating to the Flight controls are grouped in the following panels

R Overhead panel (Ref. Fig.004, 005 and 005A)

Artificial feel, master warning, control and monitoring channel, electrical supply, anti-stall system, hydraulic selection, relay jack.

Centre console (Ref. Fig.006)

Trims - Visor/Droop Nose standby control

Instrument Panel (Ref. Fig.007)

ICOVOL - Visor/Droop Nose control

Flight Engineer's Panel (Ref. Fig. 008)

Artificial feel test

### 8. Cockpit Safety Check

The COCKPIT SAFETY CHECK and COCKPIT PRELIMINARY PREPARATION group the operations carried out in the flight compartment in order to achieve a preparation of the flight control system.

#### A. COCKPIT SAFETY CHECK

EMERGENCY NOSE/VISOR UPLOCK RELEASE  
STBY, control  
VISOR/NOSE, Lever control position

DOWN  
pin engaged OFF, guarded  
Agrees with configuration

#### B. COCKPIT PRELIMINARY PREPARATION

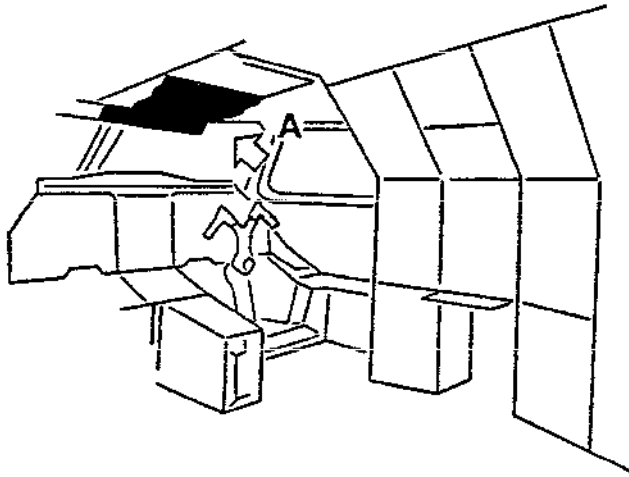
Servo control, rotary selectors blue and yellow  
BLUE JAM & GREEN JAM, lights  
BLUE JAM TEST, push button light

NORMAL  
OFF  
PRESS

EFFECTIVITY: ALL

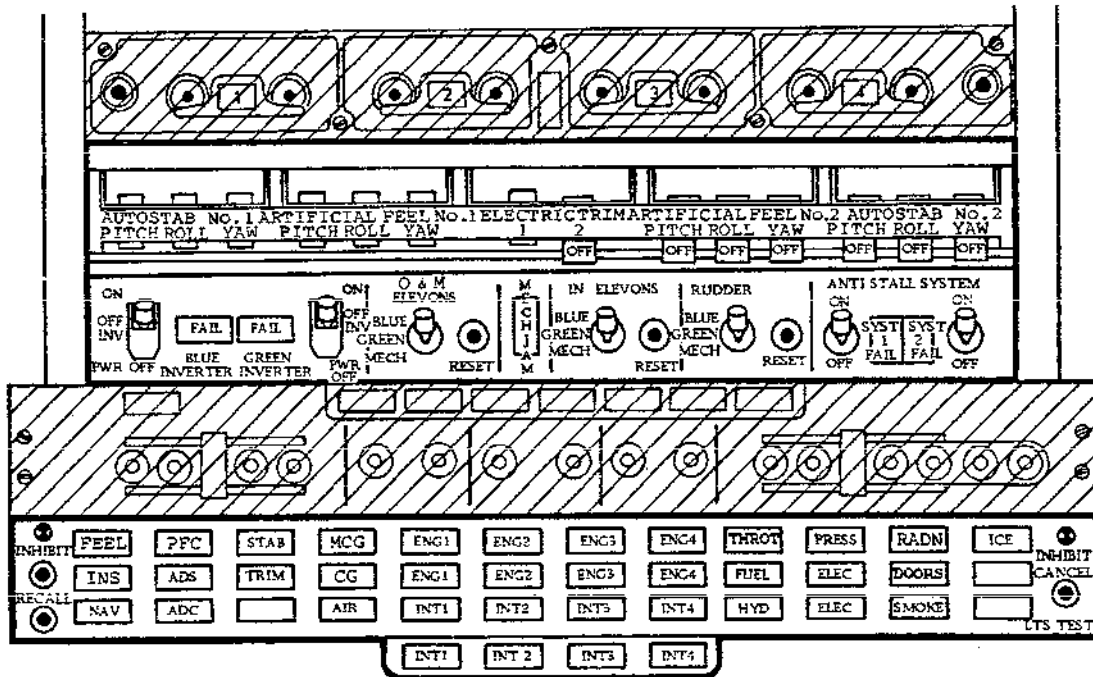
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**A**

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Overhead Panel - Sheet 1  
Figure 004

R

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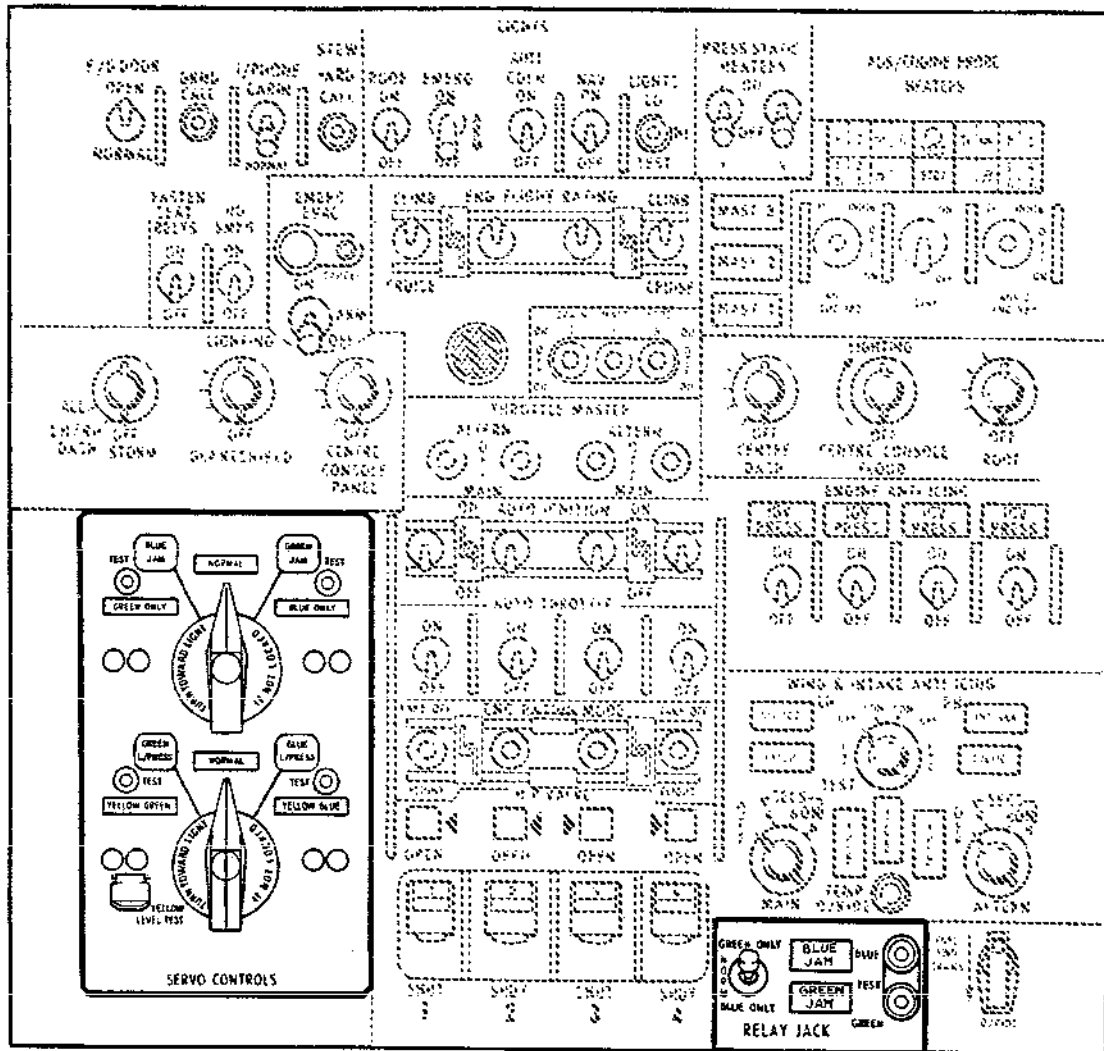
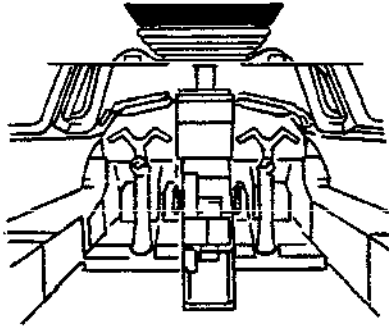
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Overhead Panel - Sheet 2  
Figure 005

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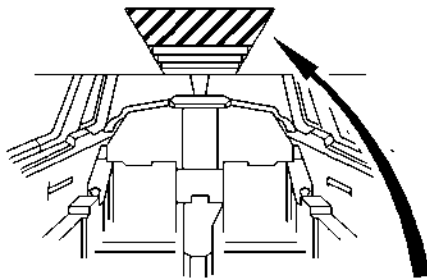
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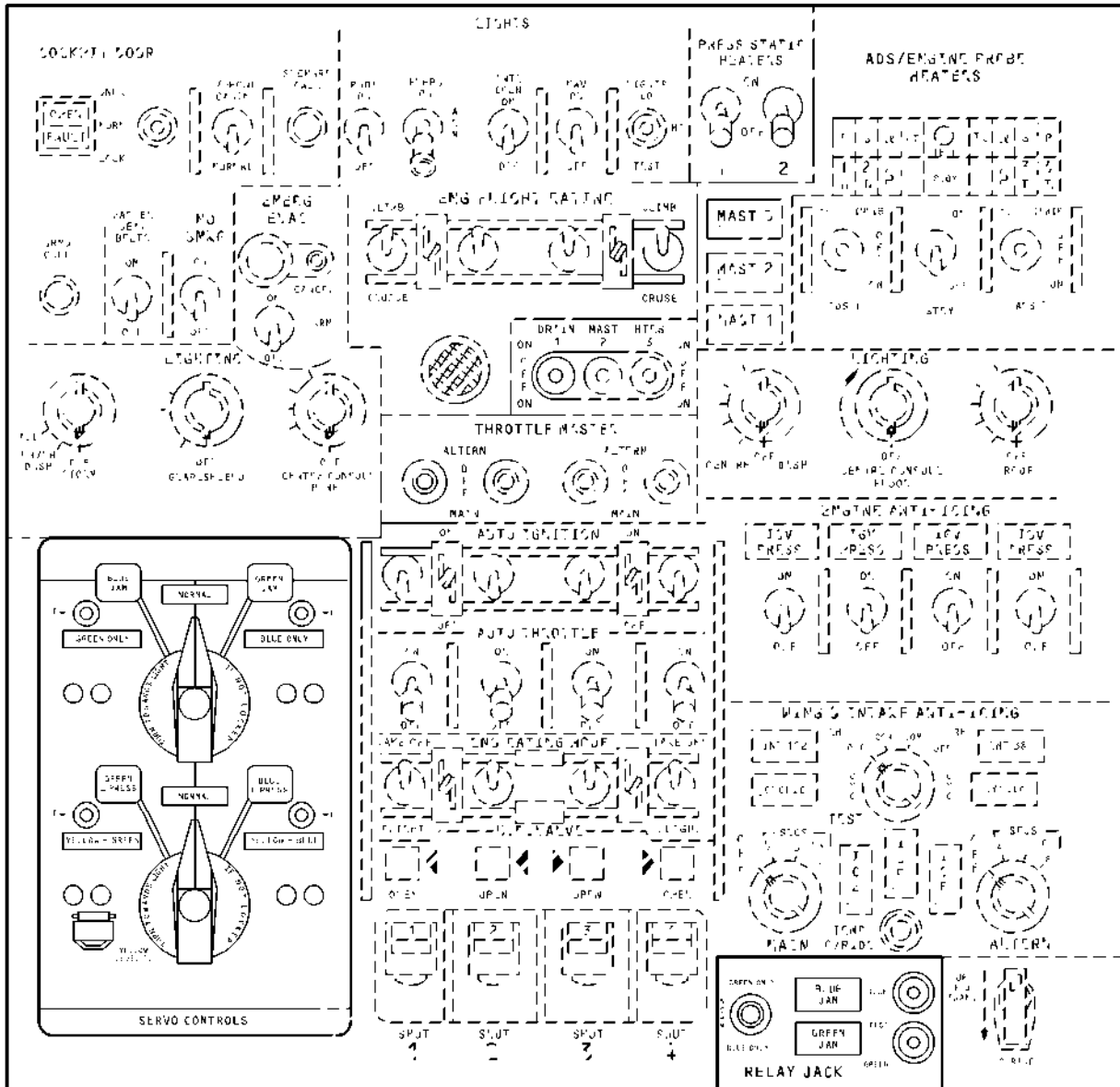
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Overhead Panel - Sheet 2  
Figure 005

R

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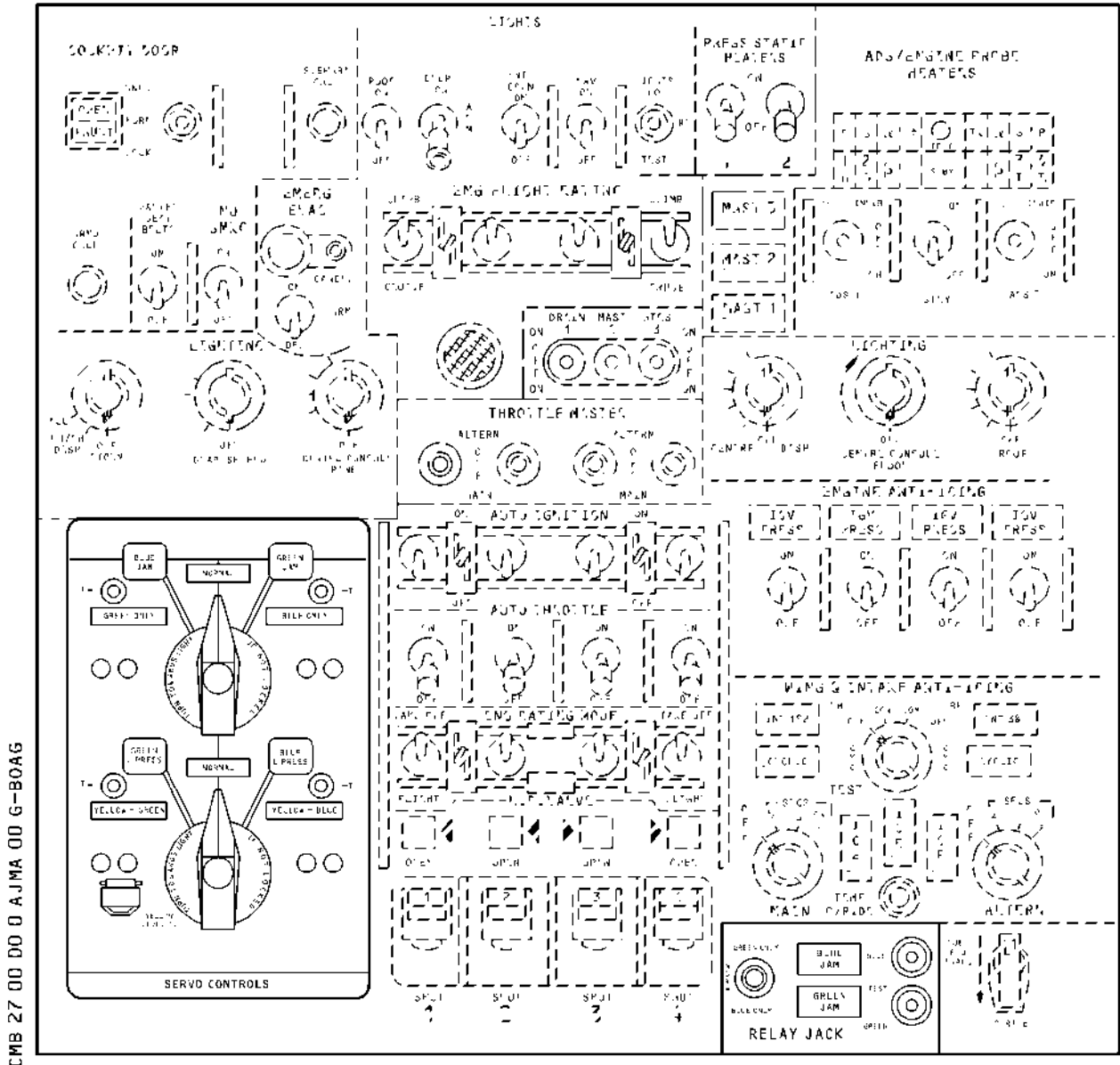
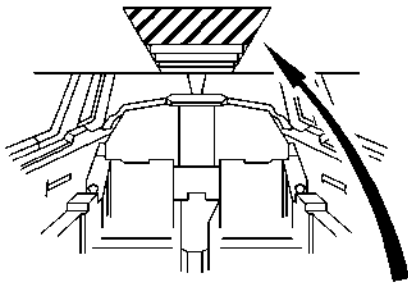
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Overhead Panel - Sheet 3  
Figure 005A

R

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# ***Concorde***

## **MAINTENANCE MANUAL**

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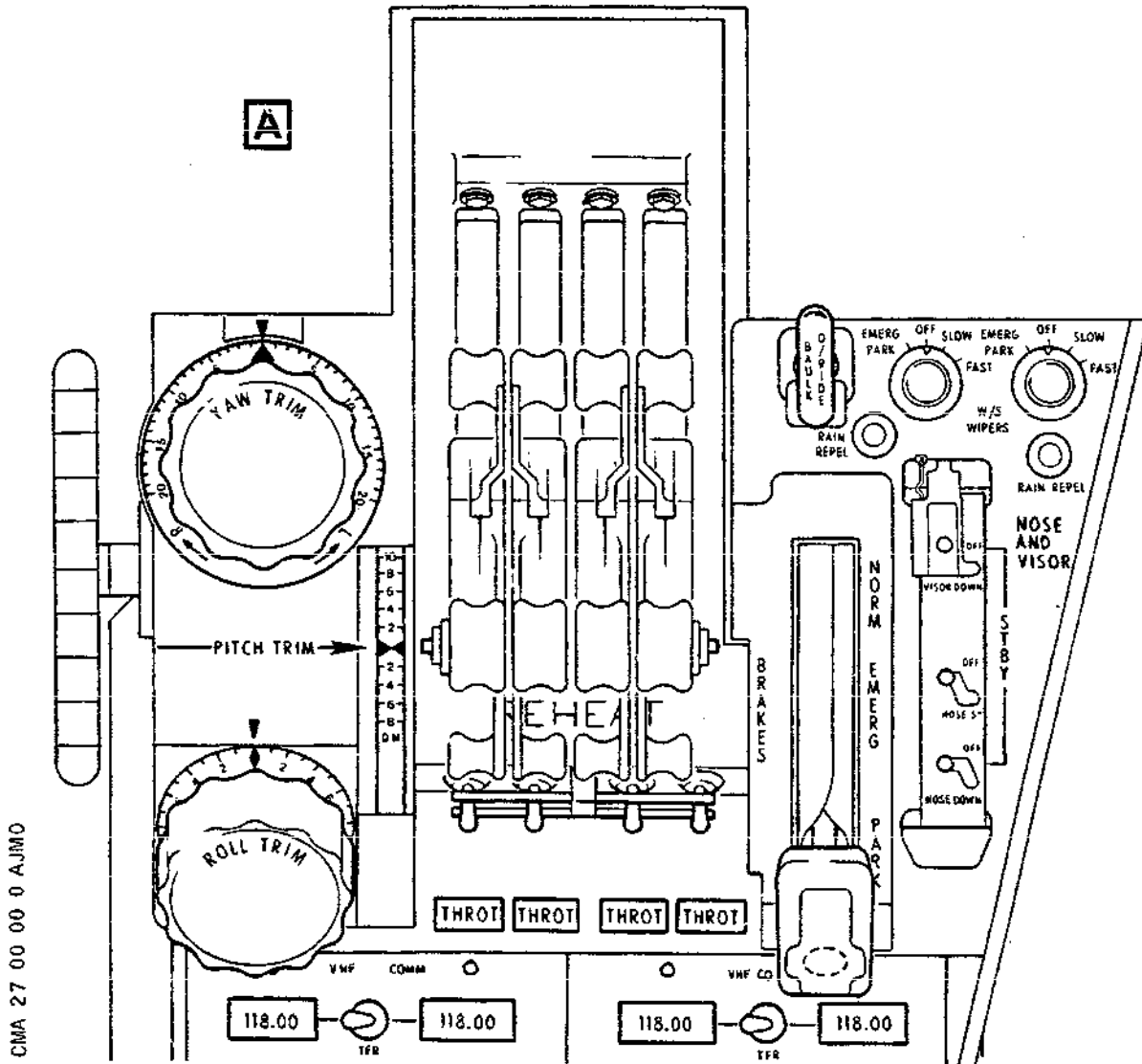
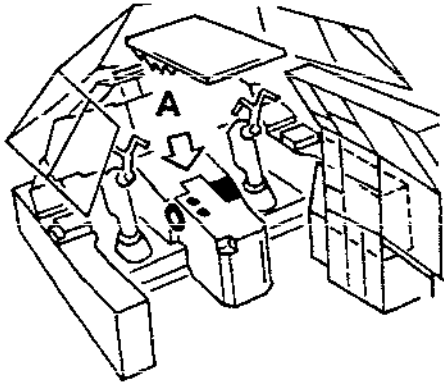
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# Concorde

## MAINTENANCE MANUAL



Centre Console  
Figure 006

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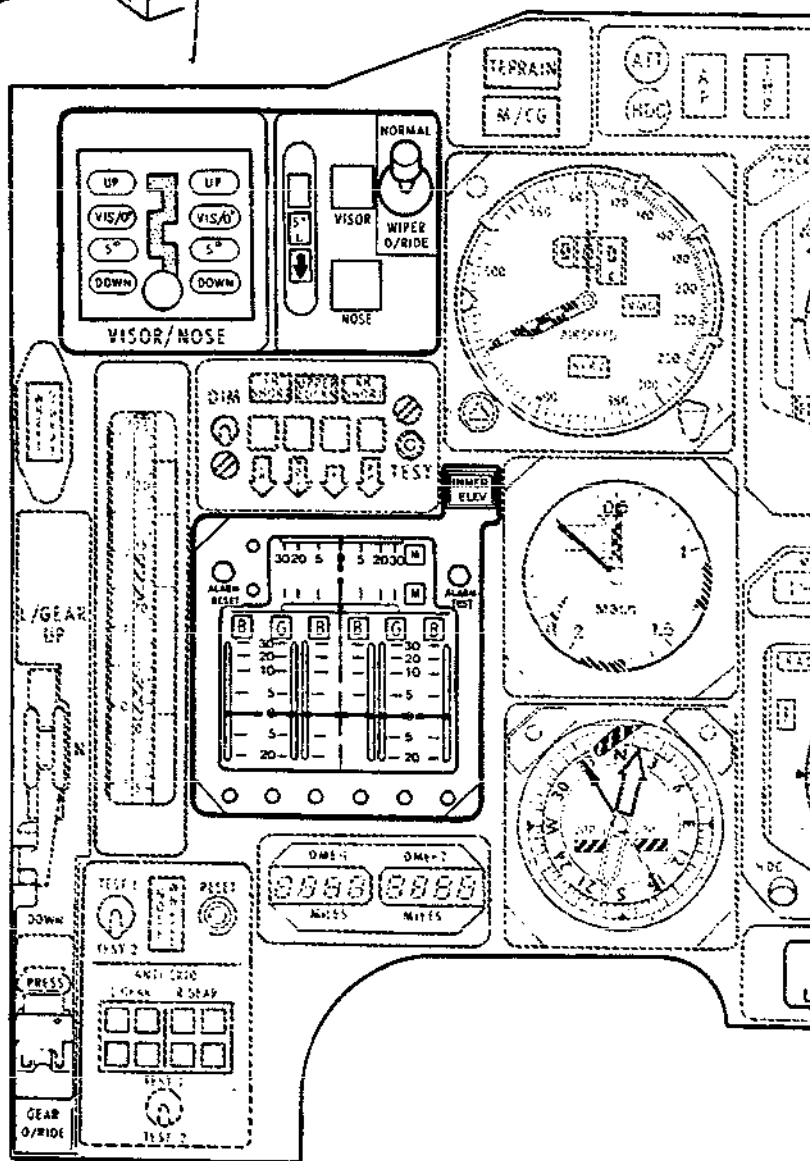
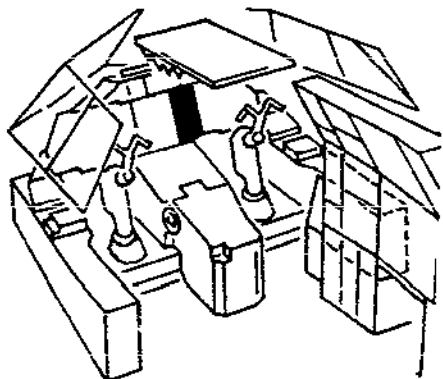
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## MAINTENANCE MANUAL



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Instrument Panel  
Figure 007

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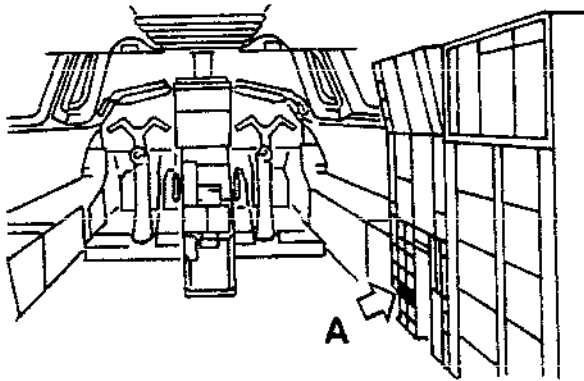
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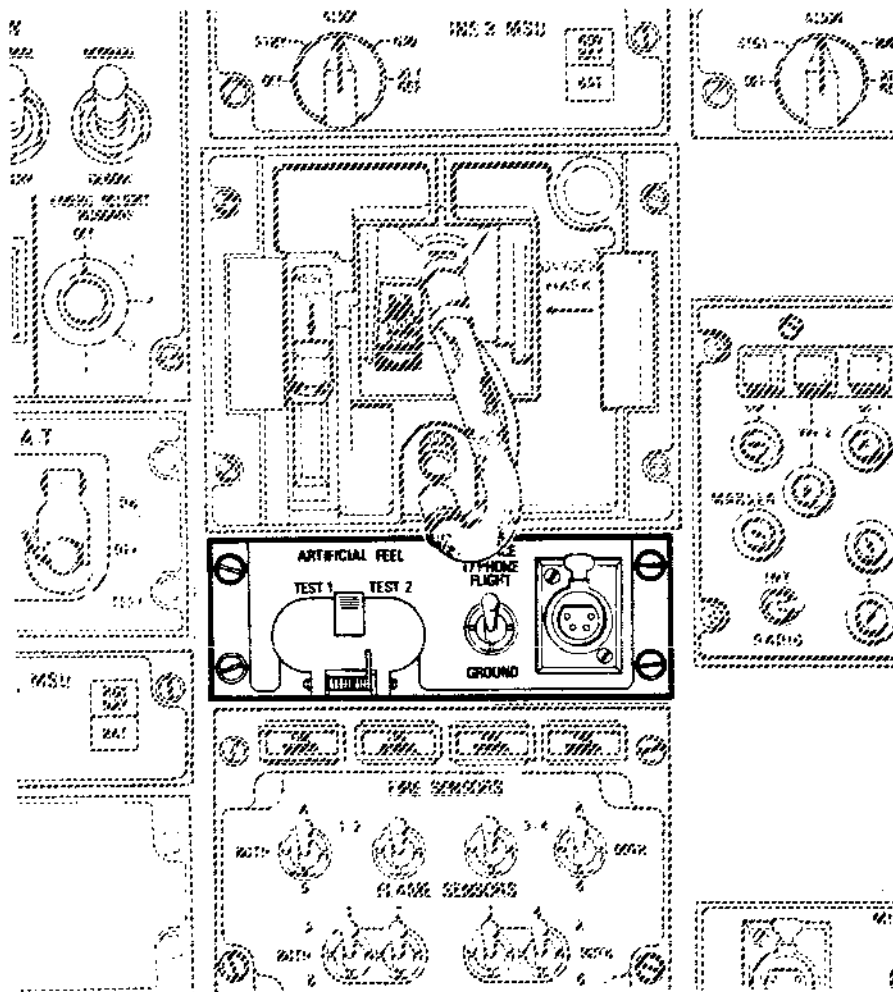
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**A**



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Flight Engineer's Panel  
Figure 008

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## MAINTENANCE MANUAL

	BLUE JAM, light (red)	ON
	MWS PFC light (red)	ON
	audio	GONG
	GREEN JAM TEST, push button, light	PRESS
	GREEN JAM, light (red)	ON
	MWS PFC light (red)	ON
	AUDIO	GONG
	GREEN L/PRESS & BLUE L/PRESS, light (red)	ON
	SERVO CONTROL, yellow rotary selector	BLUE L/ PRESS
	YELLOW BLUE pea lights (2)(green)	ON
	GREEN ONLY pea lights (2)(green)	ON
	YELLOW LEVEL TEST, push button	Lift guard PRESS OFF
	YELLOW BLUE pea lights (2)	OFF
	SERVO CONTROL, yellow rotary selector	NORMAL
	YELLOW BLUE pea lights (2)	OFF
	GREEN ONLY pea lights (2)	OFF
	SERVO CONTROL, yellow rotary selector	GREEN L/ PRESS
	YELLOW GREEN pea lights (green)(2)	ON
	BLUE ONLY pea lights (green)(2)	ON
	YELLOW LEVEL TEST push button	Left guard PRESS OFF
	YELLOW GREEN pea lights (2)	NORMAL
	SERVO CONTROL, yellow rotary selector	OFF
	YELLOW GREEN pea lights (2)	OFF
	BLUE ONLY pea lights (2)	OFF
R	RELAY JACK, switch	NORM
R	BLUE JAM, GREEN JAM, switch integral light	OFF
R	BLUE TEST, push button	PRESS
R	BLUE JAM light (red)	ON
R	RELAY JACK, switch integral light (red)	ON
	MWS PFC light (red)	ON
	AUDIO	GONG
	GREEN TEST, push button	PRESS
R	GREEN JAM light (red)	ON
R	RELAY JACK, switch integral light (red)	ON
R	MWS PFC light (red)	ON
	AUDIO	GONG
	ANTI STALL SYSTEM 1, switch	ON
	SYS 1 FAIL, light (amber)	ON
	ANTI STALL SYSTEM 2, switch	ON
R	SYS 2 FAIL, light (amber)	ON
	AUTO STAB No.1, PITCH, ROLL, YAW, switches	Engage remain en- gaged
	AUTO STAB No.2, PITCH, ROLL, YAW, switches	Engage remain en-

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ARTIFICIAL FEEL No.1 PITCH, ROLL, YAW switches	gaged Engage remain en- gaged
ARTIFICIAL FEEL No.2, PITCH, ROLL, YAW switches	Engage remain en- gaged
BLUE INVERTER, selector	ON
BLUE INVERTER FAIL, light	OFF
BLUE INVERTER FAIL, light	PRESS to test
FAIL, light (red)	ON
MWS PFC light (red)	ON
AUDIO	GONG
O & M ELEVONS, INNER ELEVONS, selector	BLUE
MECH JAM, light (red)	ON
RUDDER, selector	BLUE
ARTIFICIAL FEEL TEST 1, push button	PRESS to test
ARTIFICIAL FEEL No.1 PITCH, ROLL YAW switches	Drop to OFF
MWS FEEL light (red)	ON
AUDIO	GONG
ARTIFICIAL FEEL No. 1 PITCH, ROLL, YAW switches	Engage
MWS FEEL light	OFF
ARTIFICIAL FEEL TEST 2, push button	Press to test
ARTIFICIAL FEEL No.2 PITCH, ROLL, YAW switches	Drop to OFF
MWS FEEL, light (red)	ON
AUDIO	GONG
ARTIFICIAL FEEL No.2 PITCH, ROLL, YAW switches	ENGAGE remain en- gaged
MWS FEEL, light	OFF
EMERG CONT, push button light	OFF, mem- brane un- broken
VISOR/NOSE indications match lever position	
Visor/nose UP	VISOR mi UP
	NOSE mi UP
Visor/nose 5 DEG	VISOR mi DOWN
	NOSE mi 5 DEG
	UNLOCK light OFF
	5 DEG light OFF
WIPER O/RIDE, switch	NORMAL
Flight control position indicator - elevons (6)	In line
Flight control position indicator - rudders (2)	In line
Flight control channel MI's (8)	M
Flight control position indicator warning lights (8)	OFF

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## MAINTENANCE MANUAL

ALARM TEST, push button	Press and hold
Warning lights (red) (8)	Flash
ALARM TEST, push button	Release
Warning lights (red) (8)	ON
MWS PFC light (red)	ON
AUDIO	GONG
ALARM TEST, push button	Press
Warning lights (8)	OFF
MWS PFC, light	OFF
INNER ELEV, light (red)	ON
PULL TO ADJUST PEDALS	Pull to set required position
	Release to lock
PULL TO ADJUST PEDALS	

### 9. System Management

The flight control sub system management procedures enabling the system to be controlled or monitored either to test the system and its components, or to perform servicing operations, are carried out by means of switches and indicators located in the flight compartment.

#### RB 10. PFCU Jam Detector Unit - British Airways Mod.27F121 RB (Ref. Fig. 018)

##### RB A. Description

RB The PFCU jam detector unit is mounted in the flight deck  
RB RH racking, location 2-216. The unit receives signals  
RB from the sixteen PFCU jam switches and from the two  
RB flight deck jam warning lights.

RB The purpose of the jam detector unit is to identify which  
RB PFCU jam switch was responsible for a jam warning during  
RB flight, and will indicate whether or not the jam indication  
RB is transient. The detector unit has a "present sector"  
RB memory (MEM 1) and a "previous sector" memory (MEM 2).  
RB Jam warnings are also recorded on the flight data recorder.

RB Concorde has six elevons and two rudders. Each flight  
RB control is operated by a PFCU containing two independent  
RB hydraulic actuators (blue and green) operating in tandem.  
RB Each actuator has a microswitch that operates to give a  
RB warning of a jammed hydraulic control valve.

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## MAINTENANCE MANUAL

RB The jam detector unit monitors all sixteen jam switches and  
RB the two (blue and green) flight deck jam warning lights.  
RB Each of the jam switches is represented by an amber and a  
RB blue or green detection light on the detector unit front  
RB panel.

### RB B. Operation

RB Momentary operation of a jam switch will illuminate and  
RB latch the appropriate amber detection light on the  
RB detector unit. Operation of a jam switch for sufficient  
RB time to give a flight deck jam warning (greater than  
RB 800 mS) will also illuminate the associated blue or green  
RB detection light. The indications will remain after the  
RB jam switch responsible has returned to the normal open  
RB circuit, operating the MEM 1 switch will restore the  
RB indications previously given.

RB On power down of the detector unit for longer than  
RB approximately 25 seconds, any existing indications stored  
RB in the "present sector" memory MEM 1 will be transferred  
RB and stored in the "previous sector" memory MEM 2. Access  
RB to stored indications is via the memory view switch on  
RB the front panel. Test and reset switches are provided,  
RB and low battery indicators.

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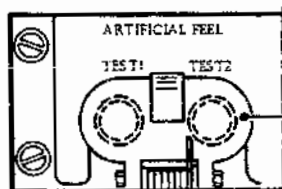
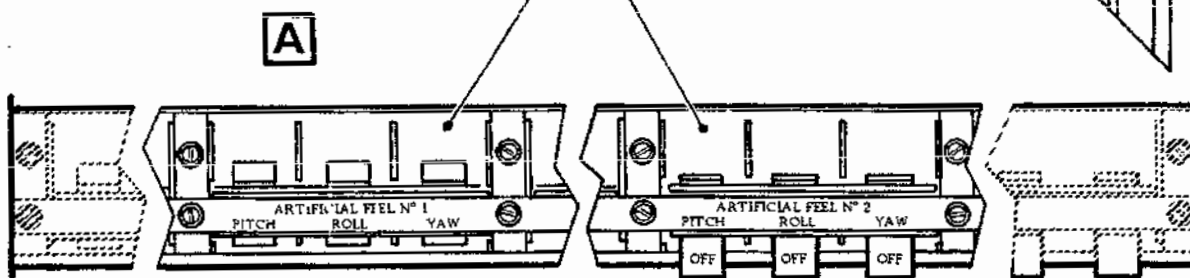
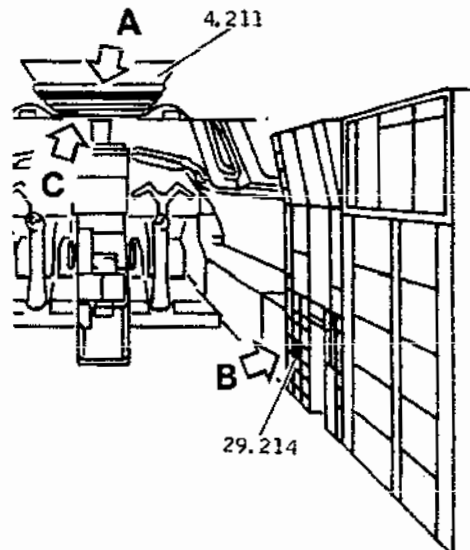
## MAINTENANCE MANUAL

THESE SWITCHES, WHEN ENGAGED, ENABLE ENGAGEMENT OF THE 3 ARTIFICIAL FEEL AXES. THEY DISENGAGE THROUGH A SIGNAL (FROM THE COMPUTER) RESULTING FROM :

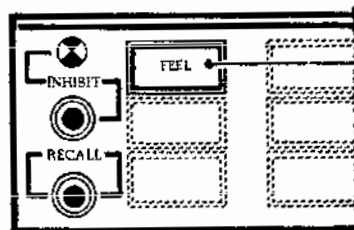
- AN OVER PRESSURE OR A PRESSURE DROP OCCURING IN THE JACK
- AN ADC FAULT
- A PRESSED TEST BUTTON.

SWITCH ENGAGED (OFF INDICATING NOT VISIBLE) SIGNALS DEVELOPED BY THE COMPUTER ARE TRANSMITTED TO A.F. JACKS

SWITCH IN OFF POSITION SUPPLIES TO THE JACK SERVOVALVE AND ELECTRO VALVE ARE CUT P SERVO VALVE AND ELECTROVALVE ARE CUT OUT AND A WARNING SIGNAL IS SENT TO THE MASTER WARNING.



PUSH BUTTONS ALLOWING TO CHECK THE CORRECT OPERATION OF THE AF COMPUTER MONITORING CHANNELS WHEN PRESSING TEST1 (OR TEST2) PUSH BUTTONS, PITCH, ROLL AND YAW SWITCHES OF ARTIFICIAL FEEL N°1 ARTIFICIAL FEEL N°2) ENGAGE SWITCH UNIT DISENGAGE AND INDICATE OFF.



THIS ALARM, ASSOCIATED WITH THE GONG, ILLUMINATES IF TWO SWITCHES OF THE SAME AXIS INDICATE OFF, AFTER BEING PREVIOUSLY ENGAGED. TO CANCEL THIS ALARM, IT IS NECESSARY TO PREN THE WARNING LIGHT AND TO RELEASE IT.

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Artificial Feel  
Figure 009

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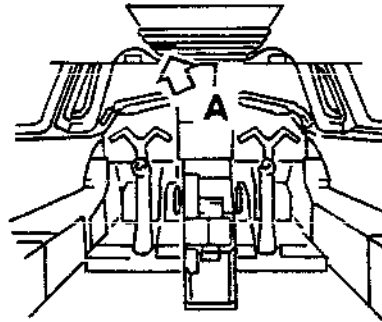
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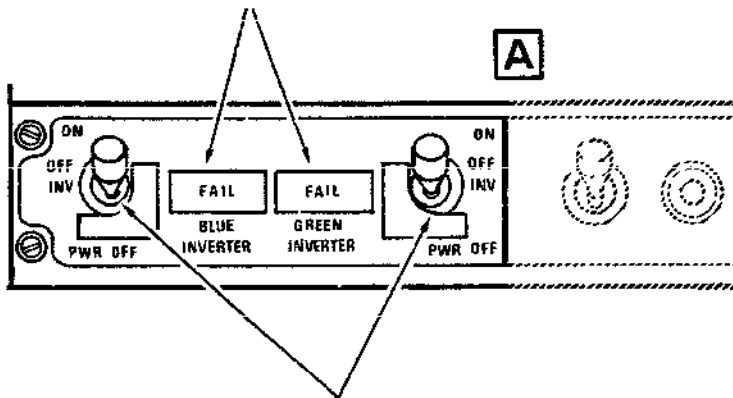
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## MAINTENANCE MANUAL

BLUE OR GREEN FAIL INDICATOR LIGHTS  
 - ILLUMINATES WHEN INVERTER IS FAULTY; SWITCH IS IN ON POSITION.  
 - ILLUMINATES WHEN THE AIRCRAFT IS ENERGIZED ON THE GROUND BY AN ELECTRICAL GROUND POWER UNIT ; SWITCH IS IN PWR OFF POSITION.



WHEN PRESSING BLUE OR GREEN FAIL INDICATOR LIGHTS ; WITH THE CORRESPONDING SWITCH IN OFF INV OR ON POSITION.  
 - FAIL INDICATOR LIGHT ILLUMINATES  
 - PFC WARNING LIGHT ILLUMINATES ON MASTER WARNING PANEL.  
 - GONG SOUNDS.



BLUE INVERTER AND GREEN INVERTER SWITCHES.  
 PWR OFF POSITION - THE SWITCH CUTS OUT THE BLUE OR GREEN 28VDC BAR WHICH SUPPLIES THE BLUE OR GREEN MONITORING AND CONTROL CHANNEL CIRCUITS. THIS POSITION IS USED ON THE GROUND WHEN THE AIRCRAFT IS SUPPLIED BY ELECTRICAL GROUND POWER UNIT. FAIL CORRESPONDING INDICATOR LIGHT IS THEN ILLUMINATED.  
 OFF POSITION - BLUE OR GREEN 28VDC BAR IS SUPPLIED BUT INVERTER DOES NOT OPERATE.  
 ON POSITION. BLUE OR GREEN INVERTER OPERATES.

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Electrical Supply  
 Figure 010

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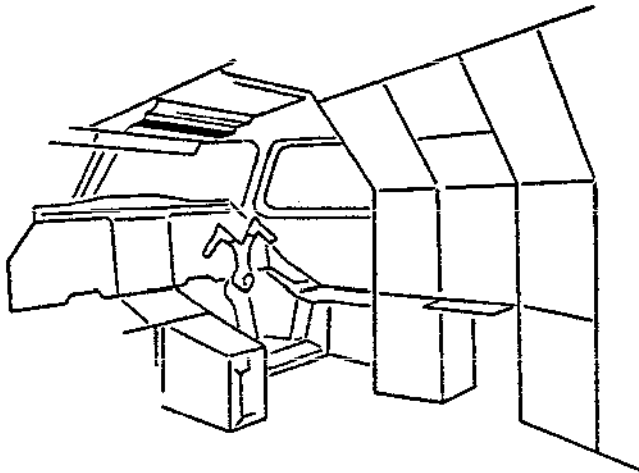
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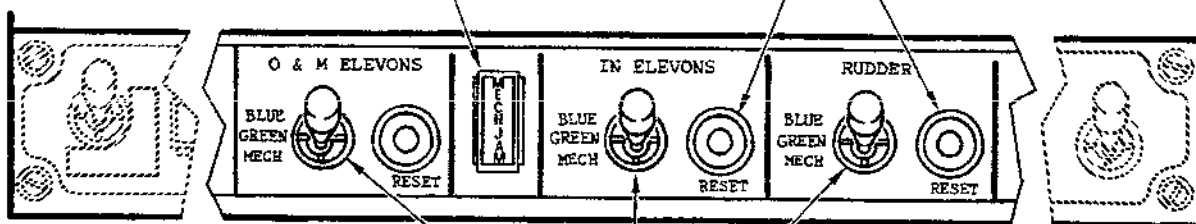
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## MAINTENANCE MANUAL



MECH JAM WARNING LIGHT  
ILLUMINATES IN THE EVENT OF  
A MECHANICAL CHANNEL JAMMING  
UPSTREAM OF THE RELAY JAK.  
AT THE SAME TIME PFC WARNING  
LIGHT ILLUMINATES AT MASTER WARNING  
WARNING PANEL AND GONG SOUNDS.

BUTTONS RESET  
FOR CHARGING FROM MECK TO GREEN  
GREEN TO BLUE  
RESET BUTTON MUST BE PRESSED



O & M ELEVON INNER ELEVONS, RUDDER SWITCHES.  
BLUE POSITION - NORMAL CONTROL CHANNEL  
GREEN POSITION - CONFIRMS THE AUTOMATIC CHANGE OVER TO  
GREEN CONTROL CHANNEL IN THE EVENT OF A FAILURE  
OF THE BLUE CONTROL CHANNEL.  
MECH. POSITION - CONFIRMS THE CHANGE-OVER TO  
MECHANICAL MODE IN THE EVENT OF A FAILURE  
OF THE GREEN CHANNEL.

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Control Channels  
Figure 011

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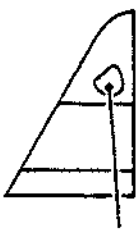
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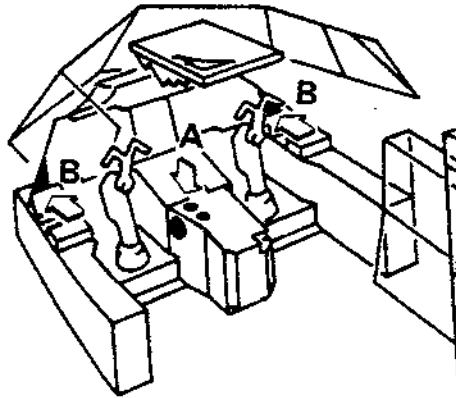
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## MAINTENANCE MANUAL



**B**

ADJUST PEDAL HANDLES  
THE RUDDER PEDAL MOUNTING IS  
SPRING LOADED AND THE PEDALS  
ARE ADJUSTED BY PUSHING OR  
RELEASING.

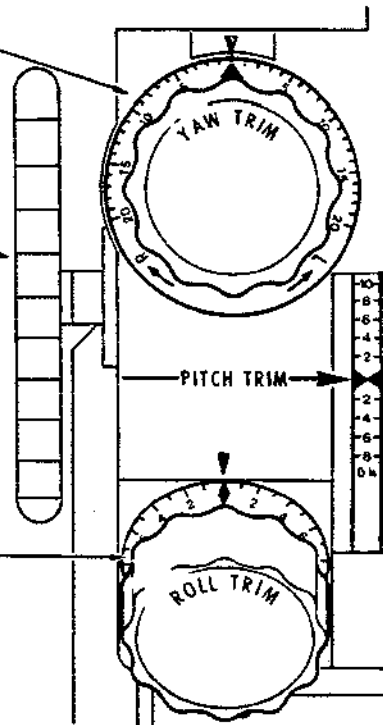


**A**

YAW TRIM CONTROL  
PROVIDES MANUAL CONTROL OF  
RUDDER TRIM.

TRIM PITCH WHEEL  
PROVIDES MANUAL CONTROL OF  
ELEVONS TRIM IN PITCH.  
THE PITCH TRIM WHEEL CAN BE  
USED TO OVERRIDE THE ELECTRICAL  
TRIM.  
MOVEMENT OF THE PITCH TRIM  
WHEEL IS ACCOMPANIED BY  
A SPRING BELL.

ROLL TRIM CONTROL  
PROVIDES MANUAL CONTROL  
OF ALL ELEVONS TRIM IN ROLL.



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Trim Controls  
Figure 012

R

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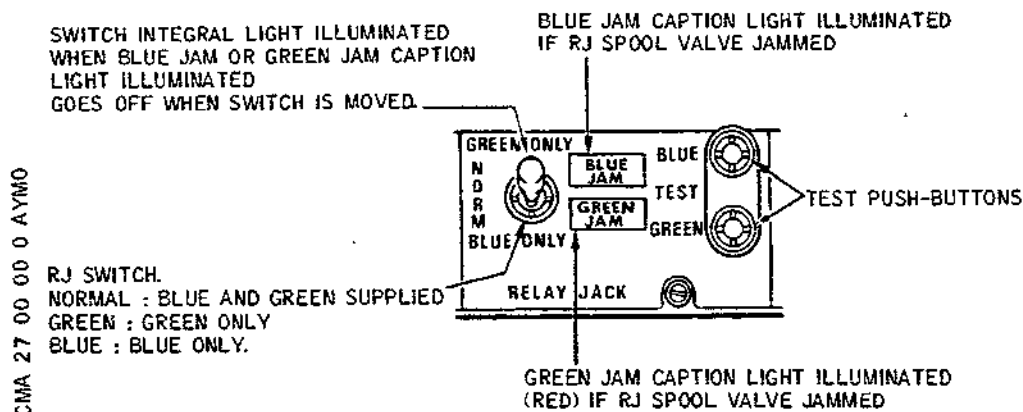
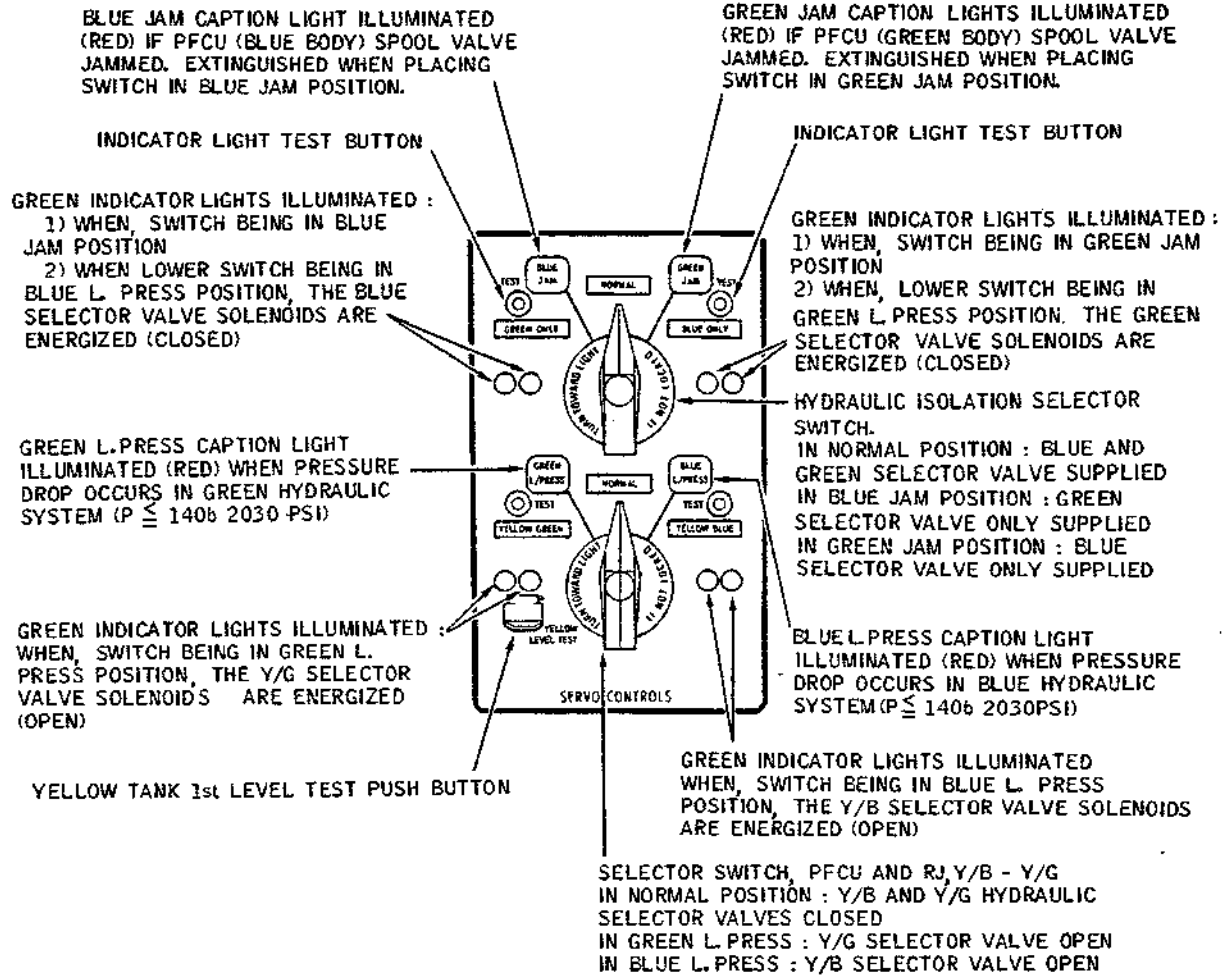
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## MAINTENANCE MANUAL



Hydraulic Selection  
Figure 013

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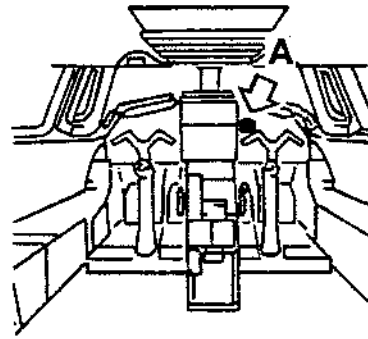
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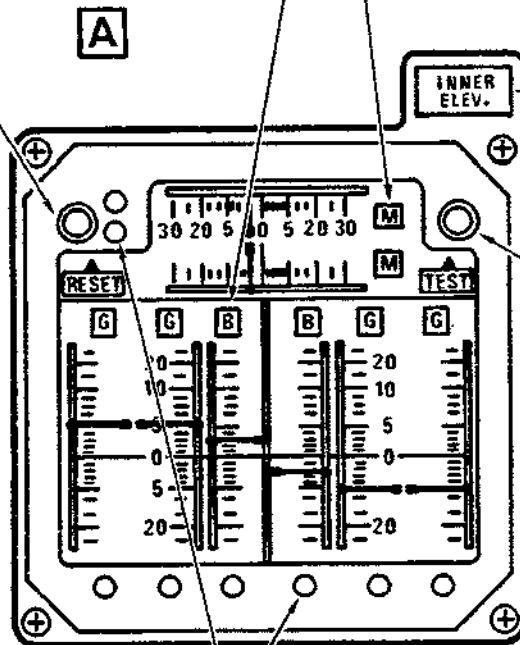
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## MAINTENANCE MANUAL

MAGNETIC INDICATORS INDICATE CONTROL MODE OF THE CORRESPONDING CONTROL SURFACES.  
 B ON BLUE BACKGROUND = BLUE  
 G ON GREEN BACKGROUND = GREEN  
 M ON RED BACKGROUND = MECHANICAL  
 THE 2 INDICATORS CORRESPONDING TO INNER ELEVONS MUST DISPLAY THE SAME COLOUR. IN THE SAME WAY THE 4 INDICATORS CORRESPONDING TO OUTER AND MIDDLE ELEVONS MUST DISPLAY THE SAME COLOUR.



RESET PUSH-BUTTON ENABLES RED WARNING LIGHTS TO BE EXTINGUISHED



INNER ELEV INDICATOR LIGHT ILLUMINATES IN THE EVENT OF INNER ELEVON DE SYNCHRONIZATION

ALARM TEST PUSH-BUTTON  
 - PRESSED :  
 INDICATOR LIGHTS FLASH  
 - RELEASED  
 INDICATOR LIGHTS REMAIN ON.

RED WARNING LIGHTS (8)  
 - ILLUMINATE WHEN A CONTROL MODE CHANGE-OVER OCCURS. (FAULT) SIGNAL SENT BY THE COMPARATORS. THIS WARNING IS ASSOCIATED WITH PFC WARNING LIGHT AND GONG  
 - FLASH IN CASE OF CONTROL SURFACE VIBRATIONS.

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Flight Control Surface Position Indicator (ICOVOL)

Figure 014

R

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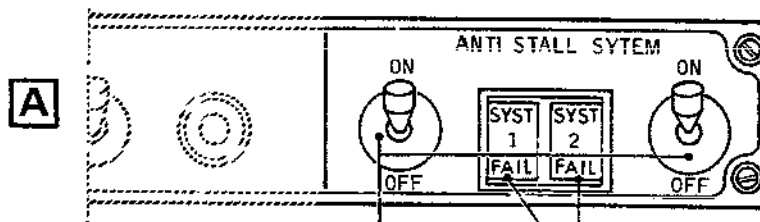
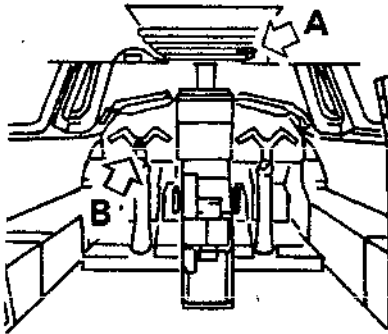
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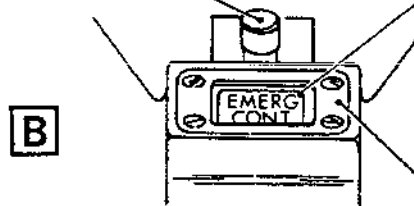


TWO STAGE AND POSITION SWITCHES (CONTROL AND MONITORING). THEY ENABLE ENGAGEMENT OF WOBBLER AND SUPERSTABILIZATION WARNINGS BELONGING TO THE ASSOCIATED SFC SYSTEM

SYST 1 FAIL AND SYST 2 FAIL INDICATOR LIGHTS THEY COME ON WHEN THE ASSOCIATED ANTI STALL SYSTEM DOES NOT OPERATE. THEY CAN BE EXTINGUISHED (EXCEPT IN THE EVENT OF A POWER SUPPLY FAILURE) BY PLACING THE ASSOCIATED ANTI STALL SWITCH IN THE OFF POSITION.

PUSHBUTTON FOR EMERGENCY FLIGHT CONTROL FUNCTION TEST. WHEN THIS PUSHBUTTON IS HOLD PRESSED ENGAGEMENT OF EMERGENCY FLIGHT CONTROL IS SIMULATED, ONLY WITH AIRCRAFT ON GROUND.

EMERG CONT INDICATOR LIGHT. IF THIS INDICATOR LIGHT IS PRESSED THE EMERGENCY FLIGHT CONTROL SYSTEM OF BOTH SFC COMPUTERS IS ENGAGED AND THE INDICATOR LIGHT COMES ON. IT IS NECESSARY TO PRESS AGAIN EMERG CONT INDICATOR LIGHT TO DISENGAGE THE EMERGENCY FLIGHT CONTROL SYSTEM.



PROTECTION MEMBRANE WHICH MUST BE PIERCED TO ENGAGE THE FUNCTION.

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Anti-Stall  
Figure 015

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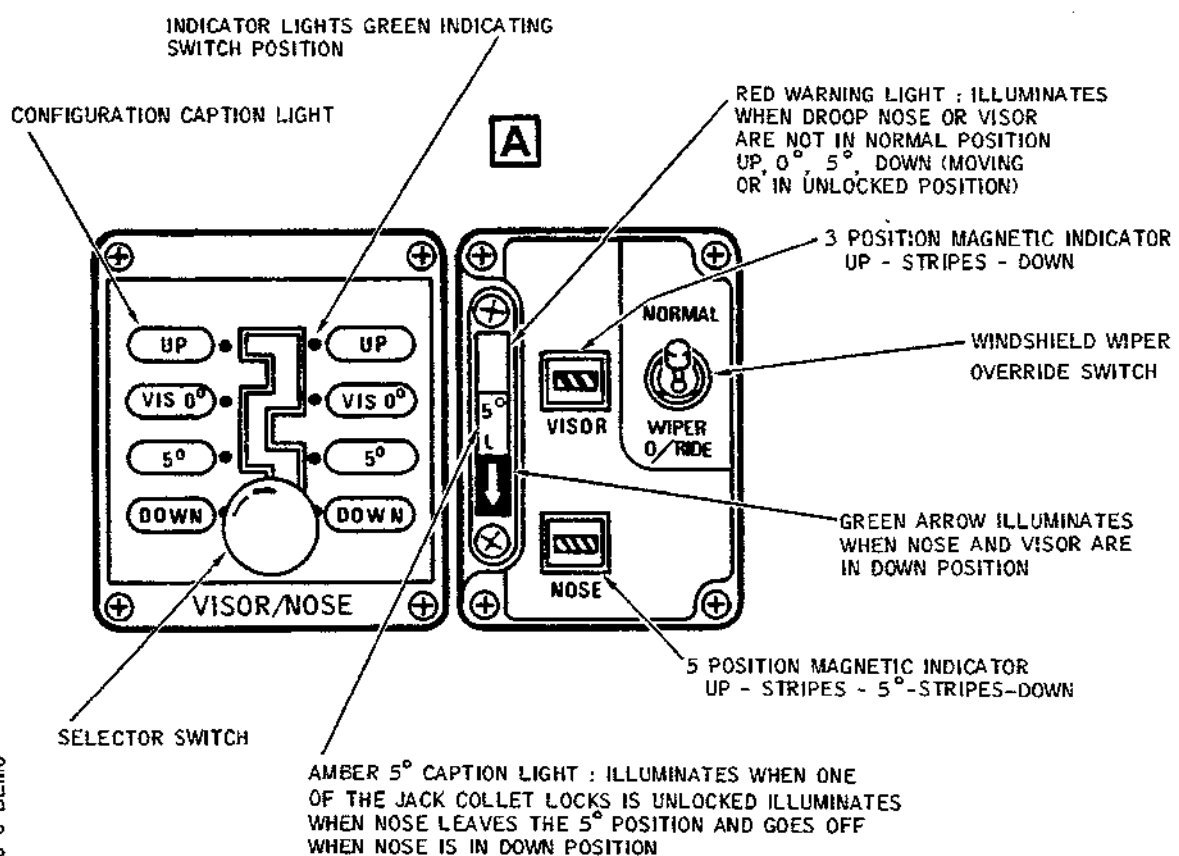
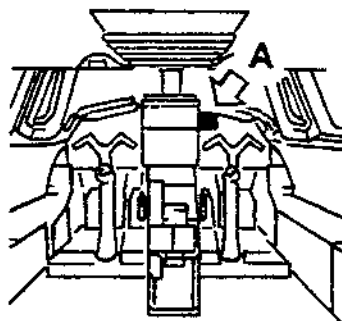
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# MAINTENANCE MANUAL



VISOR - DROOP NOSE CONTROL

Visor/Droop Nose Control  
Figure 016

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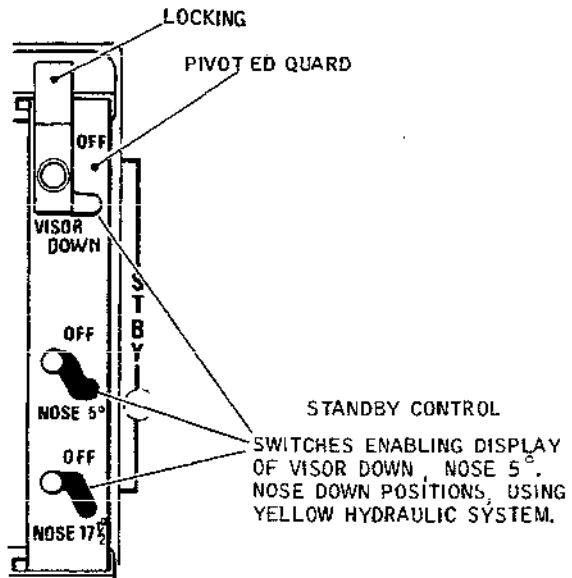
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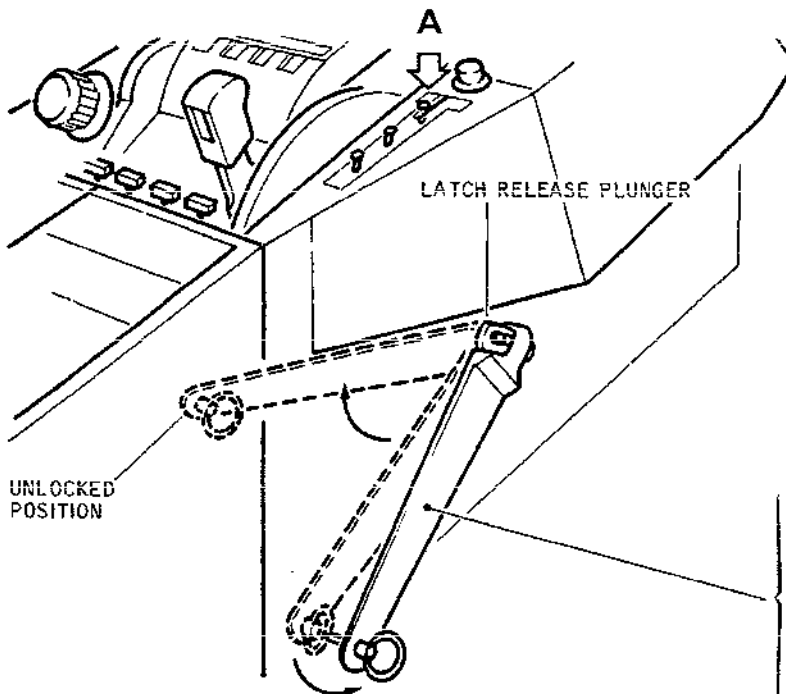
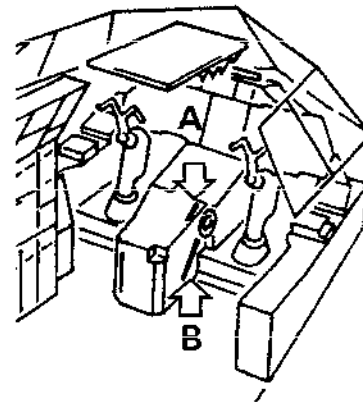


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## MAINTENANCE MANUAL



**A**



**B**

EMERGENCY CONTROL THE RELEASE LEVER CONNECTS NOSE/VISOR, NORMAL AND STANDBY SYSTEMS TO TANK RETURN AND LIFTS BOTH UPLOCK HOOKS. NOSE LOWERS DOWN TO 5° UNDER ITS OWN WEIGHT.

Visor/Droop Nose Standby Control  
Figure 017

R

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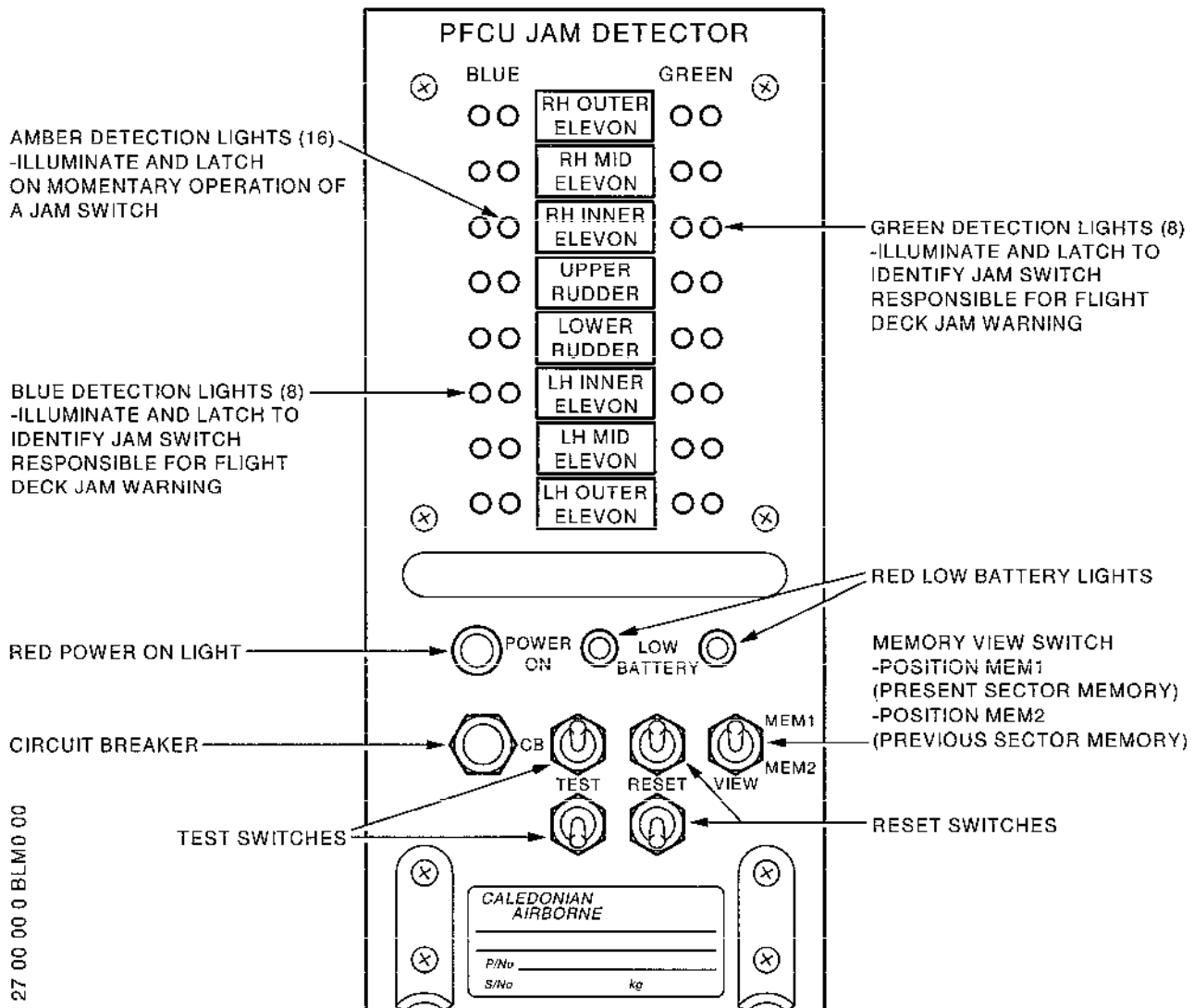
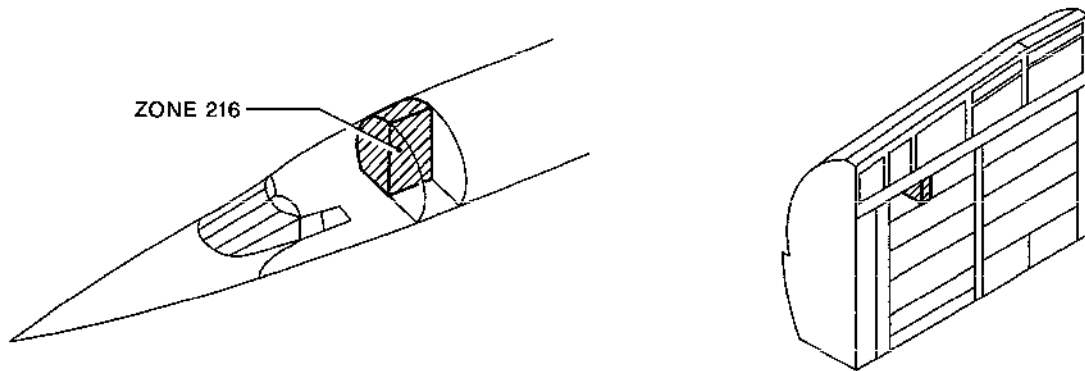
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## MAINTENANCE MANUAL



PFCU Jam Detector Unit  
Figure 018

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## MAINTENANCE MANUAL

### GENERAL - SERVICING

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

Operations described hereinafter must be carried out to set Flight Control system :

- in Blue or Green electrical mode.
- in mechanical mode.

#### 2. Procedure to set Flight Controls in Electrical Mode

##### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Electrical Ground Power Unit	
------------------------------	--

##### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.

NOTE : It is recommended to raise aircraft nose to up position to prevent a possible knocking noise in droop nose system hydraulic return lines when

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flight control tests are carried out.

- (2) On overhead panel :
  - (a) On Flight Control Unit.
    - (a1) Place BLUE INVERTER and GREEN INVERTER switches in OFF INV position.
    - (a2) Place O & M ELEVONS, IN.ELEVONS and RUDDER switches in MECH position.
  - (b) On SERVO CONTROLS unit make certain that both selector switches are in NORMAL position.
  - (c) On RELAY JACK unit, make certain that GREEN ONLY-NORM-BLUE ONLY switch is in NORM position.
- (3) On centre console, make certain that trim controls are set to zero.
- (4) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
INNER ELVN CONT & MON GRN SUP 1	1-213	1C 53	M11
MID & OUTER ELVN CONT & MON GRN SUP		1C 55	M12
OUTER ELEVON NEUTRLN GRN SUP		1C 58	M13
INNER ELEVON CONT & MON GRN SUP 2		1C 59	M14
PFCS INV GRN FAIL IND		1C 73	M15
AUDIO WARN SYS SUP 1		W 371	M21
RUDDER CONT & MON GRN SUP		1C 62	N11
RUDDER MON LOGIC GRN SUP		1C 63	N12
PFCS ALL SURFACES MON GRN SUP		1C 54	N13
PFCS INV BLUE FAIL SUP		1C 67	N14
PFCS INV GRN PROTN CONT		1C 68	N15
RELAY JACK HYD SEL IND & SUP		C 281	N17
PFC IND		C 287	N18
MWS SUP 1		W 252	N21
PFCS INV GRN SUP		1C 66	P11
YEL/GRN GRN FAIL. PFC & RELAY JACK "A" SYS CONT		C 285	P16

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
YEL/BLUE BLUE FAIL. PFC & RELAY JACK "A" SYS CONT		C 286	P17
YELL LL. PFC & RELAY JACK "A" SYS CONT		C 288	P18
FLT CONT POSN IND CONT		C 83	R11
FLT CONT POSN IND 26V 400HZ 2-213 SUP		C 84	B 4
OUTER ELEVON AMP BLUE SUP		2C 44	C 1
INNER ELEVON BLUE CONT SUP		2C 94	C 2
MID ELEVON AMP BLUE SUP		2C 93	C 3
MID & OUTER ELEVON BLUE CONT SUP		2C 92	C 4
INNER ELEVON MON BLUE SUP		2C 47	D 1
MID & OUTER ELEVON MON BLUE SUP		2C 46	D 2
RUDDER MON BLUE SUP		2C 49	D 3
RUDDER BLUE 26V 1800HZ CONT SUP		2C 76	D 4
PFCS INV BLUE PROTN SUP		2C 71	D 5
OUTER ELEVON AMP GRN SUP		1C 44	E 1
INNER ELEVON GRN CONT SUP		1C 94	F 1
MID ELEVON AMP GRN SUP		1C 93	F 2
INNER ELEVON MON GRN SUP		1C 47	G 1
MID & OUTER ELEVON MON GRN SUP		1C 46	G 2
RUDDER MON GRN SUP		1C 49	G 3
PFCS INV GRN PROTN SUP		1C 71	G 5
MID & OUTER ELEVON GRN CONT SUP		1C 92	H 5
RUDDER GRN 26V 1800HZ CONT SUP		1C 76	H 6
YELL L/LEVEL. PFC & RELAY JACK "B" SYS CONT	3-213	C 282	A 8
YELL/GRN GRN FAIL. PFC & RELAY JACK "B" SYS CONT		C 283	A 9
YELL/BLUE BLUE FAIL. PFC & RELAY JACK "B" SYS CONT		C 284	A10
PFCS INV BLUE SUP	5-213	2C 66	B14
RUDDER CONT & MON BLUE SUP		2C 62	C11
RUDDER MON LOGIC BLUE SUP		2C 63	C12
PFCS INV GRN FAIL SUP		2C 67	C13
PFCS INV BLUE PROTN CONT		2C 68	C14
AUDIO WARN SYS SUP 2		W 372	C17

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
INNER ELEVON CONT & MON BLUE SUP 1		2C 53	D11
MID & OUTER ELEVON CONT & MON BLUE SUP		2C 55	D12
OUTER ELEVON NEUTRLN BLUE SUP		2C 58	D13
INNER ELEVON CONT & MON BLUE SUP 2		2C 59	D14
MWS SUP 2		W 251	D15
PFCs INV BLUE FAIL IND		2C 73	E11
PFCs ALL SURFACES MON BLUE SUP		2C 54	E12
ROOF PNL LT TEST SUP	15-216	L1002	D13

(5) Set the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT & NAV BUS 14XS	2-213	X 355	H 2

(6) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

NOTE : Do not take into account indications and aural or visual warnings which are not mentioned in the text.

(a) - Gong must sound.

(b) - On overhead panel :

(b1) On master warning panel PFC warning light must illuminate.

(b2) On Flight Control Unit, both FAIL warning lights of BLUE INVERTER and GREEN INVERTER switches and MECH JAM warning light must illuminate.

(b3) On SERVO CONTROLS unit, both BLUE L.PRESS

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and GREEN L.PRESS caption lights must illuminate.

- (c) - On First Officer's instrument panel, the 8 magnetic indicators on the Flight Control Surface Position Indicator (ICOVOL indicator) must display M ; the indicating pointers associated with the elevons must be at lower stop ; those associated with rudders must indicate zero.
- (7) On Flight Engineer's panel, on EQUIPMENT BAY COOLING unit, make certain that electronics rack ventilation operates (Ref. 21-21-00).
- (8) On First Officer's instrument panel, press ALARM TEST push button on ICOVOL indicator and hold it pressed.
  - the 8 red warning lights on ICOVOL indicator must flash.
- (9) Release ALARM TEST push button
  - the 8 red warning lights on ICOVOL indicator must be and remain illuminated.
  - gong must sound.
- (10) Press and release the ICOVOL RESET push button.
  - the 8 red warning lights must go off.
- (11) Press and release PFC warning light
  - this warning light must go off.

### C. Procedure

- (1) Pressurize the Blue and Green hydraulic systems (Ref. 29-12-00, Servicing and 29-11-00, Servicing).
  - On overhead panel, on SERVO CONTROLS unit, BLUE L.PRESS and GREEN L.PRESS caption lights must go off.
  - On First Officer's instrument panel, on ICOVOL indicator the indicating pointers associated with elevons must indicate zero (elevons are in neutral position).
- (2) On overhead panel, on Flight Control Unit :
  - (a) Place BLUE INVERTER and GREEN INVERTER switches

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in ON position.

- Corresponding FAIL warning lights must go off.

(b) Press and release MECH JAM warning light.

- this warning light must go off.

(c) Place O & M ELEVONS, IN ELEVONS and RUDDER switches in BLUE position if Flight Controls are to be set in Blue electrical mode (or in GREEN position for operation in Green electrical mode).

(d) Press and release each RESET push-button located on the RH side of each switch.

- When pressing each push-button, the IC0VOL magnetic indicators corresponding to the affected assembly of associated control surfaces must display B (or G) according to the control mode pre-selected above in (c).

(3) Carry out operations requiring use of Flight Controls in electrical mode.

### D. Close-Up

(1) Shut down pressurization of Blue and Green hydraulic systems (Ref. 29-12-00, Servicing and 29-11-00, Servicing).

(2) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

(3) On overhead panel :

(a) On Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position and O & M ELEVONS, IN.ELEVONS and RUDDER switches in MECH position.

(4) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT & NAV BUS 14XS	2-213	X 355	H 2

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### 3. Procedure to set Flight Controls in Mechanical Mode

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.

NOTE : It is recommended to raise aircraft nose to up position to prevent a possible knocking noise in droop nose system hydraulic return lines when flight control tests are carried out.

- (2) On overhead panel :

- (a) On Flight Control Unit :

(a1) Make certain that BLUE INVERTER and GREEN INVERTER switches are in PWR OFF position.

(a2) Make certain that O & M ELEVONS, IN.ELEVONS and RUDDER switches are in MECH position.

- (b) On SERVO CONTROLS unit, make certain that both switches are in NORMAL position.

- (c) On RELAY JACK unit, make certain that GREEN ONLY-NORM-BLUE ONLY switch is in NORM position.

- (3) On centre console, make certain that trim controls are set to zero.

- (4) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFCS INV GRN FAIL IND	1-213	1C 73	M15
AUDIO WARN SYS SUP 1		W 371	M21
PFCS ALL SURFACES		1C 54	N13
MON GRN SUP			
RELAY JACK HYD SEL		C 281	N17

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
IND & SUP			
PFC IND		C 287	N18
MWS SUP 1		W 252	N21
YEL/GRN. GRN. FAIL. PFC & RELAY JACK "A" SYS CONT		C 285	P16
YEL/BLUE BLUE FAIL. PFC & RELAY JACK "A" SYS CONT		C 286	P17
YEL LL. PFC & RELAY JACK "A" SYS CONT		C 288	P18
FLT CONT POSN IND CONT		C 83	R11
FLT CONT POSN IND 26 V - 400 Hz SUP	2-213	C 84	B 4
YEL L/LEVEL. PFC & RELAY JACK "B" SYS CONT	3-213	C 282	A 8
YELL/GRN GRN FAIL. PFC & RELAY JACK "B" SYS CONT		C 283	A 9
YELL/BLUE BLUE FAIL. PFC & RELAY JACK "B" SYS CONT		C 284	A10
AUDIO WARN SYS SUP 2	5-213	W 372	C17
MWS SUP 2		W 251	D15
PFCS INV BLUE FAIL IND		2C 73	E11
PFCS ALL SURFACES		2C 54	E12
MON BLUE SUP			

- (5) Remove safety clip and tag and set the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT & NAV BUS 14XS	2-213	X 355	H 2

- (6) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

NOTE : Do not take into account aural or visual warnings which are not mentioned in the text.

(a) - Gong must sound.

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- (b) - On overhead panel :
  - (b1) On master warning panel, PFC warning light must illuminate.
  - (b2) On Flight Control Unit, FAIL warning lights of BLUE INVERTER and GREEN INVERTER switches and MECH JAM warning light must illuminate.
  - (b3) On SERVO CONTROLS unit, BLUE L.PRESS and GREEN L.PRESS caption lights must illuminate.
- (c) - On ICOVOL indicator (First Officer's instrument panel) the 8 magnetic indicators must display M.
- (7) Press and release PFC warning light :
  - this warning light must go off.
- (8) On Flight Engineer's panel, on EQUIPMENT BAY COOLING unit, make certain that electronics rack ventilation operates (Ref. 21-21-00).

### C. Procedure

- (1) Pressurize Blue and Green hydraulic systems (Ref. 29-12-00, Servicing and 29-11-00, Servicing).
  - On overhead panel, on SERVO CONTROLS unit BLUE L.PRESS and GREEN L.PRESS caption lights must go off.
- (2) On overhead panel, on Flight Control Unit :
  - (a) Press and release MECH JAM warning light :
    - This warning light must go off.
  - (b) Place BLUE INVERTER and GREEN INVERTER switches in OFF INV position :
    - The corresponding FAIL warning lights must go off.
    - On ICOVOL indicator (First Officer's instrument panel) the indicating pointers associated with the elevons must indicate zero (elevons are in neutral position).
- (3) Carry out operations requiring use of flight controls in mechanical mode.

### D. Close-Up

- (1) Shut-down pressurization of Blue and Green hydraulic

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systems (Ref. 29-12-00, Servicing and 29-11-00, Servicing).

- (2) De-energize the aircraft electrical network (24-41-00, Servicing) and disconnect electrical ground power unit.
- (3) On overhead panel, on Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position.
- (4) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT & NAV BUS 14XS	2-213	X 355	H 2

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PFCU JAM DETECTOR UNIT - MAINTENANCE PRACTICES

**WARNING:** OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DETAILED IN 24-00-00.

1. General

- A. The PFCU Jam Detector Unit is mounted in the Flight Deck RH Racking, Location 2-216.
- B. Diodes that perform a blocking function for the PFCU Jam Detector Unit are located in the RH Fwd Rack (8-216 JB) and Rear Electrical Rack (03-243).
- C. The Maintenance Practices applicable to this unit are as follows:
  - (1) Battery Replacement Procedure.
  - (2) Diode Serviceability Check.
  - (3) BITE Test of PFCU Jam Detector Unit.

2. Battery Replacement Procedure

A. General

- (1) The Battery Pack of the PFCU Jam Detector Unit is not rechargeable and requires to be replaced at no greater than yearly intervals (whether in operational use or storage while connected) or whenever either of the front panel LOW BATTERY indicators light. The Jam Detector Unit will remain fully functional when only one such indicator is lit but the Battery Pack must be replaced at the first opportunity. If either indicator should light between annual battery replacements then this is likely to be due to a fault condition, and it is recommended that the Jam Detector Unit and Battery Pack be returned to the supplier for investigation.
- (2) This procedure describes the steps to be taken in the removal and replacement of the Battery Pack of the PFCU Jam Detector Unit.

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**B. Battery Removal**

**CAUTION:** ENSURE THAT BATTERY TERMINALS ARE NOT SHORTED TOGETHER OR TO THE CHASSIS DURING REMOVAL.

MEMORY CONTENT WILL BE LOST WHEN THE BATTERY IS DISCONNECTED. ENSURE THAT MEMORY IS READ IF REQUIRED BEFORE CARRYING OUT THIS PROCEDURE.

THE UNIT CONTAINS ELECTROSTATIC SENSITIVE DEVICES. ITS PRINTED CIRCUIT BOARDS SHOULD ONLY BE HANDLED IN AN ESD PROTECTED AREA AND THEN ONLY IN ACCORDANCE WITH CAA CAP 562 LEAFLET 9-4.

- (1) Remove the Jam Detector Unit from the aircraft to a clean area (Ref. Removal/Installation).
- (2) Perform visual inspection of the unit for damage before proceeding.
- (3) Remove and retain the cross-recessed head screw and plain washer located at the front top of the case, and rotate the Dzus fastener in the centre of the rear panel by around 90° till it disengages.
- (4) Slowly withdraw the chassis from the case using the front panel handle, and place the chassis inverted on a clean surface.
- (5) Remove and retain each of the 4 slotted head screws and washers retaining the battery terminals in turn, ensuring that as each is removed its insulating sleeve is slid onto the terminal to provide complete protection from short circuit.
- (6) Remove and retain the 4 cross-recessed head screws, plain and locking washers securing the battery pack baseplate to the chassis.

**WARNING:** THE BATTERY PACK CONTAINS CELLS OF THE ALKALINE MANGANESE TYPE WITH SMALL MERCURY CONTENT. IT IS RECOMMENDED THAT THESE EITHER BE DISPOSED OF BY RETURN TO THE SUPPLIER OR BY OTHER APPROVED PROCEDURES.

UNDER NO CIRCUMSTANCES SHOULD THE BATTERY PACK BE DISPOSED OF BY FIRE AS IT MAY EXPLODE OR LEAK.

- (7) Carefully withdraw the battery pack through the aperture in the chassis.

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**C. Battery Installation**

**CAUTION:** DO NOT EXPOSE THE TERMINALS ON THE REPLACEMENT BATTERY PACK BY SLIDING BACK THE INSULATING SLEEVES UNTIL REQUIRED TO DO SO, AND THEN ENSURE THAT THE TERMINALS ARE NOT SHORTED TOGETHER OR TO THE CHASSIS. IF ACCIDENTAL SHORT CIRCUIT DOES TAKE PLACE THEN REPLACE THE BATTERY PACK.

- (1) Unpack the new battery pack and locate the 4 off replacement crinkle washers.
- (2) Verify that the battery pack has not exceeded its 3 year storage life.

**NOTE:** It is assumed that the discharged battery pack has been removed in accordance with para. 2.B., that the Jam Detector chassis is inverted on the bench and that the relevant fixings have been retained.

- (3) Carefully insert the new battery pack into the chassis aperture, ensuring that the leads lie in the direction of the chassis terminals.
- (4) Secure the battery pack baseplate to the chassis using the cross-recessed head screws, plain and locking washers retained in para. 2.B.(6).
- (5) One at a time push back onto its wire each of the battery terminal insulating sleeves and secure to the relevant chassis terminal using the slotted head screws retained in para. 2.B.(5) and new crinkle washers, as follows:

<u>Wire Ident</u>	<u>Terminal Ident</u>
Red No. 1	+ (1)
Red No. 2	+ (2)
Black No. 1	- (1)
Black No. 2	- (2)

- (6) Slowly replace the chassis into the case.

**CAUTION:** IN THE FOLLOWING PROCEDURE, UNDER NO CIRCUMSTANCES USE A LONGER SCREW, OMIT THE WASHER OR OVERTIGHTEN THE SCREW (NOTICEABLE BY CASE DEFORMATION).

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- (7) Rotate the Dzus fastener in the centre of the rear panel until it positively engages, and replace the cross-recessed head screw and washer removed in para. 2.B.(3).
- (8) Install the Jam Detector Unit on the aircraft (Ref. Removal/Installation).
- (9) Ensure that neither front panel LOW BATTERY indicator is lit then ensure memory content is cleared by operating the RESET switches twice.
- (10) Carry out BITE test in accordance with para. 4.

3. Diode Serviceability Check

A. General

- (1) Diodes, part number 1N3938PR (Post Mod 27F121), perform a blocking function to ensure that any problem with the PFCU jam detector unit will not be fed into the flying control system.

B. References

- (1) WDM 27-37-90, 27-37-91.
- (2) Modification Drawing 0-97187.

C. Test

- (1) Check each of the following diodes for correct installation, orientation and serviceability:

<u>Ident</u>	<u>Location</u>	<u>Circuit</u>
C9002	03-243 Rear Elect Rack	LH Outer Elevon Green
C9003	03-243 Rear Elect Rack	LH Mid Elevon Green
C9004	03-243 Rear Elect Rack	LH Outer Elevon Blue
C9005	03-243 Rear Elect Rack	LH Mid Elevon Blue
C9006	03-243 Rear Elect Rack	LH Inner Elevon Blue
C9007	03-243 Rear Elect Rack	LH Inner Elevon Green
C9008	03-243 Rear Elect Rack	Upper Rudder Green
C9009	03-243 Rear Elect Rack	Lower Rudder Green
C9010	03-243 Rear Elect Rack	RH Outer Elevon Green
C9011	03-243 Rear Elect Rack	RH Mid Elevon Green
C9012	03-243 Rear Elect Rack	RH Outer Elevon Blue
C9013	03-243 Rear Elect Rack	RH Mid Elevon Blue
C9014	03-243 Rear Elect Rack	RH Inner Elevon Blue
C9015	03-243 Rear Elect Rack	RH Inner Elevon Green
C9016	03-243 Rear Elect Rack	Upper Rudder Blue
C9017	03-243 Rear Elect Rack	Lower Rudder Blue
C9018	8-216 JB RH Fwd Rack	Flt Deck Light Blue
C9019	8-216 JB RH Fwd Rack	Flt Deck Light Green

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- (a) Diodes C9002 to C9009 should not allow flow from the applicable terminal on UG9024 to UG9025.
  - (b) Diodes C9010 to C9017 should not allow flow from the applicable terminal on UG9026 to UG9027.
  - (c) Diodes C9018 and C9019 should not allow flow from the applicable pin of U2598 to UM2588 26 and 27.
- (2) Any diode found unserviceable is to be replaced.

4. BITE Test of PFCU Jam Detector Unit

A. General

- (1) This test procedure checks the integrity of the unit and its associated wiring.
- (2) The BITE test must be carried out after Removal/Installation of the unit.

B. Prepare

- (1) Make available electrical ground power as detailed in 24-41-00.

C. Test (Ref. Fig. 201)

- (1) Operate and hold the two test switches:
  - (a) All amber detection lights illuminate followed by all the blue and green detection lights.
  - (b) The low battery lights also illuminate.
- (2) Release the test switches:
  - (a) All amber detection lights remain illuminated.
  - (b) The blue and green detection lights and the low battery lights extinguish.
- (3) Operate the memory view switch to MEM1:
  - (a) All blue and green detection lights again illuminate (in addition to the amber detection lights) whilst the switch is held at MEM1.

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(4) Operate the two reset switches:

(a) All amber detection lights extinguish.

D. Close-Up

(1) Switch off and disconnect electrical ground power as detailed in 24-41-00.

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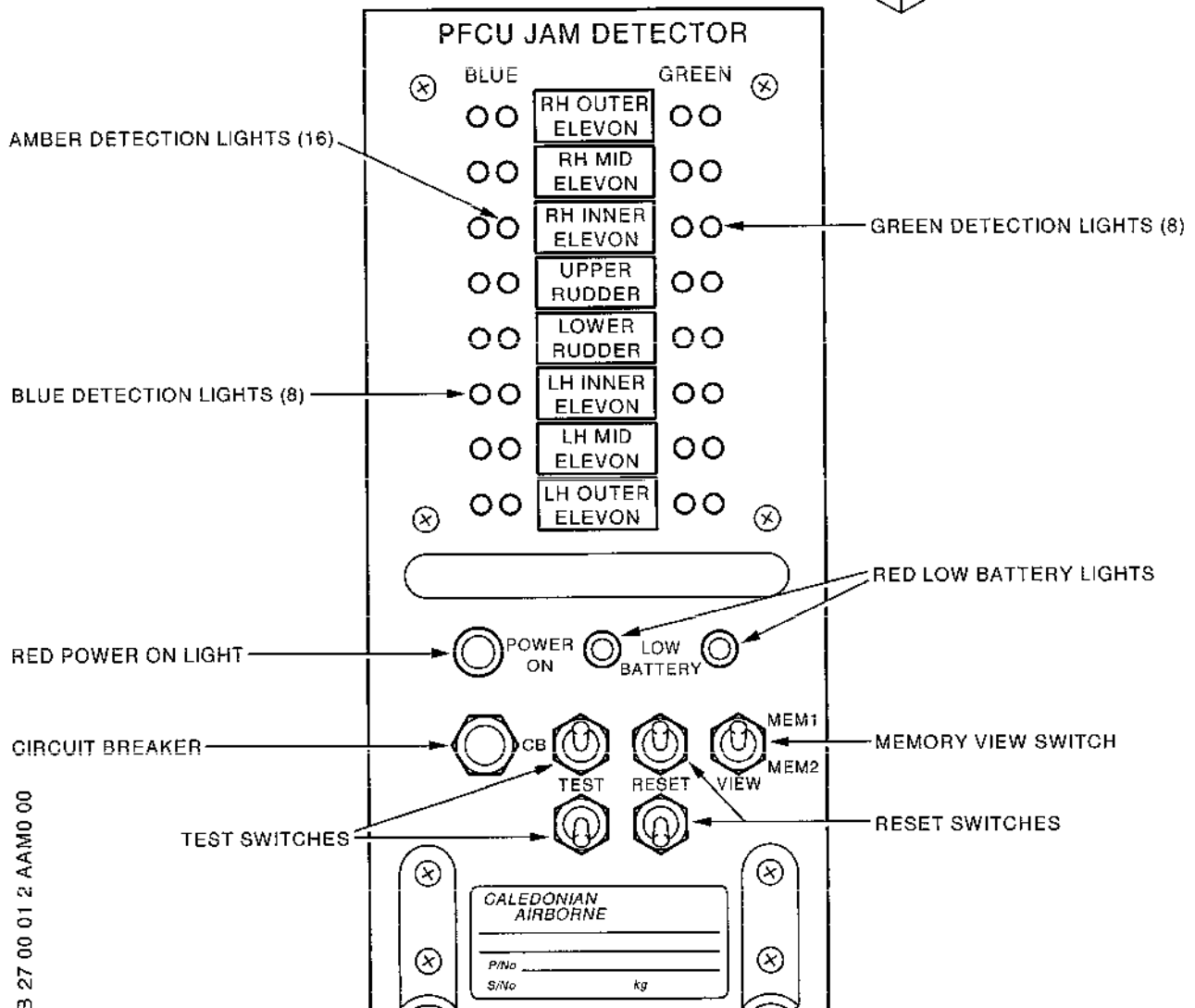
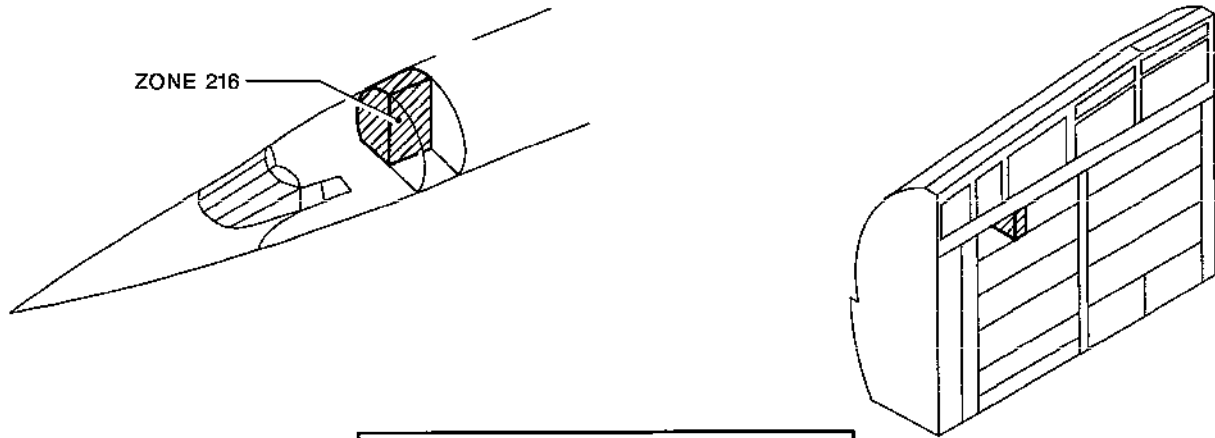
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PFCU Jam Detector Unit  
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PFCU JAM DETECTOR UNIT - REMOVAL/INSTALLATION

WARNING: OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DETAILED IN 24-00-00.

CAUTION: THE UNIT CONTAINS ELECTROSTATIC SENSITIVE DEVICES AND MUST BE HANDLED, TESTED AND STORED IN ACCORDANCE WITH CAA CAP 562 LEAFLET 9-4.

1. General

A. The PFCU Jam Detector Unit is mounted in the Flight Deck RH Racking, Location 2-216.

2. PFCU Jam Detector Unit

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clip	-

B. Prepare

(1) Trip, safety and tag the following circuit breaker:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFCU JAM DETECTOR UNIT	15-216	C9021	E25

(2) Remove the lower forward panel in Zone 216.

C. Remove

(1) On the unit unscrew the two locking knurled knobs and disengage the locking system downwards.

(2) Remove the unit pulling it by its handle.

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**D. Install**

- (1) Check that the unit rear connector and its mating rack connector are clean and free from damage.

CAUTION: WHEN INSTALLING THE UNIT PROCEED WITH CARE  
TO AVOID DAMAGE TO THE ELECTRICAL CONNECTOR  
PINS.

- (2) Engage the unit on its guiding rails and push it fully into the rack.
- (3) Install both locking systems and screw up the knurled knobs.
- (4) Remove the safety clip and tag and reset the circuit breaker tripped in para. B(1).

**E. Test**

- (1) Carry out BITE test (Ref. 27-00-01, Maintenance Practices).

**F. Close-up**

- (1) Install the lower forward panel in Zone 216.

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### ROLL CONTROL - DESCRIPTION AND OPERATION

#### 1. General (Ref. Fig. 001 )

##### A. Manual Control

The controls transmit their movement by cables, levers and rods through the artificial feel (AF) to :

- (1) The electrical resolvers of the elevons PFCU.
- (2) The control lever of the relay jack which drives the PFCU mechanical controls.

The trim wheel, mounted on the centre console, operates the PFCU control resolvers and the relay jack without altering the artificial feel.

The relative elevon deflections are obtained by electrical control, via the resolvers and by mechanised control via a mechanical system called a mixing unit.

##### B. Automatic Pilot

The aircraft is fitted with two automatic pilot systems (AP1 and AP2). These two systems are independent and electrically control the relay jack which, by an auto pilot force limiter drives the PFCU electrical control resolvers, the PFCU mechanical control linkage and the Captain's controls.

#### 2. Operation

##### A. Electrical Control of PFCUs (Ref. Fig. 002 )

After leaving the resolvers, the control of the PFCUs is divided into two channels. The Blue channel and the Green channel. The Blue channel takes priority.

Each PFCU, comprises a body which is mechanically linked to the elevons and is moved by two jacks in tandem attached to the aircraft structure.

Each half of the PFCU body contains an electrically controlled spool valve which is associated with a servo-valve and an electro-valve.

The hydraulic pressure in each half of the body is controlled by the spool valve and the electro-valve.

EFFECTIVITY: ALL

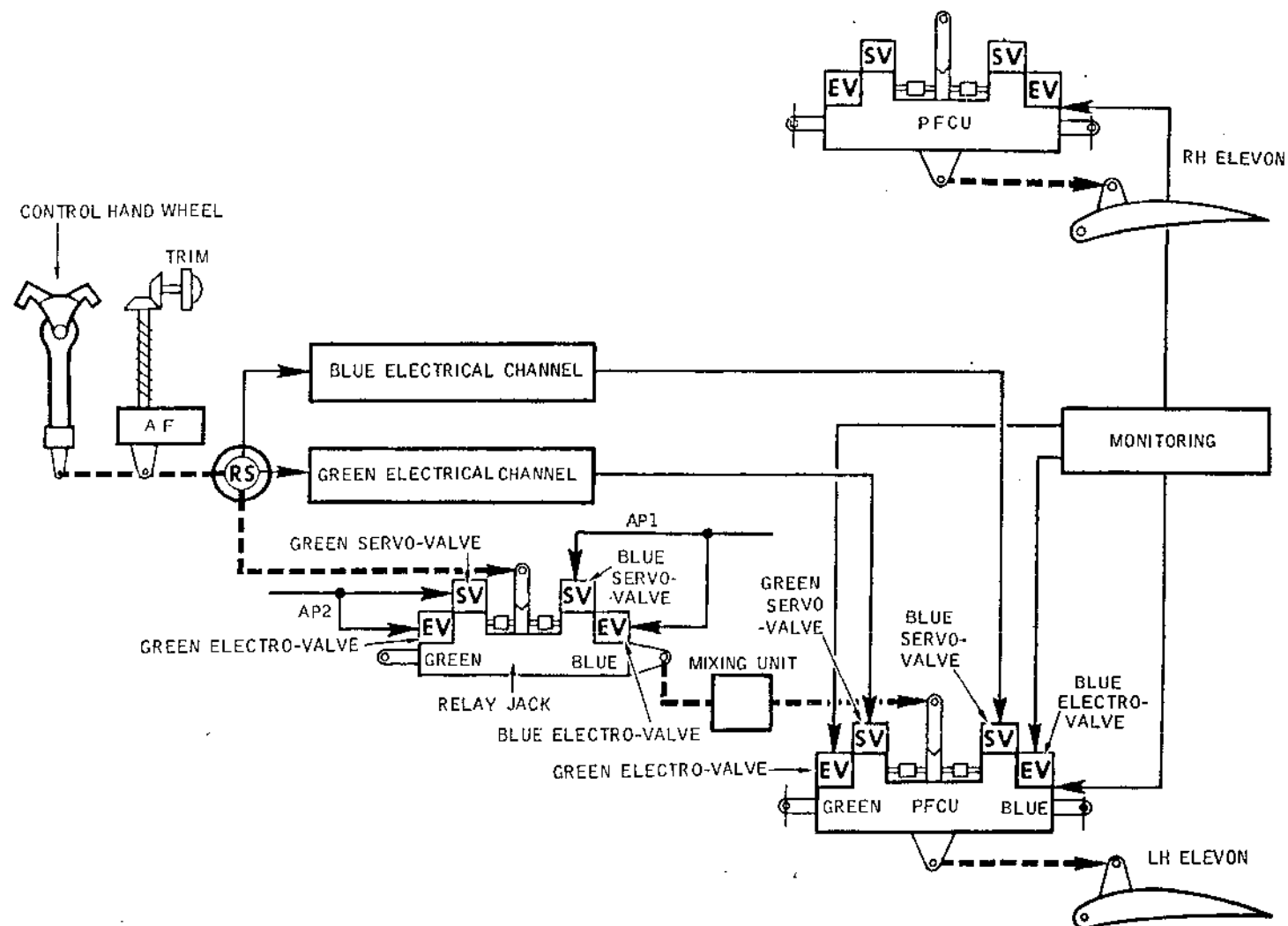
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CMA 27 10 00 0 AAM0



Roll Control - Schematic  
Figure 001

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EFFECTIVITY: ALL

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By analogy with the hydraulic system which supplies them, the components of each body-half are termed Blue if they use the BLUE system and Green if they use the GREEN system.

If nothing abnormal is disclosed by the electrical monitoring system, the Blue electro-valve opens and pressure is admitted to the Blue servo-valve. The Green electro-valve remains closed.

Electrical signals, transmitted by the Blue channel, control the proportional opening of the servo-valve.

The signal regulated servo-valve receives the hydraulic pressure admitted by the electro-valve.

The regulated pressure displaces the Blue spool valve which because of the mechanical linkage moves the Green spool valve.

The Blue and Green hydraulic pressures at the spool valves are directed to the annular section of the jacks and the PFCU body then moves in the same direction as the spool valves.

The movement stops when the PFCU finds a position of rest relative to the new position of the spool valves thus blocking the hydraulic pressure inlet ports.

### B. Monitoring System

The Blue and Green electro-valves are controlled by an electronic monitoring system.

In normal control, when this system detects a Fault during flight phase, it automatically closes the Blue electro-valve and opens the Green electro-valve.

The Green servo-valve is then controlled by the Green electrical channel and activates the Green spool valve.

If the monitoring system detects a new fault, it closes the Green electro-valve.

An internal hydraulic system in the PFCU then locks the spool valves mechanical control lever.

### C. Mechanical Control (Ref. Fig. 003 )

The relay jack, mechanically controlled by the flight controls, operates the PFCU spool valves by means of cables, rods and relays.

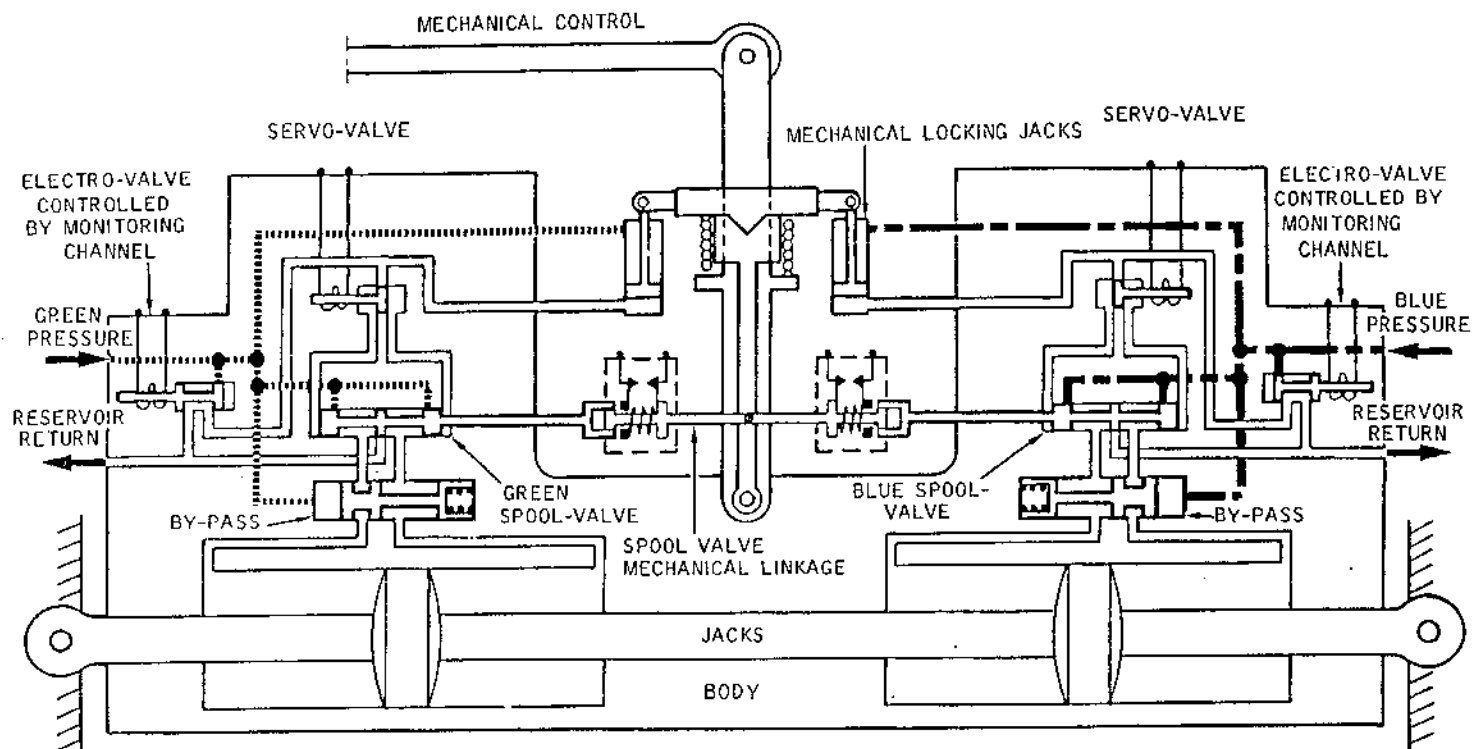
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PFCU IN NEUTRAL POSITION SUPPLIED WITH BLUE AND GREEN PRESSURE.  
ELECTRO-VALVES CLOSED, SERVO-VALVES NOT SUPPLIED AND MECHANICAL  
CONTROLS LOCKED.

PFCU Control - Schematic  
Figure 002

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EFFECTIVITY: ALL

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Each relay jack comprises a body attached to the PFCU spool valve control linkages.

The body is moved by two jacks in tandem which are attached to the aircraft structure.

Each half of the body contains an electrically controlled spool valve which is associated with a servo-valve and an electro-valve.

Hydraulic power in each half of the body is held back by the spool valve and the electro-valve, and locks the relay jack control lever on the spool valves.

This lever, mechanically operated by the flight controls, moves the spool valves.

The Blue and Green hydraulic pressures are then directed to the annular sections of the jacks and the Relay Jack body moves in the same direction as the spool valves.

The movement stops when the body finds a position of rest relative to the position of the spool valves thus blocking the hydraulic pressure input ports.

### D. Auto Pilot

By analogy with the hydraulic pressure which supplies them, the components of each body half are called Blue if they use the BLUE system and Green if they use the GREEN system.

AP1 electrically controls the relay jack via the Blue servo-valve, AP2 via the Green servo-valve.

If nothing abnormal is disclosed by the AP electronic monitoring system, the Blue electro-valve opens, Blue hydraulic pressure is admitted to the Blue servo-valve and operates on the servo-valve mechanical control lever locking system.

This hydraulic locking jack unlocks the control lever from the spool valves and locks it on to the relay jack body.

The AP1 control signal opens the Blue servo-valve proportionally which regulates the hydraulic pressure admitted to the electro-valve.

This regulated pressure moves the Blue spool valve which, being mechanically attached to the Green spool valve, is also moved.

The Blue and Green hydraulic pressures held back by the

EFFECTIVITY: ALL

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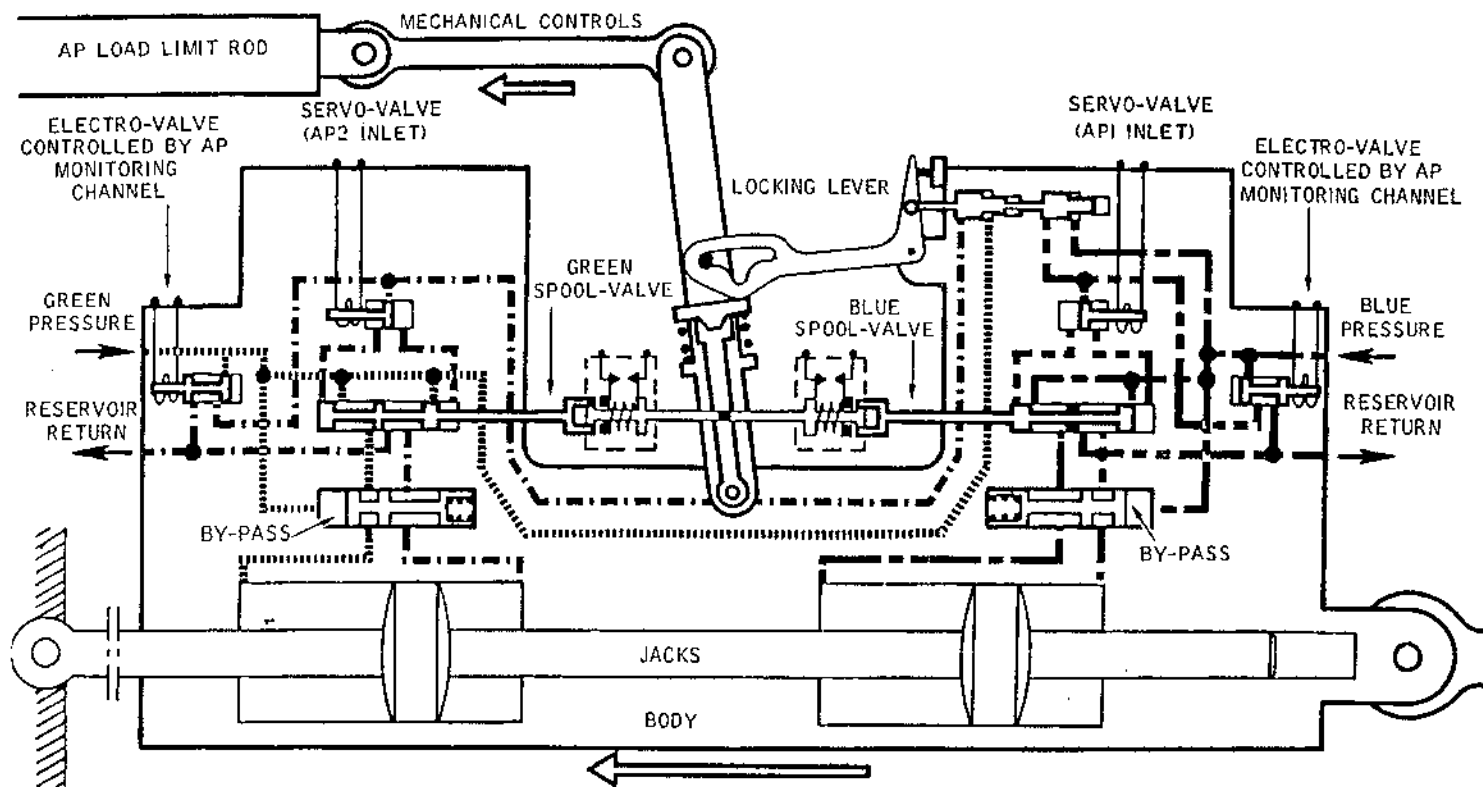
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CMA 27 10 00 0 AEM0

SERVO-CONTROL IN MECHANICAL MODE WITH  
LEVER LOCKED ON SPOOL-VALVES



Relay Jack Control - Schematic  
Figure 003

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spool valves are now directed to the annular sections of the jacks, the relay jack body moves in the same direction as the spool valves thus blocking the pressure input ports.

The relay jack displacement moves the input lever, which is locked on to its body, together with the PFCU mechanical control linkage.

The input lever displacement controls the PFCU electrical control resolvers and the manual flight controls via the AP force limiter.

In the AP1 mode, the relay jack monitoring system is supplied and opens the Blue electro-valve.

When the system detects a Fault during flight phase it automatically closes the Blue electro-valve and trips AP1.

The input lever is again locked on to the spool valves thus re-establishing manual control. If the pilot wishes to continue his flight in AP, he must switch on AP2, which functions in the same way as AP1 but using the Green hydraulic system.

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### ROLL CONTROL - TROUBLE SHOOTING

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS IN 24-00-00, SERVICING.

#### 1. General

The following trouble shooting is common to the three sections 27-10-00 (Roll), 27-20-00, (Yaw), and 27-30-00 (Pitch).

It is divided into two parts :

- Trouble shooting with Flight Controls Electrical Circuits Test Set
- Trouble shooting using front face of Flight Control surface monitoring comparators (this second part is a partial substitute of trouble shooting procedure with Test Set).

The following trouble shooting procedures are intended to enable faults found on the ground or in flight to be quickly rectified.

This information is given in the form of fault analysis synoptic charts.

The defect can be isolated with the aid of the trouble shooting procedures and traced through OK, and NOT OK paths to the appropriate charts or other specified rectification action as may be necessary. If a defect occurs perform the appropriate rectification action, then repeat the operation at which the defect was encountered to ensure the operation is OK.

Bracketed numbers in the procedures and charts indicate items on

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the component identification table (at the end of procedure). The table provides information, including component location, required for rectification. Aircraft wiring is assumed serviceable, however if the component fault is not detected, check wiring in accordance with the Wiring Diagram Manual.

### 2. Trouble Shooting with Flight Controls Electrical Circuits Test Set

#### A. General.

Trouble shooting is carried out by means of the FLIGHT CONTROLS ELECTRICAL CIRCUITS TEST SET (Ref. 31-56-100).

Fault analysis and trouble shooting procedure has been written assuming the following hypothesis :

- Faults of Test Set are not taken into consideration because :
  - Self Test is effected before each test set operation.
  - All the functions of the test set will be checked periodically in laboratory.  
Period between checks will be scheduled in such a way that probability of a test set function fault associated with a fault of the aircraft function will be negligible between two tests.
  - Several tests are repetitive and use the same internal circuits of the test set. It is thus relatively easy to detect test set incorrect simulations through repetitive incorrect answers during Flight Controls Tests.
- Only single faults on any one function are taken into consideration, the probability of having a double fault in the same circuit between two tests being small.
- Aircraft wiring is assumed serviceable and faults such as : open lines, short circuit, bent contact pins... are not taken into account in order to have a simple Trouble Shooting procedure with an efficiency sufficient for common faults.

However, when Trouble Shooting procedure leads to component removals which imply long Removal/Installation operations and long grounding period (Servo Controls for example) wiring faults are considered and checked.

- Each test series being independent, the possibility of carrying out only one series is permitted, particularly following a first operation caused by an inconclusive test in this series.

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To do this, Fault Analysis of one series does not take into account faults which have already been detected in preceding series.

### B. Prepare

#### (1) Equipment and Materials

DESCRIPTION	PART NO.
Flight Controls Electrical Circuits Test Set	31-56-100
Ground Service Telephone	
Electrical Ground Power Unit	

(2) Take precautions described in the previous WARNING paragraph.

(3) Carry out "Prepare" paragraph described in 27-17-00, Adjustment/Test, paragraph 3 (Functional Test)

NOTE 1 : In the following procedure, the term "control surface assembly" is used.  
It means the control surfaces associated in control and monitoring :  
- There are 3 assemblies :

- Outer and middle elevons (4 control surfaces)
- Inner elevons (2 control surfaces)
- Rudders (2 control surfaces)

NOTE 2 : In order to perform a complete Trouble Shooting with the first two Test Series, it is advised to operate Test Set in STEP BY STEP mode.

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### C. Trouble Shooting - 1st Test Series

\*\*\*\*\*

\* Test 1-01 is conclusive. \*

\*\*\*\*\*

OK	NOT	OK--	BLUE or Green static inverter does not operate Carry out procedure described in 27-15-00, T/S.
OK	NOT	OK--	Loss of a Blue electrovalve indication on an associated control surface assembly (Electro- valve light B1 or B2 is off on Test set) Chart 101
OK	NOT	OK--	Loss of an ICOVOL Blue indication on one of the 3 associated control surface assemblies. Check that fault is confirmed, on ICOVOL indicator (First Officer's instrument panel) by indica- tion of associated magnetic indicators. Replace static monitoring change over unit C 56 [1]

\*\*\*\*\*

\* Test 1-02 is conclusive \*

\*\*\*\*\*

OK	NOT	OK--	Outer and middle elevons change to Green or mechanical channel. Replace static monitoring change over unit C 56 [1]
OK	NOT	OK--	No response from one outer and middle elevon channel. Blue comparator (2C 48) Chart 102
OK	NOT	OK--	No response from one outer and middle elevon channel. Green comparator (1C 48) Chart 103
OK	NOT	OK--	No response from one Blue or Green linear transducer. Chart 104

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OK	NOT OK--	No response from both comparators (4 outer and middle elevon channels) Chart 105
OK	NOT OK--	No GREEN jamming indication (or BLUE jamming indication). On overhead panel, on SERVO CONTROLS unit, check that fault is confirmed by absence of GREEN JAM (or BLUE JAM) indication. Replace static monitoring change over unit C 56 [1]
OK	NOT OK--	No time delay on GREEN jamming warning (800ms): On test set, SEIZURES PFC JACK G indicator light illuminates immediately. Replace static monitoring change over unit C 56 [1]

\*\*\*\*\*  
 \* Test 1-Q3 is conclusive \*  
 \*\*\*\*\*

OK	NOT OK--	Outer and middle elevons change to Green or mechanical channel. Replace static monitoring change over unit C 56 [1]
OK	NOT OK--	No response from one outer and middle elevon channel. BLUE comparator (2C 48) Chart 102
OK	NOT OK--	No response from one outer and middle elevon channel. GREEN comparator (1C 48) Chart 103
OK	NOT OK--	No response from one BLUE or GREEN linear transducer Chart 106
OK	NOT OK--	No response from both comparators (4 outer and middle elevon channels) Chart 107

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OK	NOT OK--	GREEN jamming signal is maintained. On overhead panel, on SERVO CONTROLS unit, check that fault is confirmed by GREEN JAM warning. Replace static monitoring change over unit C 56 [1]
*****		
* Test 1-04 is conclusive *		
*****		
OK	NOT OK--	Inner elevons change to Green or mechanical channel. Replace static monitoring change over unit C 56 [1]
OK	NOT OK--	No response from one inner elevon channel. BLUE comparator (2C 48) Chart 108
OK	NOT OK--	No response from one inner elevon channel. Green comparator (1C 48) Chart 109
OK	NOT OK--	No response from one Blue or Green linear transducer Chart 110
OK	NOT OK--	No response from both comparators (4 inner elevon channels) Chart 111
OK	NOT OK--	No GREEN jamming indication (or BLUE jamming indication). On overhead panel, on SERVO CONTROLS unit, check that fault is confirmed by absence of GREEN JAM (or BLUE JAM) indication. Replace static monitoring change over unit C 56 [1].
OK	NOT OK--	No time delay on GREEN jamming warning (800ms): On test set, SEIZURES PFC JACK G indicator light illuminates immediately. Replace static monitoring change over unit C 56 [1]

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OK			
OK			
*****			
* Test 1-05 is conclusive *			
*****			
OK	NOT OK--	Inner elevons change to Green or mechanical channel. Replace static monitoring change over unit C 56 [1]	
OK	NOT OK--	No response from one inner elevon channel. BLUE comparator (2C 48) Chart 108	
OK	NOT OK--	No response from one inner elevon channel. GREEN comparator (1C 48) Chart 109	
OK	NOT OK--	No response from one BLUE or GREEN linear transducer Chart 112	
OK	NOT OK--	No response from both comparators (4 inner elevon channels) Chart 113	
OK	NOT OK--	GREEN jamming signal is maintained. On overhead panel, on SERVO CONTROLS unit, check that fault is confirmed by GREEN JAM warning. Replace static monitoring change over unit C 56 [1]	
*****			
* Test 1-06 is conclusive *			
*****			
OK	NOT OK--	Outer and middle elevons change to Green or mechanical channel. Replace static monitoring change over unit C 56 [1]	

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OK	NOT OK--	No response from one outer and middle elevon channel. BLUE comparator (2C 48) Chart 102
OK	NOT OK--	No response from one outer and middle elevon channel. GREEN comparator (1C 48) Chart 103
OK	NOT OK--	No response from one BLUE or GREEN linear transducer Chart 114
OK	NOT OK--	No response from both comparators (4 outer and middle elevon channels) Chart 115
OK	NOT OK--	No GREEN jamming indication (or BLUE jamming indication). On overhead panel, on SERVO CONTROLS unit, check that fault is confirmed by absence of GREEN JAM (or BLUE JAM) indication. Replace static monitoring change over unit C 56 [1]
OK	NOT OK--	No time delay on GREEN jamming warning (800ms): On test set, SEIZURES PFC JACK G indicator light illuminates immediately. Replace static monitoring change over unit C 56 [1]

\*\*\*\*\*  
 \* Test 1-07 is conclusive \*  
 \*\*\*\*\*

OK	NOT OK--	Outer and middle elevons change to Green or mechanical channel. Replace static monitoring change over unit C 56 [1]
OK	NOT OK--	No response from one outer and middle elevon channel. BLUE comparator (2C 48) Chart 102

EFFECTIVITY: ALL

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OK	NOT OK--	No response from one outer and middle elevon channel. GREEN comparator (1C 48) Chart 103
OK	NOT OK--	No response from one BLUE or GREEN linear transducer Chart 116
OK	NOT OK--	No response from both comparators (4 outer and middle elevon channels) Chart 117
OK	NOT OK--	GREEN jamming signal is maintained. On overhead panel, on SERVO CONTROLS unit, check that fault is confirmed by GREEN JAM warning. Replace static monitoring change over unit C 56 [1]

\*\*\*\*\*  
 \* Test 1-08 is conclusive \*  
 \*\*\*\*\*

OK	NOT OK--	Rudders change to Green or mechanical channel. Replace static monitoring change over unit C 56 [1]
OK	NOT OK--	No response from one rudder channel. BLUE comparator (2C 48) Chart 118
OK	NOT OK--	No response from one rudder channel, GREEN comparator (1C 48) Chart 119
OK	NOT OK--	No response from one BLUE or GREEN linear transducer Chart 120
OK	NOT OK--	No response from both comparators (4 rudder channels) Chart 121

EFFECTIVITY: ALL

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||  
OK  
||  
\*\*\*\*\*  
\* Test 1-09 is conclusive \*  
\*\*\*\*\*

OK	NOT OK--	Rudders change to Green or Mechanical channel. Replace static monitoring change over unit C 56 [1]
OK	NOT OK--	No response from one rudder channel, BLUE comparator (2C 48) Chart 118
OK	NOT OK--	No response from one rudder channel, GREEN comparator (1C 48) Chart 119
OK	NOT OK--	No response from one BLUE or GREEN linear transducer Chart 122
OK	NOT OK--	No response from both comparators (4 rudder channels) Chart 123

\*\*\*\*\*  
\* Test 1-10 is conclusive \*  
\*\*\*\*\*

OK	NOT OK--	Loss of Green electrovalve indication on an associated control surface assembly (G1 or G2 electrovalve light is off on test set Chart 124
OK	NOT OK--	Loss of an ICOVOL GREEN indication on one of the three associated control surface assemblies Check that fault is confirmed on ICOVOL indica- tor (First Officer's instrument panel) by indication of associated magnetic indicators. Replace static monitoring change over unit C 56 [1]

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## MAINTENANCE MANUAL

||  
OK  
||  
\*\*\*\*\*  
| Test 1-11 is conclusive \*  
\*\*\*\*\*

OK	NOT OK--	Outer and middle elevons change to mechanical channel. Replace static monitoring change over unit C56 [1]
OK	NOT OK--	No response from one outer and middle elevon channel. BLUE comparator (2C 48) Chart 102
OK	NOT OK--	No response from one outer and middle elevon channel. GREEN comparator (1C 48) Chart 103
OK	NOT OK--	No response from both outer and middle elevon channels of GREEN comparator (1C 48) Chart 125
OK	NOT OK--	No BLUE jamming indication (or GREEN jamming indication). On overhead panel, on SERVO CONTROLS unit, check that fault is confirmed by absence of BLUE JAM (or GREEN JAM) indication. Replace static monitoring change over unit C 56 [1].
OK	NOT OK--	No time delay of BLUE jamming warning (800 ms); on test set, SEIZURES PFC JACK B indicator light illuminates immediately. Replace static monitoring change over unit C56 [1]

\*\*\*\*\*  
\* Test 1-12 is conclusive \*  
\*\*\*\*\*

OK	NOT OK--	Outer and middle elevons change to mechanical channel. Replace static monitoring change over unit C 56 [1]
----	----------	--

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OK	NOT OK--	No response from one outer and middle elevon channel. BLUE comparator (2C 48) Chart 102
OK	NOT OK--	No response from one outer and middle elevon channel. GREEN comparator (1C 48) Chart 103
OK	NOT OK--	No response from both outer and middle elevon channels of GREEN comparator (1C 48) Chart 126
OK	NOT OK--	BLUE jamming signal is maintained. On overhead panel, on SERVO CONTROLS unit, check that fault is confirmed by BLUE JAM warning. Replace static monitoring change over unit C 56 [1]

\*\*\*\*\*  
\* Test 1-13 is conclusive \*  
\*\*\*\*\*

OK	NOT OK--	Inner elevons change to mechanical channel. Replace static monitoring change over unit C 56 [1]
OK	NOT OK--	No response from one inner elevon channel. BLUE comparator (2C 48) Chart 108
OK	NOT OK--	No response from one inner elevon channel. GREEN comparator (1C 48) Chart 109
OK	NOT OK	No response from both inner elevon channels of GREEN comparator (1C 48) Chart 127

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OK	NOT OK--	NO BLUE jamming indication (or GREEN jamming indication). On overhead panel, on SERVO CONTROLS unit, check that fault is confirmed by absence of BLUE JAM (or GREEN JAM) indication. Replace static monitoring change over unit C 56 [1]
OK	NOT OK--	No time delay on BLUE jamming warning (800 ms); on test set, SEIZURES PFC JACK B indicator light illuminates immediately. Replace static monitoring change over unit C 56 [1]

\*\*\*\*\*  
 \* Test 1-14 is conclusive \*  
 \*\*\*\*\*

OK	NOT OK--	Inner elevons change to mechanical mode. Replace static monitoring change over unit C 56 [1]
OK	NOT OK--	No response from one inner elevon channel. BLUE comparator (2C 48) Chart 108
OK	NOT OK--	No response from one inner elevon channel GREEN comparator (1C 48) Chart 109
OK	NOT OK--	No response from both inner elevon channels of GREEN comparator (1C 48) Chart 128
OK	NOT OK	BLUE Jamming signal is maintained. On overhead panel, on SERVO CONTROLS unit, check that fault is confirmed by BLUE JAM warning. Replace static monitoring change over unit C 56 [1].

\*\*\*\*\*  
 \* Test 1-15 is conclusive \*  
 \*\*\*\*\*

OK	NOT OK
----	--------

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OK	NOT OK--	Outer and middle elevons change to mechanical channel. Replace static monitoring change over unit C 56 [1]
OK	NOT OK--	No response from one outer and middle elevon channel. BLUE comparator (2C 48) Chart 102
OK	NOT OK--	No response from one outer and middle elevon channel. GREEN comparator (1C 48) Chart 103
OK	NOT OK--	No response from both outer and middle elevon channels of GREEN comparator (1C 48) Chart 129
OK	NOT OK--	No BLUE jamming indication (or GREEN jamming indication). On overhead panel, on SERVO CONTROLS unit, check that fault is confirmed by absence of BLUE JAM (or GREEN JAM) indication. Replace static monitoring change over unit C 56 [1]
OK	NOT OK--	No time delay of BLUE jamming warning (800 ms); on test set, SEIZURES PFC JACK B indicator light illuminates immediately. Replace static monitoring change over unit C 56 [1].

\*\*\*\*\*  
 \* Test 1-16 is conclusive \*  
 \*\*\*\*\*

OK	NOT OK--	Outer and middle elevons change to mechanical channel. Replace static monitoring change over unit C 56 [1]
OK	NOT OK--	No response from one outer and middle elevon channel. BLUE comparator (2C 48) Chart 102

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OK	NOT OK--	No response from one outer and middle elevon channel. Green comparator (1C 48) Chart 103
OK	NOT OK--	No response from both outer and middle elevon channels. Green comparator (1C 48) Chart 130
OK	NOT OK--	BLUE jamming signal is maintained. On overhead panel, on SERVO CONTROLS unit, check that fault is confirmed by BLUE JAM warning. Replace static monitoring change over unit C 56 [1]

\*\*\*\*\*  
\* Test 1-17 is conclusive \*  
\*\*\*\*\*

OK	NOT OK--	Rudders change to mechanical channel. Replace static monitoring change over unit C 56 [1]
OK	NOT OK--	No response from one rudder channel. BLUE comparator (2C 48) Chart 118
OK	NOT OK--	No response from one rudder channel. GREEN comparator (1C 48) Chart 119
OK	NOT OK--	No response from both rudder channels. GREEN comparator (1C 48) Chart 131

\*\*\*\*\*  
\* Test 1-18 is conclusive \*  
\*\*\*\*\*

OK	NOT OK--	Rudders change to mechanical channel. Replace static monitoring change over unit C 56 [1]
----	----------	---

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OK	NOT OK--	No response from one rudder channel. BLUE comparator (2C 48) Chart 118
OK	NOT OK--	No response from one rudder channel. GREEN comparator (1C 48) Chart 119
OK	NOT OK--	No response from both rudder channels of GREEN comparator (1C 48) Chart 132

\*\*\*\*\*  
 \* Test 1-19 is conclusive \*  
 \*\*\*\*\*

OK	NOT OK--	Reset not performed for an associated control surface assembly (BLUE and GREEN inverter operate). Replace static monitoring change over unit C 56 [1]
OK	NOT OK--	All control surfaces are in GREEN channel and the BLUE inverter is stopped Chart 133
OK	NOT OK--	Other system faults should be due to component multiple faults or to faults normally detected in the previous tests or which occurred between these tests and test 1-19. To avoid overloading trouble shooting procedure, they are not taken into account

\*\*\*\*\*  
 \* Test 1-20 is conclusive \*  
 \*\*\*\*\*

OK	NOT OK--	Disappearance of a Green control G1 or G2 on an associated control surface assembly. Replace Flight Control Unit C 57 [2]
----	----------	--

EFFECTIVITY: ALL

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OK	NOT OK--	Loss of a BLUE/GREEN (B/G1 or B/G2) self hold on an associated control surface assembly. Replace static monitoring change over unit C 56 [1]
----	----------	--

OK	NOT OK--	The other system faults should be due to multiple faults or to faults normally detected in the previous tests or which occurred between these tests and test No. 1-20
----	----------	---

\*\*\*\*\*  
\* Test 1-21 is conclusive \*  
\*\*\*\*\*

OK	NOT OK--	Disappearance of a mechanical control M1 or M2 on an associated control surface assembly. Replace Flight Control Unit C 57 [2]
----	----------	--

OK	NOT OK--	Loss of a GREEN/MECHANICAL (G/M1 or G/M2) self hold on an associated control surface assembly. Replace static monitoring change over unit C 56 [1]
----	----------	--

\*\*\*\*\*  
\* Test 1-22 is conclusive \*  
\*\*\*\*\*

OK	NOT OK--	This test is normally conclusive if the previous tests were conclusive
----	----------	--

\*\*\*\*\*  
\* Test 1-23 is conclusive \*  
\*\*\*\*\*

OK	NOT OK--	This test (identical with test 1-01) is normally conclusive if the previous tests were conclusive.
----	----------	--

\*\*\*\*\*  
\* End of trouble shooting - 1st test series \*  
\*\*\*\*\*

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## MAINTENANCE MANUAL

*****	
* LOSS OF A BLUE ELECTROVALVE INDICATION ON AN ASSOCIATED CONTROL	* GROUND EQUIPMENT REQUIRED
* SURFACE ASSEMBLY. (ELECTROVALVE B1 OR B2 LIGHT IS OFF ON TEST SET).	* DESCRIPTION PART NO.
*****	
	MULTIMETER
	CIRCUIT BREAKER
	SAFETY CLIPS
	ACCESS PLATFORM ; ELEVONS
	3.160 m (10 ft. 4 in.)
	ACCESS PLATFORM ; RUDDERS
	11.250 m (36 ft. 11 in.)

\*\*\*\*\*  
 \* Remove static monitoring change over unit C 56 \*  
 \* [1] and check 28 VDC supply on connector C 56 \*  
 \* pin (aircraft side) given in cross reference table \*  
 \* on following page \*

*****	
28 V	Replace circuit breaker (items [3] to [8]) given in cross reference table on following page.
*****	

\*\*\*\*\*  
 \* Trip, safety and tag circuit breakers listed in \*  
 \* Removal/Installation topic dealing with \*  
 \* relevant control surface assembly power flight \*  
 \* control unit (PFCU). \*  
 \* Open elevon fairing given in cross reference \*  
 \* table on following page and disconnect connector \*  
 \* from PFCU. \*  
 \* Check electrovalve impedance (3000  $\Omega$  approx.) \*  
 \* measured between pins given in cross reference \*  
 \* table on following page. \*

*****	
OK	Replace faulty blue electrovalve on relevant PFCU (items [9] to [16])
NOT OK	
*****	
	Replace static monitoring change over unit C 56 [1]
*****	

Chart 101 (Sheet 1 of 2)

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## MAINTENANCE MANUAL

### CROSS-REFERENCE TABLE

Control surfaces	- Elevons -				Rudders	
	Outer		Middle		Inner	
Test set ident numbers	B1		B2		B1	B2
Circuit breaker item number	2C55 [ 3 ]		2C58 [ 4 ]		2C53 [ 5 ]	2C59 [ 6 ]
28 VDC supply	C56 AA-39		C56 AA-29		C56 AB-39	C56 AB-29
PFCU item number	LH C101 [09]	RH C102 [10]	LH C103 [11]	RH C104 [12]	LH C105 [13]	RH C106 [14]
Electrovalves	A-f A-j	A-f A-j	A-f A-j	A-f A-j	A-r A-p	A-r A-p
Fairing	553 LL	653 LL	552 LL	652 LL	551 LL	651 LL
Removal/ Installation	27-34-52				27-34-53	
					27-24-31	

Chart 101 (Sheet 2 of 2)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* NO RESPONSE FROM ONE OUTER AND \*  
\* MIDDLE ELEVEN CHANNEL. BLUE \*  
\* COMPARATOR (2C 48) \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On shelf 8-216, on unit 2C 48 (BLUE comparator), \*  
\* the outer and middle eleven green indicator light \*  
\* of concerned channel illuminates during test. \*  
\*\*\*\*\*

YES	NO----	Replace BLUE comparator 2C 48 [17]
		Replace static monitoring change over unit
		C 56 [1]

Chart 102 (Sheet 1 of 1)

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# Concorde

## MAINTENANCE MANUAL

\*\*\*\*\*  
\* NO RESPONSE FROM ONE OUTER AND \*  
\* MIDDLE ELEVEN CHANNEL GREEN COMPARA \*  
\* TOR (1C 48). \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On shelf 8-215, on unit 1C 48 (GREEN comparator), \*  
\* the outer and middle eleven green indicator light \*  
\* of concerned channel illuminates during test. \*  
\*\*\*\*\*

		-----
YES	NO----	Replace GREEN comparator 1C 48 [18]
		-----
		Replace static monitoring change over unit C 56
-----		[1]
		-----

Chart 103 (Sheet 1 of 1)

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# Concorde

## MAINTENANCE MANUAL

\*\*\*\*\*  
\* NO RESPONSE FROM ONE BLUE OR GREEN \*  
\* LINEAR TRANSDUCER. \*  
\*\*\*\*\*

GROUND EQUIPMENT REQUIRED

DESCRIPTION PART NO.

MULTIMETER  
GROUND SERVICE TELEPHONE  
ACCESS PLATFORM  
2.786 m (9 ft. 1 in.)  
CIRCUIT BREAKER SAFETY  
CLIPS

\*\*\*\*\*  
\*-Trip, safety and tag circuit breakers listed in \*  
\* 27-34-52, Removal/Installation. \*  
\*-Open elevon fairings 553 LL or LR and disconnect \*  
\* connectors A or B depending on Blue or Green \*  
\* linear transducer which does not respond. \*  
\*-Check continuity between pin F of connector A or B \*  
\* and input of circuit breaker MID & OUTER ELEVON \*  
\* MON BLUE or GREEN SUP 2C 46 [21] or 1C 46 [22]. \*  
\*\*\*\*\*

		Repair line or replace circuit breaker MID &
OK	NOT OK--	OUTER ELEVON MON BLUE or GRN SUP 2C 46 [21] or
		1C 46 [22]

\*\*\*\*\*  
\* On PFCU C 101 [9], check continuity between pins \*  
\* F and X then E and D of connectors A or B \*  
\*\*\*\*\*

		Replace PFCU C 101 [9]
OK	NOT OK--	

\*\*\*\*\*  
\* Disconnect Test set from connectors C 110 AA or BA\*  
\* then check continuity between pins C 110 AA 50 and\*  
\* 37 (or BA 1 and 2) and pins E and D of connector \*  
\* A (or B) on PFCU C 101. \*  
\*\*\*\*\*

		Repair line
OK	NOT OK--	
-----		Replace PFCU C 101 [9]

Chart 104 (Sheet 1 of 1)

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# Concorde

## MAINTENANCE MANUAL

*****		-----
* NO RESPONSE FROM BOTH COMPARATORS	*	GROUND EQUIPMENT REQUIRED
* (4 OUTER AND MIDDLE ELEVON	*	-----
* CHANNELS)	*	DESCRIPTION PART NO.
*****		-----
		MULTIMETER
		GROUND SERVICE TELEPHONE
		ACCESS PLATFORM
		2.786 m (9 ft. 1 in.)
		-----

\*\*\*\*\*

\* Check on ICOVOL indicator (First Officer's \*  
 \* instrument panel) that LH outer elevon does not \*  
 \* deflect during test. \*

\* Replace autostabilization computer No.2 2C 31 [19]\*  
 \* Test becomes conclusive. \*

\*\*\*\*\*

		-----
NO	YES---	Replaced autostabilization computer was faulty
		-----

\*\*\*\*\*

\* On overhead panel, on Flight Control Unit, place \*  
 \* O & M ELEVONS switch in GREEN position. When \*  
 \* changing from BLUE to GREEN, LH outer PFCU (C 101)\*  
 \* clutch mechanism must disengage (characteristic \*  
 \* noise). On shelf 8-216, remove static monitoring \*  
 \* change over unit C 56 [1] \*

\* Open elevon fairing 553LL and disconnect connector\*  
 \* A. \*

\* Check continuity between pins C-56-AA-20 and \*  
 \* C 101-A-h. \*

\*\*\*\*\*

		-----
NOT OK	OK----	Replace PFCU C 101 [9] Blue electrovalve
		-----
		-----
-----		Repair line
		-----

Chart 105 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****	
* NO RESPONSE FROM ONE BLUE OR GREEN *	GROUND EQUIPMENT REQUIRED
* LINEAR TRANSDUCER *	
*****	
	DESCRIPTION PART NO.
	MULTIMETER
	GROUND SERVICE TELEPHONE
	ACCESS PLATFORM
	3.084 m (10 ft. 1 in.)
	CIRCUIT BREAKER
	SAFETY CLIPS

\*\*\*\*\*  
\* Trip, safety and tag circuit breaker listed in \*  
\* 27-34-52, Removal/Installation. Open elevon \*  
\* fairing 552LL or LR and disconnect connectors A \*  
\* and B depending on Blue or Green linear transducer\*  
\* which does not respond. \*  
\* Check continuity between pin F of connector A or B\*  
\* and input of circuit breaker MID & OUTER ELEVON \*  
\* MON BLUE or GRN SUP 2C 46 [21] or 1C 46 [22] \*  
\*\*\*\*\*

OK	NOT OK--	Repair line or replace circuit breaker MID & OUTER ELEVON MON BLUE or GRN SUP 2C 46 [21] or 1C 46 [22]

\*\*\*\*\*  
\* On PFCU C 103 [11], check continuity between pins \*  
\* F and X then E and D of connectors A or B. \*  
\*\*\*\*\*

OK	NOT OK--	Replace PFCU C 103 [11]

\*\*\*\*\*  
\* Disconnect test set from connectors C 110 AB or BB\*  
\* then check continuity between pins C 110 AB 50 and\*  
\* 37 (or BB-1 and 2) and pins E and D of connector A\*  
\* (or B) on PFCU C 103. \*  
\*\*\*\*\*

OK	NOT OK--	Repair line
		Replace PFCU C 103 [11]

Chart 106 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****	
* NO RESPONSE FROM BOTH COMPARATORS	* GROUND EQUIPMENT REQUIRED
* (4 OUTER AND MIDDLE ELEVON	* -----
* CHANNELS)	* DESCRIPTION PART NO.
*****	
	MULTIMETER
	GROUND SERVICE TELEPHONE
	ACCESS PLATFORM
	3.084 m (10 ft. 1 in.)
*****	

\*\*\*\*\*  
\* On ICOVOL indicator (First Officer's instrument \*  
\* panel). Check that LH middle elevon does not \*  
\* deflect during test. \*  
\* Replace autostabilization computer No.2 2C 31 [19]\*  
\* Test becomes conclusive. \*  
\*\*\*\*\*

		-----
NO	YES---	Replaced autostabilization computer was faulty.
		-----

\*\*\*\*\*  
\* On overhead panel, on Flight Control unit, place \*  
\* O & M ELEVONS switch in GREEN position. When \*  
\* changing from BLUE to GREEN, clutch mechanism of \*  
\* LH middle PFCU C 103 must disengage (characteris- \*  
\* tic noise). \*  
\* On shelf 8-216, remove static monitoring change \*  
\* over unit C 56 [11]. \*  
\* Open elevon fairing 552 LL and disconnect \*  
\* connector A. \*  
\* Check continuity between pins C 56-AA-30 and C 103\*  
\* -A-h. \*  
\*\*\*\*\*

		-----
NOT OK	OK----	Replace PFCU C 103 [11] Blue electrovalve.
		-----
		-----
-----		Repair line
		-----

Chart 107 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* NO RESPONSE FROM ONE INNER ELEVON \*  
\* CHANNEL. BLUE COMPARATOR (2C 48) \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On shelf 6-216, on unit 2C 48 (BLUE comparator) \*  
\* the inner elevon green indicator light of \*  
\* concerned channel illuminates during test. \*  
\*\*\*\*\*

YES	NO----	Replace BLUE comparator 2C 48 [17]
		Replace static monitoring change over unit C 56 [1]

Chart 108 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* NO RESPONSE FROM ONE INNER ELEVON \*  
\* CHANNEL. GREEN COMPARATOR (1C 48) \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On shelf 8-215, on unit 1C 48 (GREEN comparator), \*  
\* the inner elevon green indicator light of concern \*  
\* ed channel illuminates during test. \*  
\*\*\*\*\*

YES	NO----	Replace GREEN comparator (1C 48) [18]
		Replace static monitoring change over unit C 56
	-----	[1]

Chart 109 (sheet 1 of 1)

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## MAINTENANCE MANUAL

*****	
* NO RESPONSE FROM ONE BLUE OR GREEN *	GROUND EQUIPMENT REQUIRED
* LINEAR TRANSDUCER. *	
*****	
	DESCRIPTION PART NO.
	MULTIMETER
	GROUND SERVICE TELEPHONE
	ACCESS PLATFORM
	3.160 m (10 ft. 4 in.)
	CIRCUIT BREAKER
	SAFETY CLIPS
*****	

\*\*\*\*\*

\* Trip, safety and tag circuit breakers listed in \*

\* 27-34-53, Removal/Installation. Open elevon \*

\* fairings 551LL or LR and disconnect connectors A \*

\* or B depending on the linear transducer (BLUE or \*

\* GREEN) which does not respond. Check continuity \*

\* between pin j of connector A or B and input of \*

\* circuit breaker INNER ELEVON MON BLUE or GRN SUP \*

\* 2C 47 [23] or 1C 47 [24] \*

\*\*\*\*\*

		-----
OK	NOT OK--	Repair line or replace circuit breaker INNER
		ELEVON MON BLUE or GRN SUP 2C 47 [23] or 1C 47
		[24].
		-----

\*\*\*\*\*

\* On PFCU C 105 [13], check continuity between pins \*

\* j and i then U and V of connectors A or B \*

\*\*\*\*\*

		-----
OK	NOT OK--	Replace PFCU C 105 [13]
		-----

\*\*\*\*\*

\* Disconnect test set from connectors C 110 AA or BA \*

\* then check continuity between pins C 110-AA-23 and \*

\* 12 (or BA-7 and 16) and pins V and U of connector \*

\* A (or B) of PFCU C 105 [13] \*

\*\*\*\*\*

		-----
OK	NOT OK--	Repair line
		-----
		-----
		-----
		Replace PFCU C 105 [13]
		-----

Chart 110 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****	
* NO RESPONSE FROM BOTH COMPARATORS	* GROUND EQUIPMENT REQUIRED
* (4 INNER ELEVON CHANNELS)	*
*****	DESCRIPTION PART NO.
	MULTIMETER
	GROUND SERVICE TELEPHONE
	ACCESS PLATFORM
	3.160 m (10 ft. 4 in.)
*****	

\*\*\*\*\*  
 \* Check on ICOVOL indicator (First Officer's \*  
 \* instrument panel) that LH inner elevon does not \*  
 \* deflect during test. \*  
 \* Replace autostabilization computer No.2 2C 31[19].\*  
 \* Test become conclusive. \*  
 \*\*\*\*\*

		-----
NO	YES---	Replaced autostabilization computer was faulty
		-----

\*\*\*\*\*  
 \* On overhead panel, on Flight control unit, place \*  
 \* IN ELEVONS switch in GREEN position. When changing\*  
 \* from BLUE to GREEN, clutch mechanism of LH inner \*  
 \* PFCU (C 105) must disengage (characteristic \*  
 \* noise). \*  
 \* On shelf 8-216, remove static monitoring change \*  
 \* over unit C56 [1]. \*  
 \* Open elevon fairing 551LL and disconnect \*  
 \* connector A. \*  
 \* Check continuity between pins C 56-AB-30 and \*  
 \* C 105-A-q. \*  
 \*\*\*\*\*

		-----
NOT OK	OK---	Replace PFCU C 105 [13] Blue electrovalve
		-----
-----	-----	Repair line
-----	-----	-----

Chart 111 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****		GROUND EQUIPMENT REQUIRED
* NO RESPONSE FROM A BLUE OR GREEN	*	
* LINEAR TRANSDUCER	*	
*****		DESCRIPTION PART NO.
		MULTIMETER
		GROUND SERVICE TELEPHONE
		ACCESS PLATFORM
		3.160 m (10 ft. 4 in.)
		CIRCUIT BREAKER SAFETY
		CLIPS

\*\*\*\*\*

\* Trip, safety and tag circuit breaker listed in \*

\* 27-34-53, Removal/Installation. Open elevon \*

\* fairings 651 LL or LR and disconnect connectors \*

\* A or B depending on the linear transducer (BLUE \*

\* or GREEN) which does not respond. Check \*

\* continuity between pin j of connector A or B and \*

\* input of circuit breaker INNER ELEVON MON BLUE \*

\* or GRN SUP 2C 47 [23] or 1C 47 [24] \*

\*\*\*\*\*

		Repair line or change circuit breaker INNER
OK	NOT OK--	ELEVON MON BLUE or GRN SUP 2C 47 [23] or 1C 47
		[24]

\*\*\*\*\*

\* On PFCU C 106 [14], check continuity between pins \*

\* j and i then U and V of connectors A or B. \*

\*\*\*\*\*

OK	NOT OK--	Replace PFCU C 106 [14]

\*\*\*\*\*

\* Disconnect test set from connectors C 110 AB or BB\*

\* then check continuity between pins C 110-AB 23 and\*

\* 12 (or BB 7 and 16) and pins U and V of \*

\* connector A (or B) of PFCU C 106 [14] \*

\*\*\*\*\*

OK	NOT OK--	Repair line
-----		Replace PFCU C 106 [14]

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## MAINTENANCE MANUAL

*****	
* NO RESPONSE FROM BOTH COMPARATORS *	GROUND EQUIPMENT REQUIRED
* (4 INNER ELEVON CHANNELS) *	
*****	
	DESCRIPTION PART NO.
	MULTIMETER
	GROUND SERVICE TELEPHONE
	ACCESS PLATFORM
	3.160 m (10 ft. 4 in.)
*****	

\*\*\*\*\*  
\* Check on ICOVOL indicator (First Officer's \*  
\* instrument panel) that RH inner elevon does not \*  
\* deflect during test. \*  
\* Replace autostabilization computer No.2 2C 31 [19]\*  
\* Test becomes conclusive. \*  
\*\*\*\*\*

		-----
OK	YES---	Replaced autostabilization computer was faulty
		-----

\*\*\*\*\*  
\* On overhead panel, on Flight Control Unit, place \*  
\* IN ELEVONS switch in GREEN position. When changing\*  
\* From BLUE to GREEN, clutch mechanism of RH inner \*  
\* PFCU (C 106) must disengage (characteristic noise)\*  
\* On shelf 8-216, remove static monitoring change \*  
\* over unit C 56 [1] \*  
\* Open elevon fairing 651 LL and disconnect connec- \*  
\* tor A. Check continuity between pins C 56-AB-20 \*  
\* and C 106-A-q. \*  
\*\*\*\*\*

		-----
NOT OK	OK----	Replace PFCU C 106 [14] Blue electrovalve
		-----
		-----
-----		Repair line
		-----

Chart 113 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

```
*****
* NO RESPONSE FROM ONE BLUE OR GREEN * | GROUND EQUIPMENT REQUIRED
* LINEAR TRANSDUCER * |
***** | MULTIMETER
| GROUND SERVICE TELEPHONE
| ACCESS PLATFORM
| 3.084 m (10 ft. 1 in.)
| CIRCUIT BREAKER SAFETY
| CLIPS
*****
```

```
*****
* Trip, safety tag circuit breakers listed in *
* 27-34-52, Removal/Installation. Open elevon *
* fairings 652 LL or LR and disconnect connectors A *
* or B, depending on the linear transducer (BLUE or *
* GREEN) which does not respond. Check continuity *
* between pin F of connector A or B and input of *
* circuit breaker MID & OUTER ELEVON MON BLUE SUP *
* or GRN SUP 2C 46 [21] or 1 C 46 [22]. *
*****
```

```
|| |
OK NOT OK--| Repair line or replace circuit breaker MID &
|| | OUTER ELEVON MON BLUE or GRN SUP 2C 46 [21] or
|| | 1C 46 [22]
*****
```

```
*****
* On PFCU C 104 [12], check continuity between pins *
* F and X, then E and D of connectors A or B. *
*****
```

```
|| |
OK NOT OK--| Replace PFCU C 104 [12]
|| |
*****
```

```
*****
* Disconnect test set from connectors C110 AB or BB *
* then check continuity between pins C 110-AB-49 and *
* 61 (or BB 25 and 24) and pins E and D of connector *
* A (or B) on PFCU C104 *
*****
```

```
|| |
OK NOT OK--| Repair line
|| |
|| |
-----| Replace PFCU C 104 [12]
*****
```

Chart 114 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

```
*****-----
* NO RESPONSE FROM BOTH COMPARATORS * | GROUND EQUIPMENT REQUIRED |
* (4 OUTER AND MIDDLE ELEVONS * |
* CHANNELS) * |
***** | MULTIMETER |
* | GROUND SERVICE TELEPHONE |
* | ACCESS PLATFORM |
* | 3.084 m (10ft. 1 in.) |
*****-----
```

```
*****
* Check on ICOVOL indicator (First Officer's *
* instrument panel) that RH middle elevon does not *
* deflect during test. *
* Replace autostabilization computer No.2 2C 31 [19]*
* Test becomes conclusive *
*****
```

```
*****
|| | -----
NO YES---| Replaced autostabilization computer was faulty |
|| | -----
*****
```

```
*****
* On overhead panel, on Flight Control Unit, place *
* O & M ELEVONS switch in GREEN position. When *
* changing from BLUE to GREEN, clutch mechanism of *
* RH middle PFCU (C 104) must disengage (characte- *
* ristic noise) *
* On shelf 8-216, remove static monitoring change *
* over unit C 56 [1] *
* Open elevon fairing 652LL and disconnect connector*
* A. *
* Check continuity between pins C 56-AA-30 and C 104*
* -A-h. *
*****
```

```
*****
|| | -----
NOT OK OK---| Replace PFCU C 104 [12] Blue electrovalve |
|| | -----
|| | -----
| Repair line |
*****
```

Chart 115 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****	
* NO RESPONSE FROM ONE BLUE OR GREEN *	GROUND EQUIPMENT REQUIRED
* LINEAR TRANSDUCER *	
*****	
	DESCRIPTION PART NO.
	MULTIMETER
	GROUND SERVICE TELEPHONE
	ACCESS PLATFORM
	2.786 m (9 ft. 1 in.)
	CIRCUIT BREAKER SAFETY
	CLIPS

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in \*  
\* 27-34-52. Removal/Installation. Open elevon \*  
\* fairing/653 LL or LR and disconnect connectors A \*  
\* or B depending on the linear transducer (BLUE or \*  
\* GREEN) which does not respond. Check continuity \*  
\* between pin F of connector A or B and input of \*  
\* circuit breaker MID & OUTER ELEVON MON BLUE SUP or \*  
\* GRN SUP 2C 46 [21] or 1C 46 [22] \*  
\*\*\*\*\*

		-----
OK	NOT OK--	Repair line or replace circuit breaker MID & OUTER ELEVON MON BLUE or GRN SUP 2C 46 [21] or 1C 46 [22]
		-----

\*\*\*\*\*  
\* On PFCU C 102 [10], check continuity between pins \*  
\* F and X then E and D of connectors A or B \*  
\*\*\*\*\*

		-----
OK	NOT OK--	Replace PFCU C 102 [10]
		-----

\*\*\*\*\*  
\* Disconnect Test set from connectors C 110 AA or BA \*  
\* then check continuity between pins C 110-AA-49 and \*  
\* 61 (or BA 24 and 25) and pins E and D of connector \*  
\* A (or B) of PFCU C 102 \*  
\*\*\*\*\*

		-----
OK	NOT OK--	Repair line
		-----
-----		Replace PFCU C 102 [10]
		-----

Chart 116 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****	
* NO RESPONSE FROM BOTH COMPARATORS	* GROUND EQUIPMENT REQUIRED
* (4 OUTER AND MIDDLE ELEVON	*
* CHANNELS)	* DESCRIPTION PART NO.
*****	
	MULTIMETER
	GROUND SERVICE TELEPHONE
	ACCESS PLATFORM
	2.786 m (9 ft. 1 in.)
*****	

\*\*\*\*\*  
 \* Check on ICOVOL indicator (First Officer's \*  
 \* instrument panel) that RH outer elevon does not \*  
 \* deflect during test. \*  
 \* Replace autostabilization computer No.2 2C 31 [19]\*  
 \* Test becomes conclusive \*  
 \*\*\*\*\*

		-----
NO	YES---	Replaced autostabilization computer was faulty
		-----

\*\*\*\*\*  
 \* On overhead panel, on Flight Control Unit, place \*  
 \* O & M ELEVONS switch in GREEN position. When \*  
 \* changing from BLUE to GREEN, clutch mechanism of \*  
 \* RH outer PFCU (C 102) must disengage (character- \*  
 \* istic noise). On shelf 8-216, remove static \*  
 \* monitoring change over unit C 56 [1]. Open elevon \*  
 \* fairing 653LL and disconnect connector A. \*  
 \* Check continuity between pins C 56-AA-20 and \*  
 \* C 102-A-h. \*  
 \*\*\*\*\*

		-----
NOT OK	OK---	Replace PFCU C 102 [10] Blue electrovalve
		-----
		-----
-----		Repair line
		-----

Chart 117 (Sheet 1 of 1)

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# Concorde

## MAINTENANCE MANUAL

\*\*\*\*\*  
\* NO RESPONSE FROM ONE RUDDER CHANNEL\*  
\* BLUE COMPARATOR (2C 48) \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On shelf 8-216, on unit 2C 48 (BLUE comparator). \*  
\* the rudder Green indicator light of concerned \*  
\* channel illuminates during test \*  
\*\*\*\*\*

YES	NO----	Replace BLUE comparator 2C 48 [17]
		Replace static monitoring change over unit C 56
		[1]

Chart 118 (Sheet 1 of 1)

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# Concorde

## MAINTENANCE MANUAL

\*\*\*\*\*  
\* NO RESPONSE FROM ONE RUDDER CHANNEL\*  
\* GREEN COMPARATOR (1C 48)) \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On shelf 8-215, on unit 1C 48 (GREEN COMPARATOR) \*  
\* the rudder Green indicator light of concerned \*  
\* channel illuminates during test. \*  
\*\*\*\*\*

		-----
YES	NO----	Replace Green comparator 1C 48 [18]
		-----
		-----
-----		Replace static monitoring change over unit C56
		[1]
		-----

Chart 119 (Sheet 1 of 1)

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* NO RESPONSE FROM ONE BLUE OR GREEN \*  
\* LINEAR TRANSDUCER \*  
\*\*\*\*\*

### GROUND EQUIPMENT REQUIRED

DESCRIPTION	PART NO.
-------------	----------

MULTIMETER	
GROUND SERVICE TELEPHONE	
ACCESS PLATFORM	
11.250 m (36 ft. 11 in.)	
CIRCUIT BREAKER SAFETY	
CLIPS	

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in \*  
\* 27-24-31, Removal/Installation. Open upper rudder \*  
\* fairing 352 CR and disconnect connectors B or C \*  
\* depending on linear transducer (BLUE or GREEN) \*  
\* which does not respond. Check continuity between \*  
\* pin T of connector B or C and input of circuit \*  
\* breaker RUDDER MON BLUE or GRN SUP 2C 49 [25] or \*  
\* 1C 49 [26]. \*  
\*\*\*\*\*

OK	NOT OK--	
		Repair line or replace circuit breaker RUDDER
		MON BLUE or GRN SUP 2C 49 [25] or 1C 49 [26]

\*\*\*\*\*  
\* On PFCU C 78 [15] check continuity between pins T \*  
\* and H then F and E of connectors B or C \*  
\*\*\*\*\*

OK	NOT OK--	
		Replace PFCU C 78 [15]

\*\*\*\*\*  
\* Disconnect test set from connectors C 110 AB or BA \*  
\* then check continuity between pins C110-AB-35 and \*  
\* 22 (or BA 27 and 39) and pins E and F of connector \*  
\* B (or C) of PFCU C 78. \*  
\*\*\*\*\*

OK	NOT OK--	
		Repair line
		Replace PFCU C 78 [15]

Chart 120 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****	
* NO RESPONSE FROM BOTH COMPARATORS	* GROUND EQUIPMENT REQUIRED
* (4 RUDDER CHANNELS)	*
*****	
	DESCRIPTION PART NO.
	MULTIMETER
	GROUND SERVICE TELEPHONE
	ACCESS PLATFORM
	11.250 m (36 ft. 11 in.)
*****	

\*\*\*\*\*

\* Check on IC0VOL indicator (First Officer's \*  
 \* instrument panel) that upper rudder does not \*  
 \* deflect during test. \*

\* Replace autostabilization computer No.2 2C 31 [19]\*  
 \* Test becomes conclusive. \*

\*\*\*\*\*

		-----
NO	YES---	Replaced autostabilization computer was faulty
		-----

\*\*\*\*\*

\* On overhead panel, on Flight Control Unit, place \*  
 \* RUDDER switches in GREEN position. When changing \*  
 \* from BLUE to GREEN, clutch mechanism of upper \*  
 \* rudder PFCU (C78) must disengage (characteristic \*  
 \* noise). On shelf 8-216, remove static monitoring \*  
 \* change over unit C 56 [1]. \*

\* Open upper rudder fairing 352 CR and disconnect \*  
 \* connector B. \*

\* Check continuity between pins C 56-BA-20 and \*  
 \* C 78-B-V. \*

\*\*\*\*\*

		-----
NOT OK	OK----	Replace PFCU C 78 [15] Blue electrovalve
		-----
		-----
-----	-----	Repair line
-----	-----	-----

Chart 121 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
 \* NO RESPONSE FROM ONE BLUE OR GREEN \* | GROUND EQUIPMENT REQUIRED |  
 \* LINEAR TRANSDUCER \* |

*****	DESCRIPTION	PART NO.
	MULTIMETER	
	GROUND SERVICE TELEPHONE	
	ACCESS PLATFORM	
	11.250 m (36 ft. 11 in.)	
	CIRCUIT BREAKER SAFETY	
	CLIPS	

\*\*\*\*\*  
 \* Trip, safety and tag circuit breakers listed in \*  
 \* 27-24-31, Removal/Installation. Open lower rudder \*  
 \* fairing 351CL and disconnect connectors B or C \*  
 \* depending on linear transducer (BLUE or GREEN) \*  
 \* which does not respond. Check continuity between \*  
 \* pin T of connector B or C and input of circuit \*  
 \* breaker RUDDER MON BLUE or GRN SUP 2C 49 [25] or \*  
 \* 1C 49 [26] \*  
 \*\*\*\*\*

OK	NOT OK--	Repair line or replace circuit breaker RUDDER
		MON BLUE or GRN SUP 2C 49 [25] or 1C 49 [26]

\*\*\*\*\*  
 \* On PFCU C 79 [16], check continuity between pins T\*  
 \* and H then F and E of connectors B or C. \*  
 \*\*\*\*\*

OK	NOT OK--	Replace PFCU C 79 [16]

\*\*\*\*\*  
 \* Disconnect test set from connectors C 110-AA or BB\*  
 \* then check continuity between pins C 110-AA-22 and\*  
 \* 34 (or BB-27 and 39) and pins E and F of connector\*  
 \* B (or C) on PFCU C 79 [16] \*  
 \*\*\*\*\*

OK	NOT OK--	Repair line
-----		Repair PFCU C 79 [16]

Chart 122 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* NO RESPONSE FROM BOTH COMPARATORS \* | GROUND EQUIPMENT REQUIRED |  
\* (4 RUDDER CHANNELS) \* |  
\*\*\*\*\* | DESCRIPTION PART NO. |

MULTIMETER  
GROUND SERVICE TELEPHONE  
ACCESS PLATFORM  
11.250 m (36 ft. 11 in.)

\*\*\*\*\*  
\* Check, on ICOVOL indicator (First Officer's ins- \*  
\* trument panel), that lower rudder does not deflect \*  
\* during test. \*  
\* Replace autostabilization computer No.2 2C 31 [19] \*  
\* Test becomes conclusive \*  
\*\*\*\*\*

|| |  
NO YES---| Replaced autostabilization computer was faulty |  
|| |

\*\*\*\*\*  
\* On overhead panel, on Flight Control Unit, place \*  
\* RUDDER switch in GREEN position. When changing \*  
\* from BLUE to GREEN, clutch mechanism of lower \*  
\* rudder PFCU (C79) must disengage (characteristic \*  
\* noise). \*  
\* On shelf 8-216, remove static monitoring change \*  
\* over unit C 56 [1]. \*  
\* Open lower rudder fairing 351 CL and disconnect \*  
\* connector B. \*  
\* Check continuity between pins C 56-BA-30 and C 79 \*  
\* -B-V. \*  
\*\*\*\*\*

|| |  
NOT OK OK---| Replace PFCU C 79 [16] Blue electrovalve |  
|| |  
|| |  
-----| Repair line |

Chart 123 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
 \* LOSS OF A GREEN ELECTROVALVE INDIC- \* | GROUND EQUIPMENT REQUIRED |  
 \* ATION ON AN ASSOCIATED CONTROL \* |  
 \* SURFACE ASSEMBLY. (ELECTROVALVE G1 \* | DESCRIPTION PART NO. |  
 \* OR G2 LIGHT IS OFF ON TEST SET) \* |  
 \*\*\*\*\*

MULTIMETER  
 CIRCUIT BREAKER SAFETY  
 CLIPS  
 ACCESS PLATFORM, ELEVONS :  
 3.160 m (10 ft. 4 in.)  
 ACCESS PLATFORM, RUDDERS :  
 11.250 m (36 ft. 11 in.)

\*\*\*\*\*  
 \* Remove static monitoring change over unit C 56[1] \*  
 \* and check 28 VDC supply on pin of connector C 56 \*  
 \* (aircraft side) given in cross reference table on \*  
 \* following page. \*

\*\*\*\*\*

28V	0V----	Replace circuit breaker (item numbers [27] to [32]) given in cross reference table on following page.
-----	--------	---

\*\*\*\*\*  
 \* Trip, safety and tag circuit breakers listed in \*  
 \* section dealing with removal/installation \*  
 \* procedure of the concerned associated control \*  
 \* surface assembly PFCU. \*  
 \* Open elevon fairing given in cross reference table \*  
 \* on following page and disconnect connector from \*  
 \* PFCU. \*  
 \* Check electrovalve impedance (3000  $\Omega$  approx.) \*  
 \* measured between pins given in cross reference \*  
 \* table on following page. \*

\*\*\*\*\*

OK	NOT OK--	Replace faulty Green electrovalve on concerned PFCU (ident numbers [9] to [16]).
		Replace static monitoring change over unit C 56 [1]

Chart 124 (sheet 1 of 2)

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## MAINTENANCE MANUAL

### CROSS-REFERENCE TABLE

Control surfaces	Elevons				Elevons		Rudders	
	Outer		Middle		Inner			
Test set ident numbers	G1		G2		G1	G2	G1	G2
Circuit breaker Ident numbers	1C58 [27]		1C55 [28]		1C59 [29]	1C53 [30]	1C62 [31]	1C63 [32]
28VDC supply	C56 AA-47		C56 AA-36		C56 AB-47	C56 AB-36	C56 BA-47	C56 BA-36
PFCU	LH C101 [ 9]	RH C102 [10]	LH C103 [11]	RH C104 [12]	LH C105 [13]	RH C106 [14]	Upper C78 [15]	Lower C79 [16]
Electrovalves	B-f B-j	B-f B-j	B-f B-j	B-f B-j	B-r B-p	B-r B-p	C-D C-R	C-D C-R
Fairing	553 LR	653 LR	552 LR	652 LR	551 LR	651 LR	352 CR	351 CL
Removal/ Installation	27-34-52				27-34-53		27-24-31	

Chart 124 (Sheet 2 of 2)

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## MAINTENANCE MANUAL

```
*****
* NO RESPONSE FROM BOTH OUTER AND *| GROUND EQUIPMENT REQUIRED |
* MIDDLE ELEVON CHANNELS OF GREEN *|
* COMPARATOR (1C 48) *| DESCRIPTION PART NO. |
*****
```

```
MULTIMETER
GROUND SERVICE TELEPHONE
ACCESS PLATFORM
2.786 m (9 ft. 1 in.)
```

```
*****
* Check, on ICOVOL indicator (first Officer's *
* instrument panel) that LH outer elevon does not *
* deflect during test. Replace autostabilization *
* computer No.1 1C31 [20]. *
* Test becomes conclusive. *
```

```
*****
```

```
|| | -----
NO YES---| Replaced autostabilization computer was faulty. |
|| | -----
```

```
*****
* On overhead panel, on flight control unit, place *
* O & M ELEVONS switch in MECH position. When chan- *
* ging from MECH to GREEN, clutch mechanism of LH *
* outer PFCU (C101) must disengage (characteristic *
* noise). *
* On shelf 8-216, remove static monitoring change *
* over unit C 56 [1]. *
* Open elevon fairing 553 LR and disconnect connec- *
* tor B. *
* Check continuity between pins C 56-AA-28 and C101 *
* -B-h. *
```

```
*****
```

```
|| | -----
NOT OK OK---| Replace PFCU C 101 [9] Green electrovalve |
|| | -----
|| | -----
|-----| Repair line |
|-----|
```

Chart 125 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****		
* NO RESPONSE FROM BOTH OUTER AND	*	GROUND EQUIPMENT REQUIRED
* MIDDLE ELEVON CHANNELS OF GREEN	*	
* COMPARATOR (1C 48)	*	DESCRIPTION PART NO.
*****		
		MULTIMETER
		GROUND SERVICE TELEPHONE
		ACCESS PLATFORM
		3.084 m (10 ft. 1 in.)
*****		

\*\*\*\*\*  
 \* Check on ICOVOL indicator (First Officer's \*  
 \* instrument panel) that LH middle elevon does not \*  
 \* deflect during test. \*  
 \* Replace autostabilization computer No.1 1C 31 [20]\*  
 \* Test becomes conclusive. \*

\*\*\*\*\*

		-----
NO	YES--	Replaced autostabilization computer was faulty
		-----

\*\*\*\*\*  
 \* On overhead panel, on flight Control Unit, place \*  
 \* O & M ELEVONS switch in MECH position. When chan- \*  
 \* ging from GREEN TO MECH, clutch mechanism of \*  
 \* LH middle PFCU (C103) must disengage (characteris- \*  
 \* tic noise). \*  
 \* On shelf 8-216, remove static monitoring change \*  
 \* over unit C 56 [1]. \*  
 \* Open elevon fairing 552 LR and disconnect connec- \*  
 \* tor B. \*  
 \* Check continuity between pins C56-AA-37 and \*  
 \* C 103-B-h. \*

\*\*\*\*\*

		-----
NOT OK	OK--	Replace PFCU C 103 [11] GREEN electrovalve
		-----
-----		Repair line
		-----

Chart 126 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
 \* NO RESPONSE FROM BOTH INNER ELEVON \* | GROUND EQUIPMENT REQUIRED |  
 \* CHANNELS OF GREEN COMPARATOR (1C48)\*  
 \*\*\*\*\* | DESCRIPTION PART NO. |

MULTIMETER  
 GROUND SERVICE TELEPHONE  
 ACCESS PLATFORM  
 3.160 m (10 ft. 4 in.)

\*\*\*\*\*  
 \* Check on ICOVOL indicator (First Officer's \*  
 \* instrument panel) that LH inner elevon does not \*  
 \* deflect during test. \*  
 \* Replace autostabilization computer No.1 1C31 [20] \*  
 \* Test becomes conclusive. \*  
 \*\*\*\*\*

|| |  
 NO YES--- | Replaced autostabilization computer was faulty |  
 || |

\*\*\*\*\*  
 \* On overhead panel, on flight control unit, place \*  
 \* IN ELEVONS switch in MECH position. When changing \*  
 \* from GREEN TO MECH, clutch mechanism of LH inner \*  
 \* PFCU (C 105) must disengage (characteristic noise)\*  
 \* On shelf 8-216, remove static monitoring change \*  
 \* over unit C 56 [1]. \*  
 \* Open elevon fairing 551 LR and disconnect connec- \*  
 \* tor B. \*  
 \* Check continuity between pins C 56-AB-37 and C 105\*  
 \* -B-q. \*  
 \*\*\*\*\*

|| |  
 NOT OK OK--- | Replace PFCU C 105 [13] Green electrovalve |  
 || |  
 || |  
 ----- | Repair line |

Chart 127 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
 \* NO RESPONSE FROM BOTH INNER ELEVON \* | GROUND EQUIPMENT REQUIRED |  
 \* CHANNELS OF GREEN COMPARATOR (1C48)\*  
 \*\*\*\*\* | DESCRIPTION PART NO. |

MULTIMETER  
 GROUND SERVICE TELEPHONE  
 ACCESS PLATFORM  
 3.160 m (10ft. 4 in.)

\*\*\*\*\*  
 \* Check on ICOVOL indicator (First Officer's \*  
 \* instrument panel) that RH inner elevon does not \*  
 \* deflect during test. \*  
 \* Replace autostabilization computer No.1 1C31 [20] \*  
 \* This test is conclusive. \*  
 \*\*\*\*\*

|| |  
 NO YES--- | Replaced autostabilization computer was faulty |  
 || |

\*\*\*\*\*  
 \* On overhead panel, on flight Control Unit, place \*  
 \* IN ELEVONS switch in MECH position. When changing \*  
 \* from GREEN TO MECH, clutch mechanism of RH inner \*  
 \* PFCU (C 106) must disengage (characteristic noise)\*  
 \* On shelf 8-216, remove static monitoring \*  
 \* change over unit C 56 [1] \*  
 \* Open elevon fairing 651 LR and disconnect \*  
 \* connector B. \*  
 \* Check continuity between pins C 56-AB-28 and C 106\*  
 \* -B-q. \*  
 \*\*\*\*\*

|| |  
 NOT OK OK--- | Replace PFCU C 106 [14] Green electrovalve |  
 || |  
 |  
 ----- | Repair line |  
 -----

Chart 128 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
 \* NO RESPONSE FROM BOTH OUTER AND \* | GROUND EQUIPMENT REQUIRED |  
 \* MIDDLE ELEVON CHANNELS OF GREEN \* |  
 \* COMPARATOR (1C 48) \* | DESCRIPTION PART NO. |  
 \*\*\*\*\*

MULTIMETER  
 GROUND SERVICE TELEPHONE  
 ACCESS PLATFORM  
 3.084 m (10 ft. 1 in.)

\*\*\*\*\*  
 \* Check on ICOVOL indicator (First Officer's \*  
 \* instrument panel) that RH middle elevon does not \*  
 \* deflect during test. \*  
 \* Replace autostabilization computer No.1 1C 31 [20]\*  
 \* Test becomes conclusive. \*  
 \*\*\*\*\*

NO	YES---	Replaced autostabilization computer was faulty
----	--------	--

\*\*\*\*\*  
 \* On overhead panel, on flight Control Unit, place \*  
 \* O & M ELEVONS switch in MECH position. When \*  
 \* changing from GREEN to MECH, clutch mechanism of \*  
 \* RH middle PFCU (C 104) must disengage (characte- \*  
 \* ristic noise). \*  
 \* On shelf 8-216, remove static monitoring change \*  
 \* over unit C 56 [1] \*  
 \* Open elevon fairing 652 LR and disconnect connec- \*  
 \* tor B. \*  
 \* Check continuity between pins C 56-AA-37 and C 104\*  
 \* -B-h. \*  
 \*\*\*\*\*

NOT OK	OK---	Replace PFCU C 104 [12] Green electrovalve
		Repair line

Chart 129 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
 \* NO RESPONSE FROM BOTH OUTER AND \* | GROUND EQUIPMENT REQUIRED |  
 \* MIDDLE ELEVON CHANNELS OF GREEN \* |  
 \* COMPARATOR \* | DESCRIPTION PART NO. |  
 \*\*\*\*\*

| MULTIMETER  
 | GROUND SERVICE TELEPHONE  
 | ACCESS PLATFORM  
 | 2.786 m (9 ft. 1 in.) |  
 \*\*\*\*\*

\*\*\*\*\*  
 \* Check on ICOVOL indicator (First Officer's \*  
 \* instrument panel) that RH outer elevon does not \*  
 \* deflect during test. \*  
 \* Replace autostabilization computer No.1 1C 31 [20]\*  
 \* Test becomes conclusive. \*  
 \*\*\*\*\*

|| |  
 NO YES--| Replaced autostabilization computer was faulty |  
 || |  
 \*\*\*\*\*

\*\*\*\*\*  
 \* On overhead panel, on Flight Control Unit, place \*  
 \* O & M ELEVONS switch in MECH position. When \*  
 \* changing from GREEN to MECH, clutch mechanism \*  
 \* of RH outer PFCU (C 102) must disengage (characte- \*  
 \* ristic noise) \*  
 \* On shelf 8-216, remove static monitoring change \*  
 \* over unit C 56 [1] \*  
 \* Open elevon fairing 653 LR and disconnect connec- \*  
 \* tor B. \*  
 \* Check continuity between pins C 56-AA-28 and C 102\*  
 \* -B-h. \*  
 \*\*\*\*\*

|| |  
 NOT OK OK--| Replace PFCU C 102 [10] GREEN electrovalve |  
 || |  
 || |  
 -----| Repair line |  
 -----|  
 \*\*\*\*\*

Chart 130 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
 \* NO RESPONSE FROM BOTH RUDDER \* | GROUND EQUIPMENT REQUIRED |  
 \* CHANNELS. GREEN COMPARATOR (1C 48) \*  
 \*\*\*\*\* | DESCRIPTION PART NO. |

| MULTIMETER |  
 | GROUND SERVICE TELEPHONE |  
 | ACCESS PLATFORM |  
 | 11.250 m (36 ft. 11 in.) |

\*\*\*\*\*  
 \* Check on ICOVOL indicator (First Officer's \*  
 \* instrument panel) that upper rudder does not \*  
 \* deflect during test. \*  
 \* Replace autostabilization computer No.1 1C 31 [20]\*  
 \* Test becomes conclusive \*  
 \*\*\*\*\*

|| |  
 NO YES---| Replaced autostabilization computer was faulty |  
 ||

\*\*\*\*\*  
 \* On overhead panel, on Flight Control Unit, place \*  
 \* RUDDER switch in MECH position. When changing from\*  
 \* GREEN to MECH, clutch mechanism of upper rudder \*  
 \* PFCU (C 78) must disengage (characteristic noise).\*  
 \* On shelf 8-216, remove static monitoring change \*  
 \* over unit C 56 [1] \*  
 \* Open upper rudder fairing 352 CR and disconnect \*  
 \* connector C. \*  
 \* Check continuity between pins C 56-BA-28 and C 78-\*  
 \* C-V \*  
 \*\*\*\*\*

|| |  
 NOT OK OK---| Replace PFCU C 78 [15] GREEN electrovalve |  
 ||  
 -----| Repair line |

Chart 131 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****	
* NO RESPONSE FROM BOTH RUDDER	*] GROUND EQUIPMENT REQUIRED
* CHANNELS. GREEN COMPARATOR (1C 48) *	-----
*****	DESCRIPTION PART NO.
	-----
	MULTIMETER
	GROUND SERVICE TELEPHONE -
	ACCESS PLATFORM
	11.250 m (36 ft. 11 in.)
	-----

\*\*\*\*\*

\* Check on ICOVOL indicator (First Officer's \*  
 \* instrument panel) that lower rudder does not \*  
 \* deflect during test. \*

\* Replace autostabilization computer No.1 1C 31 [20] \*  
 \* Test becomes conclusive \*

\*\*\*\*\*

		-----
NO	YES--	Replaced autostabilization computer was faulty
		-----

\*\*\*\*\*

\* On overhead panel, on Flight Control Unit, place \*  
 \* RUDDER switch in MECH position. When changing from \*  
 \* GREEN to MECH, clutch mechanism of lower rudder \*  
 \* PFCU (C79) must disengage (characteristic noise). \*

\* On shelf 8-216, remove static monitoring change \*  
 \* over unit C 56 [1] \*

\* Open lower rudder fairing 351 CL and disconnect \*  
 \* connector C. \*

\* Check continuity between pins C 56-BA-37 and C79 \*  
 \* -C-V \*

\*\*\*\*\*

		-----
NOT OK	OK----	Replace PFCU C 79 [16] GREEN electrovalve
		-----
		-----
-----		Repair line
		-----

Chart 132 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

```
*****-----
* ALL CONTROL SURFACES ARE IN GREEN *| GROUND EQUIPMENT REQUIRED |
* CHANNEL AND THE BLUE INVERTER IS *-----
* STOPPED *| DESCRIPTION PART NO. |
*****-----
| CIRCUIT BREAKER SAFETY
| CLIPS |
*****-----
```

```
*****
* On overhead panel, on Flight Control Unit, place *
* BLUE INVERTER switch in OFF INV position then in *
* ON position. *
* BLUE INVERTER FAIL warning light goes off. *
*****
```

```
|| |
YES NO----| Carry out trouble shooting procedure detailed
|| | in chart 104 of section 27-15-00, Trouble/
|| | shooting.
|| |
*****
```

```
*****
* Unlock circuit breaker panel 15-216 and remove *
* relay C 112 [33] on shelf 12-216. *
* Test 1-19 becomes conclusive. *
*****
```

```
|| |
YES NO----| On shelf 12-216, replace relay C 111 [34]
|| |
|| |
-----| Removed relay C 112 is faulty
*****
```

Chart 133 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

### D. Trouble shooting - 2nd Test Series

\*\*\*\*\*  
\* Test 2-01 is conclusive \*  
\*\*\*\*\*

OK	NOT OK--	This test is identical with test 1-01 of the first series. Refer to trouble shooting procedure of this test.
----	----------	--

\*\*\*\*\*  
\* Test 2-02 is conclusive \*  
\*\*\*\*\*

OK	NOT OK--	BLUE static inverter protection unit (2C72) has not disconnected in undervoltage or safety undervoltage condition (on test set one of the two FAILURES DETECTION T or F indicator lights is off). Replace BLUE static inverter protection unit 2C 72 [35]
----	----------	---

OK	NOT OK--	GREEN static inverter protection unit (1C 72) has not disconnected in undervoltage or safety undervoltage condition (on test set, one of the two FAILURES DETECTION T or F indicator lights is off). Replace GREEN static inverter protection unit 1C 72 [36]
----	----------	---

OK	NOT OK--	Loss of an ICOVOL "mechanical" indication on an associated control surface assembly. Check on ICOVOL indicator that fault is confirmed by corresponding magnetic indicators Replace static monitoring change over unit C 56 [1]
----	----------	---

OK	NOT OK--	No response from one BLUE or GREEN comparator channel on an associated control surface assembly
----	----------	---

Chart 141

\*\*\*\*\*  
\* Test 2-03 is conclusive \*  
\*\*\*\*\*

OK	NOT OK
----	--------

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## MAINTENANCE MANUAL

OK	NOT OK--	Self-hold loss of voltage (or frequency) channel of protection unit (2C 72). On test set Blue generation FAILURE DETECTION T (or F) indication light and SELF-LOCKING B/G1 (or B/G2) indicator lights go off. Replace BLUE static inverter protection unit 2C 72 [35]
OK	NOT OK--	Self-hold loss of voltage (or frequency) channel of protection unit (1C 72). On test set Green generation FAILURE DETECTION T (or F) indicator light and SELF-LOCKING G/M1 (or G/M2) indicator lights go off. Replace GREEN static inverter protection unit 1C 72 [36]
OK	NOT OK--	Loss of a BLUE/GREEN (B/G1 or B/G2) self hold on an associated control surface assembly. Replace static monitoring change over unit C 56 [1]
OK	NOT OK--	Loss of a GREEN/MECHANICAL (G/M1 or G/M2) self hold on an associated control surface assembly. Replace static monitoring change over unit C 56 [1]

\*\*\*\*\*  
 \* Test 2-04 is conclusive \*  
 \*\*\*\*\*

OK	NOT OK--	No BLUE and (or) GREEN jamming detection of outer and middle elevon PFCU's. On overhead panel, on SERVO CONTROLS unit, check that fault is confirmed by absence of BLUE JAM and (or) GREEN JAM caption light illumination. Replace static monitoring change over unit C 56 [1]
----	----------	--

\*\*\*\*\*  
 \* Test 2-05 is conclusive \*  
 \*\*\*\*\*

OK	NOT OK--	BLUE or GREEN jamming warnings remain on (26 V 1800 Hz generation in operation or cut off).
----	----------	---

Chart 142

EFFECTIVITY: ALL

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OK	NOT OK-	BLUE or GREEN jamming warning remains on. On overhead panel, on SERVO CONTROLS unit check that fault is confirmed by BLUE JAM or GREEN JAM caption light illumination. Replace static monitoring change over unit C56 [1].
OK	NOT OK-	BLUE 26 V 1800 Hz generation remains cut off Chart 143
OK	NOT OK-	GREEN 26 V 1800 Hz generation remains cut off Chart 144
OK	NOT OK-	Incorrect reset on an associated control surface assembly (Incorrect Blue channel indication on an associated control surface assembly). Replace static monitoring change over unit C56 [1].

\*\*\*\*\*  
 \* Test 2-06 is conclusive \*  
 \*\*\*\*\*

OK	NOT OK-	BLUE 26 V 1800 Hz generation is not cut off (On test set FAILURES DETECTION T indicator light is off). Replace BLUE static inverter protection unit 2C 72 [35].
OK	NOT OK-	GREEN 26 V 1800 Hz generation is not cut off (On test set, FAILURES DETECTION T indicator light is off). Replace GREEN static inverter protection unit 1C 72 [36].
OK	NOT OK-	With 26 V 1800 Hz generations cut off, one FAILURE DETECTION T indicator light is not illuminated. Replace BLUE or GREEN static inverter protection unit 2C 72 [35] or 1C 72 [36].

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OK	NOT OK-	The other faults are normally dealt with on test 2-02.
***** * Test 2-07 is conclusive. *****		
OK	NOT OK-	No BLUE or (and) GREEN jamming detection of inner elevon PFCU's. On overhead panel, on SERVO CONTROLS unit, check that fault is confirmed by absence of BLUE JAM or (and) GREEN JAM caption light(s) illumination. Replace static monitoring change over unit C56 [1].
***** * Test 2-08 is conclusive. *****		
OK	NOT OK-	This test is identical with test 2-05, refer to this test procedure.
***** * Test 2-09 is conclusive. *****		
OK	NOT OK-	BLUE 26 V 1800 Hz generation is not cut off (On test set, FAILURES DETECTION F indicator light is off). Replace BLUE static inverter protection unit 2C 72 [35].
OK	NOT OK-	GREEN 26 V 1800 Hz generation is not cut off (On test set, FAILURES DETECTION F indicator light is off). Replace GREEN static inverter protection unit 1C 72 [36].
OK	NOT OK-	With 26 V 1800 Hz generations cut off, one FAILURES DETECTION F indicator light is not illuminated. Replace BLUE or GREEN static inverter protection unit 2C 72 [35] or 1C 72 [36].

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

OK	NOT OK-	The other faults are normally dealt with in test 2-02.
----	---------	--

\*\*\*\*\*  
\* Test 2-10 is conclusive. \*  
\*\*\*\*\*

OK	NOT OK-	No BLUE or (and) GREEN jamming detection of rudder PFCU's. On overhead panel, on SERVO CONTROLS unit, check that fault is confirmed by absence of BLUE JAM or (and) GREEN JAM caption light(s) illumination. Replace static monitoring change over unit C56 [1].
----	---------	--

\*\*\*\*\*  
\* Test 2-11 is conclusive. \*  
\*\*\*\*\*

OK	NOT OK-	This test is identical with test 2-05, refer to this test procedure.
----	---------	--

\*\*\*\*\*  
\* Test 2-12 is conclusive. \*  
\*\*\*\*\*

OK	NOT OK-	BLUE 26 V 1800 Hz generation is not cut off (On test set FAILURES DETECTION F indicator light is off). Replace BLUE static inverter protection unit 2C 72 [35].
----	---------	--

OK	NOT OK-	GREEN 26 V 1800 Hz generation is not cut off (On test set FAILURES DETECTION F indicator light is off). Replace GREEN static inverter protection unit 1C 72 [36].
----	---------	--

OK	NOT OK-	With 26 V 1800 Hz generations cut off, one FAILURES DETECTION F indicator light is not illuminated. Replace BLUE or GREEN static inverter protection unit 2C 72 [35] or 1C 72 [36].
----	---------	--

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

OK	NOT OK-	The other faults are normally dealt with in test 2-02.
----	---------	--

\*\*\*\*\*  
\* Test 2-13 is conclusive. \*  
\*\*\*\*\*

OK	NOT OK-	This test is identical with test 2-05 (except jamming faults). Refer to this test trouble shooting procedure.
----	---------	--

\*\*\*\*\*  
\* Test 2-14 is conclusive. \*  
\*\*\*\*\*

OK	NOT OK-	An associated control surface assembly remains in BLUE channel with ICOVOL warning. (On test set SELF LOCKING B/G1 and B/G2 indicator lights are off for this associated control surface assembly). Replace static monitoring change over unit C56 [1].
----	---------	---

OK	NOT OK-	An associated control surface assembly remains in BLUE channel without ICOVOL warning. Chart 145
----	---------	---

OK	NOT OK-	Incorrect display of BLUE or GREEN electrovalves supplies on an associated control surface assembly with a correct ICOVOL warning. Replace static monitoring change over unit C56 [1].
----	---------	---

OK	NOT OK-	Loss of an ICOVOL warning on an associated control surface assembly. Check on ICOVOL indicator that fault is confirmed by absence of illumination of red warning lights corresponding to the associated control surface assembly. Replace static monitoring change over unit C56 [1].
----	---------	---

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## MAINTENANCE MANUAL

OK

NOT OK-

Loss of BLUE/GREEN No.1 or No.2 self-hold on an associated control surface assembly.  
Replace static monitoring change over unit C56 [1].

\*\*\*\*\*

\* Test 2-15 is conclusive. \*

\*\*\*\*\*

OK

NOT OK-

An associated control surface assembly remains in BLUE channel with ICOVOL warning.  
(On test set, SELF LOCKING B/G1 and B/G2 indicator lights are off on this associated control surface assembly). Replace static monitoring change over unit C56 [1].

OK

NOT OK-

An associated control surface assembly remains in BLUE channel without ICOVOL warning.  
Chart 146

OKK

NOT OK-

Incorrect display of BLUE or GREEN electro-valves on an associated control surface assembly with correct ICOVOL warning.  
Replace static monitoring change over unit C56 [1].

OK

NOT OK-

Loss of ICOVOL warning on an associated control surface assembly.  
Check on ICOVOL indicator (First Officer's instrument panel) that fault is confirmed by absence of illumination of red warning lights on this associated control surface assembly.  
Replace static monitoring change over unit C56 [1].

OK

NOT OK-

Loss of BLUE/GREEN No.1 or No.2 self-hold on an associated control surface assembly.  
Replace static monitoring change over unit C56 [1].

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* Test 2-16 is conclusive. \*  
\*\*\*\*\*

 OK 	 NOT OK- 	----- This test is identical with test 1-10, 1st series. Refer to this test trouble shooting procedure. -----
------------	-----------------	---

\*\*\*\*\*  
\* Test 2-17 is conclusive. \*  
\*\*\*\*\*

 OK 	 NOT OK- 	----- An associated control surface assembly remains in GREEN channel <u>with</u> ICOVOL warning. (On test set, SELF LOCKING G/M1 and G/M2 indi- cator lights are off for this associated control surface assembly). Replace static moni- toring change over unit C56 [1]. -----
------------	-----------------	---

 OK 	 NOT OK- 	----- An associated control surface assembly remains in GREEN CHANNEL <u>without</u> ICOVOL warning. Chart 147 -----
------------	-----------------	--

 OK 	 NOT OK- 	----- Incorrect display of GREEN electrovalve supplies on an associated control surface assembly with correct ICOVOL warning. Replace static monitoring change over unit C56 [1]. -----
------------	-----------------	---

 OK 	 NOT OK- 	----- Loss of ICOVOL warning on an associated control surface assembly. Check on ICOVOL indicator (First Officer's instrument panel) that fault is confirmed by absence of illumination of the red warning lights corresponding to this associated control surface assembly. Replace static monitoring change over unit C56 [1]. -----
------------	-----------------	--

 OK 	 NOT OK- 	----- Loss of a GREEN/MECHANICAL No.1 or No.2 self- hold on an associated surface assembly. Replace static monitoring change over unit C56 [1]. -----
------------	-----------------	--

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* Test 2-18 is conclusive. \*  
\*\*\*\*\*

OK	NOT	OK-	An associated control surface assembly remains in GREEN channel <u>with</u> ICOVOL warning (on test set SELF LOCKING G/M1 and G/M2 indicator lights are off for this associated control surface assembly). Replace static monitoring change over unit C56 [1].
OK	NOT	OK-	An associated control surface assembly remains in GREEN channel <u>without</u> ICOVOL warning. Chart 148
OK	NOT	OK-	Incorrect display of GREEN electrovalve supplies on an associated control surface assembly with correct ICOVOL warning. Replace static monitoring change over unit C56 [1].
OK	NOT	OK-	LOSS of ICOVOL warning on an associated control surface assembly. Check on ICOVOL indicator (First Officer's instrument panel) that fault is confirmed by absence of illumination of red warning lights corresponding to this associated control surface assembly. Replace static monitoring change over unit C56 [1].
OK	NOT	OK-	Loss of a GREEN/MECHANICAL No.1 or No.2 self-hold on an associated control surface assembly. Replace static monitoring change over unit C56 [1].

\*\*\*\*\*  
\* Test 2-19 is conclusive. \*  
\*\*\*\*\*

OK	NOT	OK-	This test is normally conclusive if the previous tests were conclusive.
----	-----	-----	---

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* Test 2-20 is conclusive. \*  
\*\*\*\*\*

||  
OK NOT OK-| One of the static inverters is not re-activated|  
|| | Refer to trouble shooting procedure of test|  
|| | 2-05. |

||  
OK NOT OK-| The other faults are normally dealt with in the|  
|| | previous tests. |

\*\*\*\*\*  
\* Test 2-21 is conclusive. \*  
\*\*\*\*\*

||  
OK NOT OK-| This test is normally conclusive if the|  
|| | previous tests were conclusive. |

\*\*\*\*\*  
\* Test 2-22 is conclusive. \*  
\*\*\*\*\*

||  
OK NOT OK-| This test is identical with test 1-01, first|  
|| | series. Refer to trouble shooting procedure of|  
|| | this test. |

\*\*\*\*\*  
\* Test 2-23 is conclusive. \*  
\*\*\*\*\*

||  
OK NOT OK-| This test is identical with test 1-01, first|  
|| | series. Refer to trouble shooting procedure of|  
|| | this test. |

\*\*\*\*\*  
\* End of Trouble Shooting 2nd test series. \*  
\*\*\*\*\*

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* NO RESPONSE FROM ONE CHANNEL OF \*  
\* BLUE COMPARATOR FOR AN ASSOCIATED \*  
\* CONTROL SURFACE ASSEMBLY. \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On shelf 8-216 or 8-215, on front face of BLUE or \*  
\* GREEN comparator (2C 48) or (1C 48), check that \*  
\* the concerned channel has disconnected. \*  
\*\*\*\*\*

		-----
YES	NO---	Replace BLUE comparator 2C 48 [17] or GREEN comparator 1C 48 [18].
		-----
		Replace static monitoring change over unit C56 [1].
-----		-----

Chart 141 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****	
* BLUE AND GREEN JAMMING WARNINGS ARE*	GROUND EQUIPMENT REQUIRED
* MAINTAINED (WITH 26 V 1800 Hz GENE--*	
* RATION IN OPERATION OR CUT OFF). *	DESCRIPTION PART NO.
*****	
	CIRCUIT BREAKER
	SAFETY CLIPS

\*\*\*\*\*

\* On overhead panel, on SERVO CONTROLS unit, fault \*

\* is confirmed by illumination of BLUE JAM and GREEN\*

\* JAM warning light. \*

\* On circuit breaker panel 1-213, trip, safety and \*

\* tag circuit breaker PFCS ALL SURFACES MON GRN SUP \*

\* 1C 54 (Map Ref. N13). \*

\* Repeat test 2-05 \*

\* BLUE and GREEN jamming warnings go off. \*

\*\*\*\*\*

	YES	NO---	Unlock circuit breaker panel 15-216 and on
			shelf 12-216, replace relay C112 [33].
			Unlock circuit breaker panel 15-216 and on
			shelf 12-216, replace relay C111 [34].

Chart 142 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****	
* BLUE 26 V 1800 Hz GENERATION	* GROUND EQUIPMENT REQUIRED
* REMAINS CUT OFF.	*
*****	
DESCRIPTION	PART NO.
CIRCUIT BREAKER	
SAFETY CLIPS	
*****	

\*\*\*\*\*  
\* On overhead panel, on Flight Control Unit, place \*  
\* BLUE INVERTER switch in OFF INV then in ON \*  
\* position. \*  
\* FAIL warning light of BLUE INVERTER goes off. \*  
\*\*\*\*\*

		-----	
YES	NO---		Carry out trouble shooting procedure detailed
			in chart 104 of section 27-15-00, Trouble
			Shooting.
-----			

\*\*\*\*\*  
\* Unlock circuit breaker panel 15-216 and on shelf \*  
\* 12-216, replace relay C112 [33]. \*  
\* Test 2-05 becomes conclusive. \*  
\*\*\*\*\*

		-----	
YES	NO---		On shelf 12-216, replace relay C111 [34].
-----			Replaced relay C112 was faulty.
-----			

Chart 143 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****	
* GREEN 26 V 1800 Hz GENERATION	* GROUND EQUIPMENT REQUIRED
* REMAINS CUT OFF.	*
*****	DESCRIPTION PART NO.
	CIRCUIT BREAKER
	SAFETY CLIPS
*****	

\*\*\*\*\*  
\* On overhead panel, on Flight Control Unit, place \*  
\* GREEN INVERTER switch in OFF INV then in ON \*  
\* position. \*  
\* FAIL warning light of GREEN INVERTER goes off. \*  
\*\*\*\*\*

		-----	Carry out trouble shooting procedure detailed
YES	NO---		in chart 104 of section 27-15-00, Trouble
			Shooting.
-----			

\*\*\*\*\*  
\* Unlock circuit breaker panel 15-216 and on shelf \*  
\* 12-216, replace relay C112 [33]. \*  
\* Test 2-05 becomes conclusive. \*  
\*\*\*\*\*

		-----	
YES	NO---		On shelf 12-216, replace relay C111 [34].
-----			Replaced relay C112 was faulty.
-----			

Chart 144 (Sheet 1 of 1)

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* AN ASSOCIATED CONTROL SURFACE \*  
\* ASSEMBLY REMAINS IN BLUE CHANNEL \*  
\* WITHOUT ICOVOL WARNING. \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On shelf 8-216, replace BLUE comparator 2C 48 [17]\*  
\* Repeat test 2-14 ; this test becomes conclusive. \*  
\*\*\*\*\*

NO	YES==	Replaced BLUE comparator was faulty.
		Replace static monitoring change over unit C56 [1].

Chart 145 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* AN ASSOCIATED CONTROL SURFACE \*  
\* ASSEMBLY REMAINS IN BLUE CHANNEL \*  
\* WITHOUT ICOVOL WARNING. \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On shelf 8-216, replace BLUE comparator 2C 48 [17]\*  
\* Repeat test 2-15 ; this test becomes conclusive. \*  
\*\*\*\*\*

		-----
NO	YES--	Replaced BLUE comparator was faulty.
		-----
		-----
-----		Replace static monitoring change over unit C56
		[1].
		-----

Chart 146 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* AN ASSOCIATED CONTROL SURFACE \*  
\* ASSEMBLY REMAINS IN GREEN CHANNEL \*  
\* WITHOUT ICOVOL WARNING. \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On shelf 8-215, replace GREEN comparator 1C 48 \*  
\* [18] \*  
\* Repeat test 2-17, this test becomes conclusive \*  
\*\*\*\*\*

NO	YES---	Replaced GREEN comparator was faulty
		Replace static monitoring change over unit C 56
		[1]

Chart 147 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

\*\*\*\*\*

\* AN ASSOCIATED CONTROL SURFACE \*  
\* ASSEMBLY REMAINS IN GREEN CHANNEL \*  
\* WITHOUT ICOVOL WARNING \*

\*\*\*\*\*

\*\*\*\*\*

\* On shelf 8-215, replace GREEN comparator 1C 48 \*

\* [18] \*

\* Repeat test 2-18 : this test becomes conclusive \*

\*\*\*\*\*

		-----
NO	YES---	Replaced GREEN comparator was faulty
		-----
		-----
		Replaced static monitoring change over unit C 56
-----		[1]
		-----

Chart 148 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

### E. Trouble Shooting - 3 rd Test Series

\*\*\*\*\*  
\* Test 3.01 is conclusive \*  
\*\*\*\*\*

OK	NOT OK--	NO MECH JAM warning (on test set, MECHANICAL LINKAGE indicator light is off) On overhead panel, on Flight control unit, fault is confirmed by absence of MECH JAM warning illumination. Replace Flight Control unit C 57 [2]
OK	NOT OK--	On overhead panel, on Flight Control Unit, MECH JAM warning light is off: (on test set, MECHANICAL LINKAGE indicator light is illuminated) Replace Flight Control Unit C 57 [2].
OK	NOT OK--	On overhead panel, on RELAY JACK unit, the indicator light located on end of GREEN ONLY NORM - BLUE ONLY switch is off. Chart 150
OK	NOT OK--	NO MECH JAM warning self hold after test. On overhead panel, on Flight Control Unit, fault is confirmed by extinction of MECH JAM warning light. Replace Flight Control Unit C 57 [2]
OK	NOT OK--	On test set, all SEIZURES, RELAY JACK B, RELAY JACK SOLENOID VALVES B and Y/B indicator lights are off during test. Chart 151
OK	NOT OK--	On test set, incorrect combination of SEIZURES, RELAY JACK B, RELAY JACK SOLENOID VALVES B and Y/B indicator light illumination during test. Replace Relay jack hydraulic supply selector unit C 298 [37]

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## MAINTENANCE MANUAL

OK	NOT OK--	On overhead panel, on RELAY JACK unit, BLUE JAM caption light does not illuminate (On test set corresponding indicator light is illuminated). Replace BLUE JAM caption light C 305 [38]
OK	NOT OK--	No time delay (800 ms) on BLUE JAM warning during test (on overhead panel, on RELAY JACK unit, BLUE JAM caption light illuminates immediately). Replace Relay jack hydraulic supply selector unit C 298 [37]
OK	NOT OK--	No self-hold of Relay Jack BLUE jamming configuration after test. Replace Relay jack hydraulic supply selector unit C 298 [37]

\*\*\*\*\*

\* Test 3-02 is conclusive \*

\*\*\*\*\*

OK	NOT OK--	No MECH JAM warning self hold. Refer to test 3-01
OK	NOT OK--	No self-hold of Relay jack BLUE jamming configuration without supply of GREEN and YELLOW/GREEN electrovalves. Refer to test 3-01.
OK	NOT OK--	Configuration unchanged with respect to test 3-01 (NO GREEN JAM warning) Replace Relay jack hydraulic supply selector unit C 298 [37].
OK	NOT OK--	On overhead panel, on RELAY JACK unit, GREEN JAM caption light does not illuminate. (On test set, corresponding indicator light is illuminated) Replace GREEN JAM caption light C 306 [39]

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

OK	NOT OK--	On overhead panel, on RELAY JACK unit, indicator light located on end of GREEN ONLY -NORM-BLUE ONLY switch is off. Replace diode C 307 [40]
OK	NOT OK--	GREEN JAM warning with long time constant (200 ms approximately) Replace Relay jack hydraulic supply selector unit C 298 [37]
OK	NOT OK--	GREEN JAM warning with BLUE and YELLOW/BLUE electrovalves no longer supplied and GREEN and YELLOW/GREEN electrovalves supplied. Replace Relay jack hydraulic supply selector unit C 298 [37]
OK	NOT OK--	No self-hold of GREEN JAM warning after test. Replace Relay jack hydraulic supply selector unit C 298 [37]

\*\*\*\*\*  
 \* Test 3-03 is conclusive \*  
 \*\*\*\*\*

OK	NOT OK--	MECH JAM warning is maintained Chart 152
OK	NOT OK--	GREEN JAM and BLUE JAM warnings remain. On overhead panel, on RELAY JACK unit, fault is confirmed by illumination of GREEN JAM and BLUE JAM caption lights. Replace Relay jack hydraulic supply selector unit C 298 [37]
OK	NOT OK--	No return to BLUE and GREEN electrovalve no longer supplied configuration. On test set one or several RELAY JACK SOLENOID VALVES indicator light(s) remain(s) illuminated Replace Relay jack hydraulic supply selector unit C 298 [37]

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## MAINTENANCE MANUAL

||  
OK  
||  
\*\*\*\*\*  
\* Test 3-04 is conclusive \*  
\*\*\*\*\*

OK	NOT OK--	On test set, all SEIZURES RELAY JACK G, RELAY JACK SOLENOID VALVES G and Y/G indicator lights are off during test. Replace relay jack hydraulic supply selector unit C 298 [37]
OK	NOT OK--	On test set, incorrect combination of SEIZURES RELAY JACK G, RELAY JACK SOLENOID VALVES G and Y/G indicator light illumination during test. Replace relay jack hydraulic supply selector unit C 298 [37]
OK	NOT OK--	No time delay (800 ms) on GREEN JAM warning during test (on overhead panel, on RELAY JACK unit, GREEN JAM caption light illuminates immediately). Replace relay jack hydraulic supply selector unit C 298 [37]
OK	NOT OK--	MASTER WARNING (PFC + GONG) is not activated during illumination of GREEN JAM caption light. Ref. 35-15-00, Trouble Shooting.
OK	NOT OK--	No self hold of relay jack GREEN jamming configuration after test. Replace relay jack hydraulic supply selector unit C 298 [37]

\*\*\*\*\*  
\* Test 3-05 is conclusive \*  
\*\*\*\*\*

OK	NOT OK--	No self hold of relay jack GREEN jamming configuration with BLUE and YELLOW/BLUE electrovalves no longer supplied. Ref. test 3-04
----	----------	--

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## MAINTENANCE MANUAL

OK	NOT OK--	Configuration unchanged with respect to test 3-04 (NO BLUE JAM warning). Replace relay jack hydraulic supply selector unit C 298 [37]
OK	NOT OK--	BLUE JAM warning with a long time constant (800 ms approximately). Replace relay jack hydraulic supply selector unit C 298 [37]
OK	NOT OK--	BLUE JAM warning with GREEN and YELLOW/GREEN electrovalves no longer supplied and BLUE and YELLOW/BLUE electrovalves supplied. Replace relay jack hydraulic supply selector unit C 298 [37]
OK	NOT OK--	MASTER WARNING (PFC + GONG) is not activated during illumination of BLUE JAM caption light Ref. 33-15-00, Trouble shooting
OK	NOT OK--	No self hold of relay jack BLUE jamming configuration after test. Replace relay jack hydraulic supply selector unit C 298 [37]
***** * Test 3-06 is conclusive *		
OK	NOT OK--	This test is identical with test 3-03 Refer to trouble shooting procedure of this test
***** * Test 3-07 is conclusive *		
OK	NOT OK--	Loss of BLUE electrovalve indication on an associated control surface assembly (electrovalve light B1 or B2 is off on test set). This type of fault is dealt with in test 1-01, first series. Chart 101

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## MAINTENANCE MANUAL

OK	NOT OK--	No LH inner elevon PFCU desynchronization warning. On First Officer's instrument panel, INNER ELEV indicator light does not illuminate, PFC warning (on master warning panel) and GONG are not activated. Replace BLUE comparator 2C 48 [17].
OK	NOT OK--	MASTER WARNING (PFC + GONG) is not activated during illumination of INNER ELEVON indicator light (Ref. 33-15-00, Trouble Shooting)
OK	NOT OK--	INNER ELEV indicator light does not illuminate and MASTER WARNING (PFC + GONG) is activated. Replace INNER ELEV indicator light C 404 [41]
OK	NOT OK--	Loss of autostabilization No.1 ROLL axis. On overhead panel, on AUTOSTAB No.1 unit ROLL switch disengages. Chart 153
OK	NOT OK--	Outer and middle elevons change to GREEN channel with illumination of associated warning lights on ICOVOL indicator. Before changing to GREEN channel the 4 elevons deflect. Chart 154
OK	NOT OK--	Outer and middle elevons change to GREEN channel with illumination of associated warning lights on ICOVOL indicator. Before changing to GREEN channel the 4 elevons do not deflect Chart 155
OK	NOT OK--	Outer and middle elevons change to GREEN channel with illumination of associated warning lights on ICOVOL indicator. Before changing to GREEN channel, one of the four elevons does not deflect. Chart 156

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* Test 3-08 is conclusive \*  
\*\*\*\*\*

OK	NOT OK--	LH inner elevon PFCU desynchronisation warning is maintained. On First Officer's instrument panel, INNER ELEV indicator light does not go off. Replace BLUE comparator 2C 48 [17]
OK	NOT OK--	Loss of autostabilization No.1 PITCH axis. On overhead panel, on AUTO STAB No.1 unit, PITCH switch disengages Chart 157
OK	NOT OK--	Outer and middle elevons change to GREEN channel with illumination of associated warning lights on ICOVOL indicator Before changing to GREEN channel the 4 elevons deflect Chart 158
OK	NOT OK--	Outer and middle elevons change to GREEN channel with illumination of associated warning lights on ICOVOL indicator. Before changing to GREEN channel the 4 elevons do not deflect. Chart 159
OK	NOT OK--	Outer and middle elevons change to GREEN channel with illumination of associated warning lights on ICOVOL indicator. Before changing to GREEN channel one of the 4 elevons does not deflect Replace autostabilization computer No.2 2C 31 [19]

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## MAINTENANCE MANUAL

OK	NOT OK--	Inner elevons change to GREEN channel with illumination of associated warning lights on ICOVOL indicator. Before changing to GREEN channel the 2 elevons deflect. Chart 160
OK	NOT OK--	Inner elevons change to GREEN channel with illumination of associated warning lights on ICOVOL indicator. Before changing to GREEN channel neither elevon deflects. Chart 161
OK	NOT OK--	Inner elevons change to GREEN channel with illumination of associated warning lights on ICOVOL indicator. Before changing to GREEN channel one of the two elevons does not deflect. Chart 162

\*\*\*\*\*  
 \* Test 3-09 in conclusive \*  
 \*\*\*\*\*

OK	NOT OK--	No RH inner elevon PFCU desynchronization warning. On First Officer's instrument panel INNER ELEVON indicator light does not illuminate and PFC warning (on master warning panel) and GONG are not activated. Replace BLUE comparator 2C 48 [17].
OK	NOT OK--	INNER ELEV indicator light or MASTER WARNING faults are normally dealt with during test 3-07
OK	NOT OK--	Loss of autostabilization No.1 YAW axis. On overhead panel, on AUTO STAB No.1 unit YAW switch disengages Chart 163

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## MAINTENANCE MANUAL

OK	NOT OK--	Rudders change to GREEN channel with illumination of associated warning lights on ICOVOL indicator. Before changing to GREEN channel, both rudders deflect. Chart 164
OK	NOT OK--	Rudders change to GREEN channel with illumination of associated warning lights on ICOVOL indicator. Before changing to GREEN channel, neither rudder deflects. Chart 165
OK	NOT OK--	Rudders change to GREEN channel with illumination of associated warning lights on ICOVOL indicator. Before changing to GREEN channel one of the two rudders does not deflect Chart 166

\*\*\*\*\*  
\* Test 3-10 is conclusive \*  
\*\*\*\*\*

OK	NOT OK--	RH inner elevon PFCU desynchronization warning is maintained. On First Officer's instrument panel INNER ELEV indicator light does not go off. Replace BLUE comparator 2C 48 [17]
OK	NOT OK--	Loss of GREEN electrovalve indication on an associated control surface assembly. (electrovalve G1 or G2 light is off on test set). This type of fault is dealt with during test 1-10 of the 1st Series. Chart 124

\*\*\*\*\*  
\* Test 3-11 is conclusive \*  
\*\*\*\*\*

OK	NOT OK
----	--------

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## MAINTENANCE MANUAL

OK	NOT OK--	Loss of autostabilization No.1 ROLL axis. On overhead panel, on AUTO STAB No.1 unit, ROLL switch disengages. Replace autostabilization computer No.1 1C 31 [20]
OK	NOT OK--	Outer and middle elevons change to Mechanical channel with illumination of associated warning lights on ICOVOL indicator. Before changing to Mechanical channel the 4 elevons deflect. Chart 167
OK	NOT OK--	Outer and middle elevons change to Mechanical channel with illumination of associated warning lights on ICOVOL indicator. Before changing to Mechanical channel the 4 elevons do not deflect. Replace autostabilization computer No.1 1C 31 [20]
OK	NOT OK--	Outer and Middle elevons change to Mechanical channel with illumination of associated warning lights on ICOVOL indicator. Before changing to Mechanical channel one of the 4 elevons does not deflect. Chart 168

\*\*\*\*\*  
 \* Test 3-12 is conclusive \*  
 \*\*\*\*\*

OK	NOT OK--	Loss of autostabilization No.1 PITCH axis. On overhead panel, on AUTOSTAB No.1 unit, PITCH switch disengages. Replace autostabilization computer No.1 1C 31 [20].
OK	NOT OK--	Outer and Middle elevons change to Mechanical channel with illumination of associated warning lights on ICOVOL indicator. Before changing to Mechanical channel the 4 elevons deflect Chart 169

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## MAINTENANCE MANUAL

OK	NOT OK--	Outer and Middle elevons change to mechanical channel with illumination of associated warning lights on ICOVOL indicator. Before changing to Mechanical channel the 4 elevons do not or one of the 4 elevons does not deflect. Replace autostabilization computer No.1 1C 31 [20]
OK	NOT OK--	Inner elevons change to Mechanical channel with illumination of associated warning lights on ICOVOL indicator. Before changing to Mechanical channel, both elevons deflect. Chart 170
OK	NOT OK--	Inner elevons change to Mechanical channel with illumination of associated warning lights on ICOVOL indicator. Before changing to Mechanical channel neither elevon deflects. Replace autosbilization computer No.1 1C 31 [20]
OK	NOT OK--	Inner elevons change to Mechanical channel with illumination of associated warning lights on ICOVOL indicator Before changing to Mechanical channel one of the two elevons does not deflect. Chart 171

\*\*\*\*\*  
\* Test 3-13 is conclusive \*  
\*\*\*\*\*

OK	NOT OK--	Loss of autostabilization No.1 YAW axis. On overhead panel, on AUTO STAB No.1 unit, YAW switch disengages. Replace autostabilization computer No.1 1C 31 [20]
----	----------	---

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## MAINTENANCE MANUAL

OK	NOT OK--	Rudders change to Mechanical channel with illumination of associated warning lights on ICOVOL indicator. Before changing to Mechanical channel both rudders deflect. Chart 172
OK	NOT OK--	Rudders change to Mechanical channel with illumination of associated warning lights on ICOVOL indicator Before changing to Mechanical channel one of the two rudders does not deflect Chart 173
OK	NOT OK--	Rudders change to Mechanical channel with illumination of associated warning lights on ICOVOL indicator. Before changing to Mechanical channel neither rudder deflects. Replace autostabilization computer No.1 1C 31 [20].
***** * Test 3-14 is conclusive *		
OK	NOT OK--	Faults detected by this test (inverter, ICOVOL indicator, electrovalves..) are normally dealt with during the second series of tests. Refer to Trouble shooting procedure of this series.
***** * Test 3-15 is conclusive *		
OK	NOT OK--	Loss of autostabilization No.2 ROLL axis. On overhead panel, on AUTO STAB No.2 unit, ROLL switch disengages. Chart 174
OK	NOT OK--	Outer and Middle elevons change to GREEN channel with illumination of associated warning lights on ICOVOL indicator. Replace autostabilization computer No.2 2C 31 [19]

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* Test 3-16 is conclusive \*  
\*\*\*\*\*

OK	NOT OK--	Loss of autostabilization No.2 PITCH axis. On overhead panel, on AUTO STAB No.2 unit, PITCH switch disengages Chart 175
OK	NOT OK--	Outer and Middle elevons change to GREEN channel with illumination of associated warning lights on ICOVOL indicator. Replace autostabilization computer No.2 2C 31 [19].
OK	NOT OK--	Inner elevons change to GREEN channel with illumination of associated warning lights on ICOVOL indicator. Replace autostabilization computer No.2 2C 31 [19].

\*\*\*\*\*  
\* Test 3-17 is conclusive \*  
\*\*\*\*\*

OK	NOT OK--	Loss of autostabilization No.2 YAW axis. On overhead panel, on AUTO STAB No.2 unit, YAW switch disengages Chart 176
OK	NOT OK--	Rudders change to GREEN channel with illumination of associated warning lights on ICOVOL indicator. Replace autostabilization computer No.2 2C 31 [19].

\*\*\*\*\*  
\* Test 3-18 is conclusive \*  
\*\*\*\*\*

OK	NOT OK--	This Test is normally conclusive if test 3-10 is conclusive ; Refer to trouble shooting procedure of test 3-10.
----	----------	---

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## MAINTENANCE MANUAL

OK		
OK		
***** * Test 3-19 is conclusive *		
*****		
OK	NOT OK--	Loss of autostabilization No.2 ROLL axis. On overhead panel, on AUTO STAB No.2 unit, ROLL switch disengages. Replace autostabilization computer No.2 2C 31 [19].
OK	NOT OK--	Outer and Middle elevons change to Mechanical channel with illumination of associated warning lights on ICOVOL indicator. Chart 177
***** * Test 3-20 is conclusive *		
*****		
OK	NOT OK--	Loss of autostabilization No.2 PITCH axis. On overhead panel, on AUTO STAB No.2 unit, PITCH switch disengages. Replace autostabilization computer No.2 2C 31 [19]
OK	NOT OK--	Outer and Middle elevons or inner elevons change to mechanical channel with illumination of associated warning lights on ICOVOL indicator. Chart 178.
***** * Test 3-21 is conclusive *		
*****		
OK	NOT OK--	Loss of autostabilization No.2 YAW axis. On overhead panel, on AUTO STAB No.2 unit, YAW switch disengages. Replace autostabilization computer No.2 2C 31 [19]

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## MAINTENANCE MANUAL

OK	NOT OK--	Rudders change to Mechanical channel with illumination of associated warning lights on ICOVOL indicator Chart 179
----	----------	--

\*\*\*\*\*  
\* Test 3-22 is conclusive \*  
\*\*\*\*\*

OK	NOT OK--	This test is normally conclusive if test 3-14 is conclusive ; Refer to trouble shooting procedure of test 3-14.
----	----------	---

\*\*\*\*\*  
\* End of trouble shooting - 3rd test series \*  
\*\*\*\*\*

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* ON OVERHEAD PANEL, ON RELAY JACK \*  
\* UNIT, INDICATOR LIGHT LOCATED ON \*  
\* END OF GREEN ONLY-NORM-BLUE ONLY \*  
\* SWITCH IS OFF. \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On overhead panel, on RELAY JACK unit, press \*  
\* TEST GREEN push button. \*  
\* indicator light on end of GREEN ONLY-NORM-BLUE \*  
\* ONLY switch illuminates \*  
\*\*\*\*\*

		-----	
YES	NO----	On RELAY JACK unit replace GREEN ONLY-NORM-   BLUE ONLY switch C303 [42]	
		-----	
		-----	
-----	-----	Replace diode C 308 [43]	
		-----	

Chart 150 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* ON TEST SET, ALL SEIZURES, RELAY \*  
\* JACK B, RELAY JACK SOLENOID VALVES \*  
\* B AND Y/B INDICATOR LIGHTS ARE \*  
\* OFF DURING TEST \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On overhead panel, on RELAY JACK unit, press \*  
\* BLUE TEST push button. \*  
\* BLUE JAM caption light illuminates \*  
\*\*\*\*\*

YES	NO----	Replace circuit breaker RELAY JACK HYD SEL IND & SUP C 281 [44]
-----	--------	---

\*\*\*\*\*  
\* Remove Relay jack hydraulic supply selector \*  
\* unit C 298 [37] \*  
\* On circuit breaker panel 1-213 (Map Ref. N 17) \*  
\* set circuit breaker RELAY JACK HYD SEL IND & SUP \*  
\* C 281 [44] and measure voltage between pin \*  
\* C 298-A-36 and ground (aircraft side). \*  
\*\*\*\*\*

28 VDC	OVDC--	On RELAY JACK unit, replace GREEN ONLY-NORM-BLUE ONLY switch C 303 [42]
		Replace Relay Jack hydraulic supply selector unit C 298 [37]

Chart 151 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****		-----	
* MECH JAM WARNING IS MAINTAINED	*	GROUND EQUIPMENT REQUIRED	
*****		-----	
		DESCRIPTION	PART NO.
		-----	
		CIRCUIT BREAKER SAFETY	
		CLIPS	
		-----	

\*\*\*\*\*  
\* On circuit breaker panel 1-213 (Map Ref. N 13) \*  
\* trip, safety and tag circuit breaker PFCS ALL \*  
\* SURFACES MON GRN SUP 1C 54. \*  
\* Repeat test 3-03 : it becomes conclusive \*  
\*\*\*\*\*

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\*\*\*\*\*  
\* On circuit breaker panel 5-213 (Map Ref. E 12) \*  
\* trip, safety and tag circuit breaker PFCS ALL \*  
\* SURFACES MON BLUE SUP 2C 54 then set it. \*  
\* On overhead panel, on Flight Control Unit, MECH \*  
\* JAM warning light remains off. \*  
\*\*\*\*\*

		-----
NO	YES---	Unlock circuit breaker panel 15-216 and on
		shelf 12-216, replace relay C 112 [33]
-----		
-----		
-----		
-----		
-----		Replace Flight Control Unit C 57 [2].

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\*\*\*\*\*  
\* LOSS OF AUTOSTABILIZATION No.1 ROLL\*  
\* AXIS. ON OVERHEAD PANEL ON AUTO- \*  
\* STAB UNIT No.1, ROLL SWITCH DIS- \*  
\* ENGAGES. \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On shelf 8-215, replace autostabilization computer\*  
\* No.1 1C 31 [20]. \*  
\* Repeat test 3-07 ; it becomes conclusive. \*  
\*\*\*\*\*

		-----
YES	NO---	Replace Air Data Computer 1 1F 71 [45].
		-----
		-----
-----		Replaced autostabilization computer was faulty.
		-----

Chart 153 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* OUTER AND MIDDLE ELEVONS CHANGE TO \*  
\* GREEN CHANNEL WITH ILLUMINATION OF \*  
\* ASSOCIATED WARNING LIGHTS ON \*  
\* ICOVOL INDICATOR. \*  
\* BEFORE CHANGING TO GREEN CHANNEL \*  
\* THE FOUR ELEVONS DEFLECT. \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On shelf 8-216, replace autostabilization computer\*  
\* No.2 2C 31 [19]. \*  
\* Repeat test 3-07 ; it becomes conclusive. \*  
\*\*\*\*\*

		-----
NO	YES--	Replaced autostabilization computer was faulty.
		-----

\*\*\*\*\*  
\* On shelf 8-215, replace autostabilization computer\*  
\* No.1 1C 31 [20]. \*  
\* Repeat test 3-07 ; it becomes conclusive. \*  
\*\*\*\*\*

		-----
NO	YES--	Replaced autostabilization computer was faulty.
		-----
-----		Replace BLUE comparator 2C 48 [17].
		-----

Chart 154 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* OUTER AND MIDDLE ELEVONS CHANGE TO \*  
\* GREEN CHANNEL WITH ILLUMINATION OF \*  
\* ASSOCIATED WARNING LIGHTS ON \*  
\* ICOVOL INDICATOR. \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On shelf 8-216, replace autostabilization computer\*  
\* No.2 2C 31 [19]. \*  
\* Repeat test 3-07 ; it becomes conclusive. \*  
\*\*\*\*\*

		-----
YES	NO---	Replace autostabilization computer No.1 1C 31
		[20].
		-----
		-----
-----		Replaced autostabilization computer was faulty.
-----		-----

Chart 155 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****		-----	
* OUTER AND MIDDLE ELEVONS CHANGE TO	*	GROUND EQUIPMENT REQUIRED	
* GREEN CHANNEL WITH ILLUMINATION OF	*	-----	
* ASSOCIATED WARNING LIGHTS ON	*	DESCRIPTION	PART NO.
* ICOVOL INDICATOR. BEFORE CHANGING	*	-----	
* TO GREEN CHANNEL ONE OF THE FOUR	*	MULTIMETER	_____
* ELEVONS DOES NOT DEFLECT.	*	ACCESS PLATFORM	_____
*****		3.084 m (10 ft..	_____
		1 in.)	_____
		CIRCUIT BREAKER	_____
		SAFETY CLIPS	_____
		-----	

\*\*\*\*\*  
 \* On shelf 8-216, replace autostabilization computer\*  
 \* No.2 2C 31 [19]. \*  
 \* Repeat test 3-07 ; it becomes conclusive. \*  
 \*\*\*\*\*

		-----
NO	YES--	Replaced autostabilization computer was faulty.
		-----

\*\*\*\*\*  
 \* Trip, safety and tag circuit breakers listed in \*  
 \* 27-34-52, Removal/Installation. Depending on the \*  
 \* elevon which has not deflected, open relevant \*  
 \* fairing given in the following cross-reference \*  
 \* table and disconnect connector A from PFCU. \*  
 \* 1) Check electrovalve impedance (1500  $\Omega$ ) measured \*  
 \* between pins A-h and A-j then A-h and A-f. \*  
 \* 2) Check continuity between pins A-f and A-g. \*  
 \*\*\*\*\*

		-----
NOT OK-	Replace faulty BLUE electrovalve on affected	
	PFCU (ident numbers [9] to [12]).	
	-----	

CROSS REFERENCE TABLE				
ELEVONS	LH OUTER	RH OUTER	LD MIDDLE	RH MIDDLE
PFCU	C-101	C-102	C-103	C-104
FAIRING	553-LL	653-LL	552-LL	652-LL

Chart 156 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* LOSS OF AUTOSTABILIZATION No.1 \*  
\* PITCH AXIS. \*  
\* ON OVERHEAD PANEL, ON AUTOSTAB No.1\*  
\* UNIT, PITCH SWITCH DISENGAGES. \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On shelf 8-215, replace autostabilization computer\*  
\* No.1 1C 31 [20]. \*  
\* Repeat test 3-08 ; it becomes conclusive. \*  
\*\*\*\*\*

		-----
YES	NO---	Replace Air Data Computer 1 1F 71 [45].
		-----
		-----
-----		Replaced autostabilization computer was faulty.
		-----

Chart 157 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* OUTER AND MIDDLE ELEVONS CHANGE TO \*  
\* GREEN CHANNEL WITH ILLUMINATION OF \*  
\* ASSOCIATED WARNING LIGHTS ON \*  
\* ICOVOL INDICATOR. \*  
\* BEFORE CHANGING TO GREEN CHANNEL \*  
\* THE FOUR ELEVONS DEFLECT. \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On shelf 8-216, replace autostabilization computer\*  
\* No.2 2C 31 [19]. \*  
\* Repeat test 3-08 ; it becomes conclusive. \*  
\*\*\*\*\*

		-----
NO	YES--	Replaced autostabilization computer was faulty.
		-----

\*\*\*\*\*  
\* On shelf 8-215, replace autostabilization computer\*  
\* No.1 1C 31 [20]. \*  
\* Repeat test 3-08 ; it becomes conclusive. \*  
\*\*\*\*\*

		-----
NO	YES--	Replaced autostabilization computer was faulty.
		-----
		-----
-----		Replace BLUE comparator 2C 48 [17].
		-----

Chart 158 (Sheet 1 of 1)

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* OUTER AND MIDDLE ELEVONS CHANGE TO \*  
\* GREEN CHANNEL WITH ILLUMINATION OF \*  
\* ASSOCIATED WARNING LIGHTS ON ICOVOL\*  
\* INDICATOR. \*  
\* BEFORE CHANGING TO GREEN CHANNEL \*  
\* THE FOUR ELEVONS DO NOT DEFLECT. \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On shelf 8-216, replace autostabilization computer\*  
\* No.2 2C 31 [19]. \*  
\* Repeat test 3-08 ; it becomes conclusive. \*  
\*\*\*\*\*

YES	NO---	Replace autostabilization computer No.1 1C 31. [20].
-----		
Replaced autostabilization computer was faulty.		

Chart 159 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* INNER ELEVONS CHANGE TO GREEN \*  
\* CHANNEL WITH ILLUMINATION OF ASSO- \*  
\* CIATED WARNING LIGHTS ON ICOVOL \*  
\* INDICATOR. BEFORE CHANGING TO GREEN\*  
\* CHANNEL BOTH ELEVONS DEFLECT. \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On shelf 8-216, replace autostabilization computer\*  
\* No.2 2C 31 [19]. \*  
\* Repeat test 3-08 ; it becomes conclusive. \*  
\*\*\*\*\*

		-----
NO	YES--	Replaced autostabilization computer was faulty.
		-----

\*\*\*\*\*  
\* On shelf 8-215, replace autostabilization computer\*  
\* No.1 1C 31 [20]. \*  
\* Repeat test 3-08 ; it becomes conclusive. \*  
\*\*\*\*\*

		-----
NO	YES--	Replaced autostabilization computer was faulty.
		-----
		-----
-----		Replace BLUE comparator 2C 48 [17].
		-----

Chart 160 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* INNER ELEVONS CHANGE TO GREEN \*  
\* CHANNEL WITH ILLUMINATION OF \*  
\* ASSOCIATED WARNING LIGHTS ON \*  
\* ICOVOL INDICATOR. BEFORE CHANGING \*  
\* TO GREEN CHANNEL NEITHER ELEVON \*  
\* DEFLECTS. \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On shelf 8-216, replace autostabilization computer\*  
\* No.2 2C 31 [19]. \*  
\* Repeat test 3-08 ; it becomes conclusive. \*  
\*\*\*\*\*

		-----
YES	NO----	Replace autostabilization computer No.1 1C 31.
		[20].
		-----
		-----
-----		Replaced autostabilization computer was faulty.
-----		-----

Chart 161 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****		
* INNER ELECONS CHANGE TO GREEN	*	GROUND EQUIPMENT REQUIRED
* CHANNEL WITH ILLUMINATION OF ASSO-	*	
* CIATED WARNING LIGHTS ON ICOVOL	*	DESCRIPTION PART NO.
* INDICATOR. BEFORE CHANGING TO GREEN*		
* CHANNEL ONE OF THE ELECONS DOES NOT*		MULTIMETER
* DEFLECT.	*	ACCESS PLATFORM
*****		
		3.160 m (10 ft.
		4 in.)
		CIRCUIT BREAKER
		SAFETY CLIPS
*****		

\*\*\*\*\*  
\* On shelf 8-216, replace autostabilization computer\*  
\* No.2 2C 31 [19]. \*  
\* Repeat test 3-08 ; it becomes conclusive. \*  
\*\*\*\*\*

		-----
NO	YES--	Replaced autostabilization computer was faulty.
		-----

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in \*  
\* 27-34-53, Removal/Installation. Open fairing 551LL\*  
\* or 651LL for RH or LH inner elevon which has not \*  
\* deflected and disconnect connector A on PFCU C105 \*  
\* or C106. \*  
\* 1) Check electrovalve impedance (1500  $\Omega$  approxi- \*  
\* mately) measured between pins A-q and A-r then \*  
\* A-q and A-p. \*  
\* 2) Check continuity between pins A-t and A-p. \*  
\*\*\*\*\*

	-----
NOT OK-	Replace faulty BLUE electrovalve on affected
	PFCU (ident number [13] or [14]).
	-----

Chart 162 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****		-----
* LOSS OF AUTOSTABILIZATION No.1 YAW *	*	GROUND EQUIPMENT REQUIRED
* AXIS. ON OVERHEAD PANEL, ON AUTO-	*	-----
* STAB No.1 UNIT, YAW SWITCH DIS-	*	DESCRIPTION PART NO.
* ENGAGES.	*	-----
*****		MULTIMETER
		CIRCUIT BREAKER
		SAFETY CLIPS
		-----

\*\*\*\*\*  
\* On shelf 8-215, replace autostabilization computer\*  
\* No.1 1C 31 [20]. \*  
\* Repeat test 3-09 ; it becomes conclusive. \*  
\*\*\*\*\*

		-----
NO	YES--	Replaced autostabilization computer was faulty.
		-----

\*\*\*\*\*  
\* On shelf 6-215, remove relay 1F 106 [47] and check\*  
\* continuity on relay between pins A2 and A3 then \*  
\* B2 and B3. \*  
\*\*\*\*\*

		-----
OK	NOT OK-	Removed relay 1F 106 [47] is faulty ; replace
		relay.
		-----
-----		Replace Air Data Computer 1 1F 71 [45].
		-----

Chart 163 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* RUDDERS CHANGE TO GREEN CHANNEL \*  
\* WITH ILLUMINATION OF ASSOCIATED \*  
\* WARNING LIGHTS ON ICOVOL INDICATOR.\*  
\* BEFORE CHANGING TO GREEN CHANNEL \*  
\* BOTH RUDDERS DEFLECT. \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On shelf 8-216, replace autostabilization computer\*  
\* No.2 2C 31 [19]. \*  
\* Repeat test 3-09 ; it becomes conclusive. \*  
\*\*\*\*\*

```

||      | -----
NO      YES--| Replaced autostabilization computer was faulty.|
||      | -----

```

\*\*\*\*\*  
\* On shelf 8-215, replace autostabilization computer\*  
\* No.1 1C 31 [20]. \*  
\* Repeat test 3-09 ; it becomes conclusive. \*  
\*\*\*\*\*

```

||      | -----
OK      NOT OK-| Replaced autostabilization computer was faulty.|
||      | -----
|-----| Replace BLUE comparator 2C 48 [17]. |
|-----| -----

```

Chart 164 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* RUDDERS CHANGE TO GREEN CHANNEL \*  
\* WITH ILLUMINATION OF ASSOCIATED \*  
\* WARNING LIGHTS ON ICOVOL INDICATOR.\*  
\* BEFORE CHANGING TO GREEN CHANNEL, \*  
\* NEITHER RUDDER DEFLECTS. \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On shelf 8-216, replace autostabilization computer\*  
\* No.2 2C 31 [19]. \*  
\* Repeat test 3-09 ; it becomes conclusive. \*  
\*\*\*\*\*

YES	NO---	Replace autostabilization computer No.1 1C 31 [20].
-----		
-----		Replaced autostabilization computer was faulty.

Chart 165 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****	
* RUDDERS CHANGE TO GREEN CHANNEL	*   GROUND EQUIPMENT REQUIRED
* WITH ILLUMINATION OF ASSOCIATED	*
* WARNING LIGHTS ON ICOVOL INDICATOR.	*   DESCRIPTION PART NO.
* BEFORE CHANGING TO GREEN CHANNEL	*
* ONE OF THE TWO RUDDERS DOES NOT	*   MULTIMETER
* DEFLECT.	*   ACCESS PLATFORM
*****	
	11.250 m (36 ft.
	11 in.)
	CIRCUIT BREAKER
	SAFETY CLIPS
-----	

\*\*\*\*\*  
\* On shelf 8-216, replace autostabilization computer\*  
\* No.2 2C 31 [19]. \*  
\* Repeat test 3-09 ; it becomes conclusive. \*  
\*\*\*\*\*

		-----
NO	YES--	Replaced autostabilization computer was faulty.
		-----

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in \*  
\* 27-24-31, Removal/Installation. Open fairing 352CR\*  
\* or 351CL for upper or lower rudder which has not \*  
\* deflected and on PFCU C 78 or C 79 disconnect \*  
\* connector B. \*  
\* 1) Check electrovalve impedance (1500  $\Omega$  approx) \*  
\* measured between pins B-V and B-D then B-V \*  
\* and B-R. \*  
\* 2) Check continuity between pins B-R and B-J. \*  
\*\*\*\*\*

	-----
NOT OK-	Replace faulty BLUE electrovalve on affected
	PFCU (ident numbers [15] or [16]).
	-----

Chart 166 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* OUTER AND MIDDLE ELEVONS CHANGE TO \*  
\* MECHANICAL CHANNEL WITH ILLUMINA- \*  
\* TION OF ASSOCIATED WARNING LIGHTS \*  
\* ON ICOVOL INDICATOR. \*  
\* BEFORE CHANGING TO MECHANICAL \*  
\* CHANNEL THE FOUR ELEVONS DEFLECT. \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On shelf 8-215, replace autostabilization computer\*  
\* No.1 1C 31 [20]. \*  
\* Repeat test 3-11 ; it becomes conclusive. \*  
\*\*\*\*\*

		-----
YES	NO---	Replace GREEN comparator 1C 48 [18].
		-----
		-----
-----		Replaced autostabilization computer was faulty.
		-----

Chart 167 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****	
* OUTER AND MIDDLE ELEVONS CHANGE TO	* GROUND EQUIPMENT REQUIRED
* MECHANICAL CHANNEL WITH ILLUMINA-	* -----
* TION OF ASSOCIATED WARNING LIGHTS	* DESCRIPTION PART NO.
* ON ICOVOL INDICATOR.	* -----
* BEFORE CHANGING TO MECHANICAL	* MULTIMETER
* CHANNEL ONE OF THE FOUR ELEVONS	* ACCESS PLATFORM
* DOES NOT DEFLECT.	* 3.084 m (10 ft. 1 in.)
*****	* CIRCUIT BREAKER SAFETY
	* CLIPS
	-----

\*\*\*\*\*  
 \* On shelf 8-215, replace autostabilization \*  
 \* computer No.1 1C 31 [20]. \*  
 \* Repeat test 3-11 ; it becomes conclusive \*  
 \*\*\*\*\*

		-----
NO	YES--	Replaced autostabilization computer was faulty
		-----

\*\*\*\*\*  
 \* Trip, safety and tag circuit breakers listed in \*  
 \* 27-34-52, Removal/Installation. Open fairing given \*  
 \* in the following cross reference table for elevon \*  
 \* which does not deflect and disconnect connector \*  
 \* B on PFCU. \*  
 \* 1) Check electrovalve impedance (1500  $\Omega$  approx) \*  
 \* measured between pins B-h and B-j then B-h \*  
 \* and B-f. \*  
 \* 2) Check continuity between pins B-f and B-g. \*  
 \*\*\*\*\*

		-----
NOT OK--	Replace faulty GREEN electrovalve on affected	
	PFCU (ident number [09] to [12])	
	-----	

CROSS REFERENCE TABLE				
ELEVONS	LH OUTER	RH OUTER	LH MIDDLE	RH MIDDLE
PFCU	C - 101	C - 102	C - 103	C - 104
FAIRING	553 - LL	653 - LL	552 - LL	652 - LL

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# Concorde

## MAINTENANCE MANUAL

\*\*\*\*\*  
\* OUTER AND MIDDLE ELEVONS CHANGE TO \*  
\* MECHANICAL CHANNEL WITH ILLUMINA- \*  
\* TION OF ASSOCIATED WARNING LIGHTS \*  
\* ON ICOVOL INDICATOR. \*  
\* BEFORE CHANGING TO MECHANICAL \*  
\* CHANNEL THE FOUR ELEVONS DEFLECT. \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On shelf 8-215, replace autostabilization \*  
\* computer No.1 1C 31 [20] \*  
\* Repeat test 3-12 : it becomes conclusive \*  
\*\*\*\*\*

		-----
YES	NO----	Replace GREEN Comparator 1C 48 [18]
		-----
		-----
-----		Replaced autostabilization computer was faulty.
		-----

Chart 169 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

```
*****
* INNER ELEVONS CHANGE TO MECHANICAL *
* CHANNEL WITH ILLUMINATION OF ASSO- *
* CIATED WARNING LIGHTS ON ICOVOL   *
* INDICATOR.                          *
* BEFORE CHANGING TO MECHANICAL      *
* CHANNEL BOTH ELEVONS DEFLECT       *
*****
```

```
*****
* On shelf 8-215, replace autostabilization computer*
* No.1 1C 31 [20] *
* Repeat test 3-12 : it becomes conclusive *
*****
```

```

||      |-----|
YES      NO----| Replace GREEN comparator 1C 48 [18] |
||      |-----|
||      |-----|
-----| Replaced autostabilization computer was faulty |
-----|-----|
```

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## MAINTENANCE MANUAL

*****	
* INNER ELEVONS CHANGE TO MECHANICAL	* GROUND EQUIPMENT REQUIRED
* CHANNEL WITH ILLUMINATION OF ASSO-	* -----
* CIATED WARNING LIGHTS ON ICOVOL	* DESCRIPTION PART NO.
* INDICATOR.	* -----
* BEFORE CHANGING TO MECHANICAL	* MULTIMETER
* CHANNEL ONE OF THE ELEVONS DOES NOT	* ACCESS PLATFORM
* DEFLECT	* 3.160 m (10 ft. 4 in.)
*****	
	* CIRCUIT BREAKER SAFETY
	* CLIPS
*****	

\*\*\*\*\*  
\* On shelf 8-215, replace autostabilization computer\*  
\* No.1 1C 31 [20]. \*  
\* Repeat test 3-12 : it becomes conclusive \*  
\*\*\*\*\*

		-----
NO	YES---	Replaced autostabilization computer was faulty
		-----

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in \*  
\* 27-34-53, Removal/Installation. Open fairing 551 \*  
\* LR or 651 LR for LH or RH inner elevon which does \*  
\* not deflect and disconnect connector B on PFCU \*  
\* C 105 or C 106. \*  
\* 1) Check electrovalve impedance (1500  $\Omega$  approx) \*  
\* measured between pins B-q and B-r then B-q and \*  
\* B-p. \*  
\* 2) Check continuity between pins B-t and B-p \*  
\*\*\*\*\*

		-----
NOT OK--		Replace faulty GREEN electrovalve on affected
		PFCU (ident numbers [13] or [14])
		-----

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* RUDDERS CHANGE TO MECHANICAL \*  
\* CHANNEL WITH ILLUMINATION OF ASSO- \*  
\* CIATED WARNING LIGHTS ON ICOVOL \*  
\* INDICATOR. \*  
\* BEFORE CHANGING TO MECHANICAL \*  
\* CHANNEL BOTH RUDDERS DEFLECT \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On shelf 8-215, replace autostabilization computer\*  
\* No.1 1C 31 [20]. \*  
\* Repeat test 3-13 : it becomes conclusive. \*  
\*\*\*\*\*

YES	NO----	Replace GREEN comparator 1C 48 [18]
-----  Replaced autostabilization computer was faulty		

Chart 172 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****	
* RUDDERS CHANGE TO MECHANICAL	* GROUND EQUIPMENT REQUIRED
* CHANNEL WITH ILLUMINATION OF ASSOCI*	-----
* ATED WARNING LIGHTS ON ICOVOL	* DESCRIPTION PART NO.
* INDICATOR.	-----
* BEFORE CHANGING TO MECHANICAL	* MULTIMETER
* CHANNEL ONE OF THE RUDDERS DOES NOT*	* ACCESS PLATFORM
* DEFLECT.	* 11.250 m (36 ft. 11 in.)
*****	* CIRCUIT BREAKER SAFETY
	* CLIPS
	-----

\*\*\*\*\*  
\* On shelf 8-215, replace autostabilization computer\*  
\* No.1 1C 31 [20]. \*  
\* Repeat test 3-13 ; it becomes conclusive. \*  
\*\*\*\*\*

		-----
NO	YES==	Replaced autostabilization computer was faulty.
		-----

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in \*  
\* 27-24-31, Removal/Installation. Open fairing \*  
\* 352 CR or 351CL for upper or lower rudder which \*  
\* does not deflect and on PFCU C 78 or C 79 \*  
\* disconnect connector C. \*  
\* 1) Check electrovalve impedance (1500  $\Omega$  \*  
\* approx) measured between pins C-V and C-D then \*  
\* C-V and C-R. \*  
\* 2) Check continuity between pins C-R and C-J \*  
\*\*\*\*\*

		-----
NOT OK--		Replace faulty GREEN electrovalve on affected
		PFCU (ident numbers [15] or [16])
		-----

Chart 173 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* LOSS OF AUTOSTABILIZATION NO.2 ROLL\*  
\* AXIS. \*  
\* ON OVERHEAD PANEL, ON AUTOSTAB NO.2\*  
\* UNIT, ROLL SWITCH DISENGAGES \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On shelf 8-216, replace autostabilization compu- \*  
\* ter No.2 2C 31 [19]. \*  
\* Repeat test 3-15 ; it becomes conclusive. \*  
\*\*\*\*\*

		-----
YES	NO----	Replace Air Data Computer 2 2F 71 [46]
		-----
		-----
-----		Replaced autostabilization computer was faulty
		-----

Chart 174 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* LOSS OF AUTOSTABILIZATION NO.2 \*  
\* PITCH AXIS. \*  
\* ON OVERHEAD PANEL, ON AUTOSTAB UNIT\*  
\* NO.2, PITCH SWITCH DISENGAGES. \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On shelf 8-216, replace autostabilization computer\*  
\* No.2 2C 31 [19]. \*  
\* Repeat test 3-16 ; it becomes conclusive \*  
\*\*\*\*\*

		-----
YES	NO----	Replace Air Data Computer 2 2F 71 [46]
		-----
		-----
-----	-----	Replaced autostabilization computer was faulty
-----	-----	-----

Chart 175 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****	
* LOSS OF AUTOSTABILIZATION NO.2 YAW *	GROUND EQUIPMENT REQUIRED
* AXIS. *	
* ON OVERHEAD PANEL, ON AUTOSTAB UNIT*	DESCRIPTION PART NO.
* NO.2, YAW SWITCH DISENGAGES *	
*****	
	MULTIMETER
	CIRCUIT BREAKER SAFETY
	CLIPS
*****	

\*\*\*\*\*  
\* On shelf 8-216, replace autostabilization computer\*  
\* No.2 2C 31 [19]. \*  
\* Repeat test 3-17 : it becomes conclusive. \*  
\*\*\*\*\*

		-----
NO	YES---	Replaced autostabilization computer was faulty.
		-----

\*\*\*\*\*  
\* On shelf 6-216, remove relay 2F 106 [48] and check\*  
\* continuity between pins A2 and A3 then B2 and B3. \*  
\*\*\*\*\*

		-----
OK	NOT OK--	Removed relay 2F 106 [48] is faulty : replace
		it.
		-----
		-----
-----		Replace Air Data Computer 2 2F 71 [46]
		-----

Chart 176 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* OUTER AND MIDDLE ELEVONS CHANGE TO \*  
\* MECHANICAL CHANNEL WITH ILLUMINA- \*  
\* TION OF ASSOCIATED WARNING LIGHTS \*  
\* ON ICOVOL INDICATOR. \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On shelf 8-215, replace autostabilization computer\*  
\* No.1 1C 31 [20]. \*  
\* Repeat test 3-19 ; it becomes conclusive. \*  
\*\*\*\*\*

		-----
YES	NO----	Replace autostabilization computer No.2 2C 31
		[19].
		-----
		-----
-----		Replaced autostabilization computer was faulty
		-----

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* OUTER AND MIDDLE ELEVONS OR INNER \*  
\* ELEVONS CHANGE TO MECHANICAL \*  
\* CHANNEL WITH ILLUMINATION OF ASSO- \*  
\* CIATED WARNING LIGHTS ON ICOVOL \*  
\* INDICATOR. \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On shelf 8-215, replace autostabilization computer\*  
\* No.1 1C 31 [20]. \*  
\* Repeat test 3-20 : it becomes conclusive. \*  
\*\*\*\*\*

YES	NO---	Replace autostabilization computer No.2 2C 31 [19]
-----		
Replaced autostabilization computer was faulty		

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* RUDDERS CHANGE TO MECHANICAL \*  
\* CHANNEL WITH ILLUMINATION OF ASSO- \*  
\* CIATED WARNING LIGHTS ON ICOVOL \*  
\* INDICATOR \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On shelf 8-215, replace autostabilization computer\*  
\* No.1 1C 31 [20]. \*  
\* Repeat test 3-21 ; it becomes conclusive \*  
\*\*\*\*\*

YES	NO---	Replace autostabilization computer No.2 2C 31 [19]
-----		
Replaced autostabilization computer was faulty		

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## MAINTENANCE MANUAL

### F. Close-Up

- (1) Carry out close-up operations described in 27-17-00, Adjustment/Test, paragraph 3 (Functional Test).

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# *Concorde*

## MAINTENANCE MANUAL

### 3. Trouble Shooting Using Front Face of Flight Control surface Monitoring Comparators

#### A. General

This Trouble Shooting procedure is a partial substitute of the procedure, using Flight Control Electrical Circuit Test Set, dealt with in the previous chapter. This procedure is carried out assuming that :

- there are no "perceptible" faults of Flight Control electrical channels (if there are, refer to 27-17-00 or 27-27-00, Trouble shooting)
- Flight Control Hydraulic systems are in correct condition (if not, refer to 27-15-00, Trouble shooting).
- Flight Control surface position indicating circuit operates correctly (if not, refer to 27-16-00, Trouble shooting).

Flight control system consists of two identical electrical channels : BLUE and GREEN channels :  
Trouble shooting described below concerns BLUE channel only. Description and identification number of corresponding component of GREEN channel is indicated between brackets.

#### B. Prepare

- (1) On shelf 8-216 (8-215), open cover of indicating unit on front face of Blue comparator 2C48 (GREEN 1C48).
- (2) Set Flight Controls in BLUE (GREEN) electrical mode  
Ref. 27-00-00, Servicing.

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## MAINTENANCE MANUAL

### C. Trouble Shooting

\*\*\*\*\*  
 \* On front face of BLUE comparator 2C 48 (GREEN 1C \*  
 \* 48), place and hold TEST-LT TEST switch in LT. \*  
 \* TEST position. \*  
 \* ALL indicator lights must illuminate. \*  
 \*\*\*\*\*

OK	NOT OK--	Light test defective. One of the two red FAILURE DETECTION warning lights does not illuminate Replace Faulty lamp.
OK	NOT OK--	Light test defective. Neither red FAILURE DETECTION warning light illuminates. Replace BLUE comparator 2C 48 [17] (GREEN 1C 48 [18]).
OK	NOT OK--	Light test defective. One of the six green indicator lights does not illuminate Chart 181
OK	NOT OK--	Light test defective. The six green indicator lights do not illuminate. Replace BLUE comparator 2C 48 [17] (GREEN 1C 48 [18]).

\*\*\*\*\*  
 \* On front face of BLUE comparator 2C 48 (GREEN 1C \*  
 \* 48) place and hold TEST-LT TEST switch in TEST \*  
 \* position then press O-L push button, channel 1. \*  
 \* - Corresponding Green indicator light must illumi- \*  
 \* nate \*  
 \* - on overhead panel, on master warning panel, PFC \*  
 \* warning light must illuminate and GONG must \*  
 \* sound. \*  
 \* - On ICOVOL indicator (First Officer's instrument \*  
 \* panel) magnetic indicators associated with \*  
 \* Outer & Middle elevons must display G (M) and \*  
 \* the four corresponding red warning lights must \*  
 \* illuminate. \*  
 \*\*\*\*\*

OK	NOT OK
----	--------

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## MAINTENANCE MANUAL

OK	NOT OK--	Test O-L, channel 1, defective. Corresponding Green indicator light does not illuminate. Replace BLUE comparator 2C 48 [17] (GREEN 1C 48 [18]).
OK	NOT OK--	Test O-L, channel 1, defective. GONG and PFC warning light are not activated and the four red warning lights are illuminated on ICOVOL indicator. Chart 182
OK	NOT OK--	Test O-L, channel 1, defective. GONG and PFC warning light are not activated and two of the four warning lights are off on ICOVOL indicator. Remove diode assembly C 86 [49] and remove diode C 85-B [50].
OK	NOT OK--	Test O-L, channel 1, defective. GONG and PFC warning light are not activated and the 4 red warning lights are off on ICOVOL indicator. Chart 183
OK	NOT OK--	Test O-L, channel 1, defective. GONG and PFC warning light are activated and two of the four warning lights are off on ICOVOL indicator. Remove diode assembly C 86 [49] and remove diode C 85-A [51].
OK	NOT OK--	Test O-L, channel 1, defective. On ICOVOL indicator two or four magnetic indicators do not display G (M). Replace static monitoring change over unit C 56 [1].

\*\*\*\*\*  
\* On front face of BLUE comparator 2C 48 (GREEN 1C \*  
\* 48), place and hold TEST-LT TEST switch in TEST \*  
\* position then press M-L push button channel 1. \*  
\* Corresponding Green indicator light must \*  
\* illuminate \*  
\*\*\*\*\*

OK NOT OK

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## MAINTENANCE MANUAL

OK	NOT OK--	Test M-L, channel 1, defective. Corresponding Green indicator light does not illuminate. Replace BLUE comparator 2C 48 [17] (GREEN 1C 48 [18]).
----	----------	---

\*\*\*\*\*  
\* On front face of BLUE comparator 2C 48 (GREEN 1C \*  
\* 48), place and hold TEST-LT TEST switch in TEST \*  
\* position then press M-R push button, channel 1. \*  
\* Corresponding Green indicator light must \*  
\* illuminate \*  
\*\*\*\*\*

OK	NOT OK--	Test M-R, channel 1, defective. Corresponding Green indicator light does not illuminate. Replace BLUE comparator 2C 48 [17] (GREEN 1C 48 [18]).
----	----------	---

\*\*\*\*\*  
\* On front face of BLUE comparator 2C 48 (GREEN 1C \*  
\* 48) place and hold TEST - LT TEST switch in TEST \*  
\* position, then press O-R push button, channel 1. \*  
\* Corresponding Green indicator light must illumin- \*  
\* ate. \*  
\*\*\*\*\*

OK	NOT OK--	Test O-R, channel 1, defective ; corresponding Green indicator light does not illuminate. Replace BLUE comparator 2C 48 [17] (GREEN 1C 48 [18]).
----	----------	--

\*\*\*\*\*  
\* On ICOVOL indicator, (First Officer's instrument \*  
\* panel) press ALARM-RESET push button. \*  
\* The four red warning lights and PFC warning light, \*  
\* on master warning panel must go off. \*  
\*\*\*\*\*

OK	NOT OK--	Ref. 27-16-00, Trouble Shooting
----	----------	---------------------------------

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* On front face of BLUE comparator 2C 48 (GREEN 1C \*  
\* 48) place and hold TEST-LT TEST switch in TEST \*  
\* position then press IN-L push button, channel 1. \*  
\* - Corresponding Green indicator light must illumi-\*  
\* nate. \*  
\* - On overhead panel, on master warning panel, PFC \*  
\* warning light must illuminate and GONG must sound.\*  
\* - On ICOVOL indicator (First Officer's instrument \*  
\* panel) magnetic indicators associated with inner \*  
\* elevons must display G (M) and the 2 correspon-\*  
\* ding red indicator lights must illuminate. \*  
\*\*\*\*\*

OK	NOT OK--	TEST IN-L, channel 1, defective : corresponding green indicator light does not illuminate. Replace BLUE comparator 2C 48 [17] (GREEN 1C 48 [18])
OK	NOT OK--	TEST IN-L, channel 1, defective. GONG and PFC warning light are not activated and the two red warning lights illuminated on ICOVOL indicator. Remove diode assembly C 86 [49] and remove diode C 85-G [52].
OK	NOT OK--	TEST IN-L, channel 1, defective. GONG and PFC warning light are not activated and the two red warning lights are off on ICOVOL indicator. Chart 184
OK	NOT OK--	TEST IN-L, channel 1, defective. On ICOVOL indicator the 2 magnetic indicators do not display G (M). Replace static monitoring change over unit C56 [1].

\*\*\*\*\*  
\* On front face of BLUE comparator 2C 48 (GREEN 1C \*  
\* 48) place and hold TEST-LT TEST switch in TEST \*  
\* position then press IN-R push button, channel 1. \*  
\* The corresponding Green indicator light must \*  
\* illuminate. \*  
\*\*\*\*\*

||  
OK NOT OK  
||

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## MAINTENANCE MANUAL

OK	NOT OK--	Test IN-R, channel 1, defective. Corresponding Green indicator light does not illuminate. Replace BLUE comparator 2C 48 [17] (GREEN 1C 48 [18]).
----	----------	--

\*\*\*\*\*  
\* On ICOVOL indicator (First Officer's instrument \*  
\* panel) press ALARM RESET push button. \*  
\* The two red warning lights and, on master warning \*  
\* panel, PFC warning light must go off. \*  
\*\*\*\*\*

OK	NOT OK--	Ref. 27-16-00, Trouble Shooting
----	----------	---------------------------------

\*\*\*\*\*  
\* On front face of BLUE comparator 2C 48 (GREEN 1C \*  
\* 48), place and hold TEST. LT TEST switch in TEST \*  
\* position then press U-R push button, channel 1. \*  
\* - Corresponding Green indicator light must \*  
\* illuminate \*  
\* - On overhead panel, on master warning panel, PFC \*  
\* warning light must illuminate and GONG must sound. \*  
\* - On ICOVOL indicator (First Officer's instrument \*  
\* panel) magnetic indicators corresponding to \*  
\* rudders must display G (M) and the two associated \*  
\* red warning lights must illuminate. \*  
\*\*\*\*\*

OK	NOT OK--	Test U-R, channel 1, defective. Corresponding Green indicator light does not illuminate. Replace BLUE comparator 2C 48 [17] (GREEN 1C 48 [18]).
----	----------	---

OK	NOT OK--	Test U-R, channel 1, defective. GONG and PFC warning light are not activated and the two red warning lights are illuminated on ICOVOL indicator. Remove diode assembly C 86 [49] and replace diode C 85-H [53].
----	----------	---

OK	NOT OK--	Test U-R, channel 1, defective. GONG and PFC warning light are not activated and the two red warning lights are off on ICOVOL indicator Chart 185
----	----------	--

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## MAINTENANCE MANUAL

		-----
OK	NOT OK-	Test U-R, channel 1, defective. On ICOVOL indicator the two magnetic indicators do not display G (M). Replace static monitoring change over unit C56 [1].
		-----

\*\*\*\*\*  
\* On front face of BLUE comparator 2C 48 (GREEN \*  
\* 1C 48) place and hold TEST - LT TEST switch in \*  
\* TEST position then press L R push button, channel \*  
\* 1. Corresponding Green indicator light must illu- \*  
\* minate. \*  
\*\*\*\*\*

		-----
OK	NOT OK-	Test L-R, channel 1, defective. Corresponding Green indicator light does not illuminate. Replace BLUE comparator 2C 48 [17] (Green 1C 48 [18]).
		-----

\*\*\*\*\*  
\* On ICOVOL indicator (First Officer's instrument \*  
\* panel) press ALARM RESET push button. \*  
\* The two red warning lights and on master warning \*  
\* panel PFC warning light must go off. \*  
\* On overhead panel, on Flight Control Unit, press \*  
\* the three RESET push buttons. \*  
\* On ICOVOL indicator, the eight magnetic indicators \*  
\* must display B. \*  
\*\*\*\*\*

		-----
OK	NOT OK-	Ref. 27-16-00, Trouble shooting.
		-----

\*\*\*\*\*  
\* On front face of BLUE comparator 2C 48 (GREEN \*  
\* 1C 48), place and hold TEST. LT TEST switch in \*  
\* TEST position then press O - L push button, \*  
\* channel 2. \*  
\* Corresponding Green indicator light must illumi- \*  
\* nate. \*  
\* On overhead panel, on master warning panel, PFC \*  
\* warning light must illuminate and GONG must sound. \*  
\* On ICOVOL indicator (First Officer's instrument \*  
\* panel) magnetic indicators associated with outer \*  
\* and middle elevons must display G (M) and the four \*  
\* red corresponding warning lights must illuminate. \*  
\*\*\*\*\*

OK	NOT OK

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## MAINTENANCE MANUAL

OK	NOT OK-	Test O-L, channel 2, defective ; Corresponding Green indicator light does not illuminate. Replace BLUE comparator 2C 48 [17] (GREEN 1C 48 [18]).
OK	NOT OK-	Test O-L, channel 2, defective ; GONG warning and PFC warning light are not activated and the four red warning lights are off on ICOVOL indicator. Chart 186
OK	NOT OK-	Test O-L, channel 2, defective ; on ICOVOL indicator the four magnetic indicators do not display G (M). Replace static monitoring change over unit C56 [1].

\*\*\*\*\*  
 \* On front face of BLUE comparator 2C 48 (GREEN \*  
 \* 1C 48) place and hold TEST - LT TEST switch in \*  
 \* TEST position then press M-L push button, channel \*  
 \* 2. Corresponding Green indicator light must illu- \*  
 \* minate. \*  
 \*\*\*\*\*

OK	NOT OK-	Test M-L, channel 2, defective. Corresponding Green indicator light does not illuminate. Replace BLUE comparator 2C 48 [17] (GREEN 1C 48 [18]).
----	---------	---

\*\*\*\*\*  
 \* On front face of BLUE comparator 2C 48 (GREEN \*  
 \* 1C 48) place and hold TEST - LT TEST switch in \*  
 \* TEST position then press M-R push button, channel \*  
 \* 2. Corresponding Green indicator light must illu- \*  
 \* minate. \*  
 \*\*\*\*\*

OK	NOT OK-	Test M-R, channel 2, defective ; corresponding Green indicator light does not illuminate. Replace BLUE comparator 2C 48 [17] (Green 1C 48 [18]).
----	---------	--

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* On front face of BLUE comparator 2C 48 (GREEN \*  
\* 1C 48), place and hold TEST - LT TEST switch in \*  
\* TEST position then press O-R push-button, channel \*  
\* 2. Corresponding Green indicator light must illu- \*  
\* minate. \*  
\*\*\*\*\*

		Test O-R, channel 2, defective ; corresponding
OK	NOT OK-	Green indicator light does not illuminate.
		Replace BLUE comparator 2C 48 [17] (GREEN
		1C 48 [18]).

\*\*\*\*\*  
\* On ICOVOL indicator (First Officer's instrument \*  
\* panel) press ALARM RESET push button. \*  
\* The four red warning lights and on master warning \*  
\* panel PFC warning light must go off. \*  
\*\*\*\*\*

		Ref. 27-16-00, Trouble Shooting
OK	NOT OK-	

\*\*\*\*\*  
\* On front face of BLUE comparator 2C 48 (GREEN \*  
\* 1C 48) place and hold TEST - LT TEST switch in \*  
\* TEST position then press M-L push button, channel \*  
\* 2. Corresponding Green indicator light must illu- \*  
\* minate. \*  
\* On overhead panel, on master warning panel, PFC \*  
\* warning light must illuminate and GONG must sound. \*  
\* On ICOVOL indicator (First Officer's instrument \*  
\* panel) magnetic indicators associated with inner \*  
\* elevons must display G (M) and the two corres- \*  
\* ponding red warning lights must illuminate. \*  
\*\*\*\*\*

		Test IN-L, channel 2, defective ; corresponding
OK	NOT OK-	Green indicator light does not illuminate.
		Replace BLUE comparator 2C 48 [17] (GREEN
		1C 48 [18]).

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## MAINTENANCE MANUAL

OK	NOT OK-	Test IN-L, channel 2, defective : GONG warning and PFC warning light are not activated and the two red warning lights are off on ICOVOL indicator.
		Chart 187
OK	NOT OK-	Test IN-L, channel 2, defective ; on ICOVOL indicator, the two magnetic indicators do not display B (M). Replace static monitoring change over unit C56 [1].

\*\*\*\*\*  
 \* On front face of BLUE comparator 2C 48 (GREEN \*  
 \* 1C 48) place and hold TEST - LT TEST switch in \*  
 \* test position then press IN-R push button, channel \*  
 \* 2. Corresponding Green indicator light must illu- \*  
 \* minate. \*  
 \*\*\*\*\*

OK	NOT OK-	Test IN-R, channel 2, defective ; corresponding Green indicator light does not illuminate. Replace BLUE comparator 2C 48 [17] (GREEN 1C 48 [18]).
----	---------	---

\*\*\*\*\*  
 \* On ICOVOL indicator (First Officer's instrument \*  
 \* panel) press ALARM RESET push button. \*  
 \* The two red warning lights and, on master warning \*  
 \* panel, PFC warning light must go off. \*  
 \*\*\*\*\*

OK	NOT OK-	Ref. 27-16-00, Trouble shooting
----	---------	---------------------------------

\*\*\*\*\*  
 \* On front face of BLUE comparator 2C 48 (GREEN \*  
 \* 1C 48) replace and hold TEST - LT TEST switch in \*  
 \* TEST position then press U-R push button, channel \*  
 \* 2. Corresponding Green indicator light must illu- \*  
 \* minate. \*  
 \* On overhead panel, on master warning panel, PFC \*  
 \* warning light must illuminate and GONG must sound. \*  
 \* On ICOVOL indicator (First Officer's instrument \*  
 \* panel) magnetic indicators associated with rudders \*  
 \* must display G (M) and the 2 corresponding red \*  
 \* warning lights must illuminate. \*  
 \*\*\*\*\*

OK	NOT OK
----	--------

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## MAINTENANCE MANUAL

OK	NOT OK-	Test U-R, channel 2, defective ; corresponding Green indicator light does not illuminate. Replace BLUE comparator 2C 48 [17] (GREEN 1C 48 [18]).
OK	NOT OK-	Test U-R, channel 2, defective ; GONG and PFC warning light are not activated and the two red warning lights on ICOVOL indicator are off. Chart 188
OK	NOT OK-	Test U-R, channel 2, defective ; on ICOVOL indicator the two magnetic indicators do not display G (M). Replace static monitoring change over unit C56 [1].

\*\*\*\*\*  
\* On front face of BLUE comparator 2C 48 (GREEN \*  
\* 1C 48), place and hold TEST - LT TEST switch in \*  
\* TEST position then press L-R push button, channel \*  
\* 2. Corresponding Green indicator light must illu- \*  
\* minate. \*  
\*\*\*\*\*

OK	NOT OK-	Test L-R, channel 2, defective ; corresponding Green indicator light does not illuminate. Replace BLUE comparator 2C 48 [17] (GREEN 1C 48 [18]).
----	---------	--

\*\*\*\*\*  
\* End of Trouble shooting using front face of Flight\*  
\* Control surface monitoring comparators. \*  
\*\*\*\*\*

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* LIGHT TEST DEFECTIVE - ONE OF THE \*  
\* SIX GREEN INDICATOR LIGHTS DOES NOT\*  
\* ILLUMINATE \*  
\*\*\*\*\*

\*\*\*\*\*  
\* Replace lamp of indicator light concerned then \*  
\* repeat LT TEST. \*  
\* Indicator light illuminates. \*  
\*\*\*\*\*

		-----
YES	NO---	Replace BLUE comparator 2C 48 [17] (GREEN 1C 48 [18])
		-----
-----		Replaced lamp was faulty
		-----

Chart 181 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* TEST O-L, CHANNEL 1, DEFECTIVE. \*  
\* GONG WARNING AND PFC WARNING LIGHT \*  
\* ARE NOT ACTIVATED AND THE FOUR \*  
\* WARNING LIGHTS ARE ILLUMINATED ON \*  
\* ICOVOL INDICATOR. \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On front face of BLUE comparator 2C 48 (GREEN 1C \*  
\* 48), place and hold TEST LT-TEST switch in TEST \*  
\* position then press IN-L push button, channel 1. \*  
\* GONG warning and PFC warning light are activated \*  
\*\*\*\*\*

		-----
YES	NO---	Ref. 33-15-00, Trouble Shooting.
		-----
		-----
-----		Remove diode assembly C 86 [49] and replace
		diode C 85-F [54]
		-----

Chart 182 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* TEST O.L, CHANNEL 1, DEFECTIVE. \*  
\* GONG WARNING AND PFC WARNING LIGHT \*  
\* ARE NOT ACTIVATED AND THE FOUR RED \*  
\* WARNING LIGHTS ARE OFF ON ICOVOL \*  
\* INDICATOR. \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On ICOVOL indicator (First Officer's instrument \*  
\* panel) the four magnetic indicators display G (M) \*  
\*\*\*\*\*

	NO	YES---	Replace static monitoring change over unit C
			56 [1]

\*\*\*\*\*  
\* On shelf 8-216, on front face of BLUE neutraliza- \*  
\* tion computer 2C 45 (GREEN 1C 45) place TEST- \*  
\* LT TEST switch in LT TEST position. Both LOGICS \*  
\* C and H indicator lights illuminate. \*  
\*\*\*\*\*

	YES	NO---	Replace circuit breaker OUTER ELEVON NEUTRLN
			BLUE (GRN) SUP 2C 58 [04] (1C 58 [27]).

\*\*\*\*\*  
\* Replace BLUE comparator 2C 48 [17] (GREEN 1C 48 \*  
\* [18]. Repeat test O.L, channel 1; fault is still \*  
\* present \*  
\*\*\*\*\*

	YES	NO---	Replaced comparator was faulty
			Replace static monitoring change over unit C 56
			[1]

Chart 183 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

```

*****-----
* TEST IN-L, CHANNEL 1, DEFECTIVE. *| GROUND EQUIPMENT REQUIRED |
* GONG WARNING AND PFC WARNING LIGHT *-----
* ARE NOT ACTIVATED AND THE TWO RED *| DESCRIPTION PART NO. |
* WARNING LIGHTS ARE OFF ON ICOVOL *-----
* INDICATOR *| MULTIMETER _____ |
*****| CIRCUIT BREAKER SAFETY _____ |
| CLIPS _____ |
*****-----

```

```

*****
* On ICOVOL indicator (First Officer's instrument *
* panel) the 2 magnetic indicators display G (M) *
*****

```

```

| | |-----
| | | Replace static monitoring change over unit C 56 |
NO YES---| [1] |
| | |-----

```

```

*****
* Remove BLUE comparator 2C 48 [17] (GREEN 1C 48 *
* [18]) On rack connector 2C 48-AA (1C 48-AA, *
* measure 28 VDC between pins 33 and 13. *
*****

```

```

| | |-----
| | | Replace circuit breaker INNER ELEVON CONT & MON |
28V 0V---| BLUE (GREEN) SUP 2 2C 59 [7] (1C 59 [29]). |
| | |-----

```

```

*****
* Replace BLUE comparator 2C 48 [17] (GREEN 1C 48 *
* [18]). Repeat test IN-L, channel 1 ; fault is *
* still present. *
*****

```

```

| | |-----
YES NO---| Replaced comparator was faulty |
| | |-----
| | | Replace static monitoring change over unit C |
|-----| 56 [1] |
|-----|

```

Chart 184 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

```
*****-----
* TEST U-R, CHANNEL 1, DEFECTIVE.      *| GROUND EQUIPMENT REQUIRED |
* GONG WARNING AND PFC WARNING ARE     *|-----
* NOT ACTIVATED AND THE TWO RED        *| DESCRIPTION          PART NO. |
* WARNING LIGHTS ON ICOVOL ARE OFF.    *|-----
*****| MULTIMETER
      | CIRCUIT BREAKER SAFETY
      | CLIPS
      |-----
```

```
*****
* On ICOVOL indicator (First Officer's instrument *
* panel) the 2 magnetic indicators display G (M) *
*****
```

```

| |
| |
NO      YES---| Replace static monitoring change over unit C 56 |
| |          | [1]
| |          |-----
```

```
*****
* Remove BLUE comparator 2C 48 [17] (GREEN 1C 48 *
* [18]). On rack connector 2C 48-AA (1C 48-AA), *
* measure 28 VDC voltage between pins 39 and 13 *
*****
```

```

| |
| |
28 V    OV---| Replace circuit breaker RUDDER CONT & MON BLUE |
| |          | (GREEN) SUP 2C 62 [8] (1C 62 [31]).
| |          |-----
```

```
*****
* Replace BLUE comparator 2C 48 [17] (GREEN 1C 48 *
* [18]). Repeat test U-R, channel 1, fault is still *
* present. *
*****
```

```

| |
| |
YES      NO---| Replaced comparator was faulty
| |          |-----
| |          |-----
| |          | Replace static monitoring change over unit C 56 |
| |          | [1]
| |          |-----
```

Chart 185 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

```
*****
* TEST 0-L, CHANNEL 2, DEFECTIVE.      *| GROUND EQUIPMENT REQUIRED |
* GONG WARNING AND PFC WARNING ARE     *|-----|
* NOT ACTIVATED AND THE FOUR RED      *| DESCRIPTION          PART NO. |
* WARNING LIGHTS ARE OFF ON ICOVOL    *|-----|
* INDICATOR.                          *| MULTIMETER          |
*****                               *| CIRCUIT BREAKER SAFETY |
                                      *| CLIPS                |
                                      *|-----|
```

```
*****
* On ICOVOL indicator (First Officer's instrument *
* panel) the four magnetic indicators display G *
* (M).                                           *
*****
```

```

| | |-----|
| | | Replace static monitoring change over unit C 56 |
NO YES--| [1] |
| | |-----|
```

```
*****
* Remove BLUE comparator 2C 48 [17] (GREEN 1C 48 *
* [18]). On rack connector 2C 48-AA (1C 48-AB), *
* measure 28VDC voltage between pins 38 and 13. *
*****
```

```

| | |-----|
| | | Replace circuit breaker MID & OUTER ELEVON CONT |
28V 0V---| & MON BLUE (GRN) SUP 2C 55 [3] (1C 55 [28]). |
| | |-----|
```

```
*****
* Replace BLUE comparator 2C 48 [17] (GREEN 1C 48 *
* [18]). Repeat test 0-L, channel 2; fault is still *
* present.                                           *
*****
```

```

| | |-----|
YES NO---| Replaced comparator was faulty |
| | |-----|
| | | Replace static monitoring change over unit |
|-----| C 56 [1] |
| | |-----|
```

Chart 186 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

```
*****-----=====
* TEST IN-L, CHANNEL 2, DEFECTIVE. *| GROUND EQUIPMENT REQUIRED |
* GONG WARNING AND PFC WARNING ARE *|-----|
* NOT ACTIVATED AND THE TWO RED *| DESCRIPTION PART NO. |
* WARNING LIGHTS ARE OFF ON ICOVOL *|-----|
* INDICATOR. *| MULTIMETER |
*****| CIRCUIT BREAKER SAFETY |
*****| CLIPS |
*****|-----|
```

```
*****
* On ICOVOL indicator (First Officer's instrument *
* panel) the 2 magnetic indicators display G (M). *
*****
```

```
||-----|
|| NO YES--| Replace static monitoring change over unit C 56|
|| [1]
||-----|
```

```
*****
* Remove BLUE comparator 2C 48 [17] (GREEN 1C 48 *
* [18]). On rack connector 2C 48-AB (1C 48-AB) *
* measure 28 VDC voltage between pins 28 and 13. *
*****
```

```
||-----|
|| 28V 0V---| Replace circuit breaker INNER ELEVEN CONT & MON|
|| BLUE (GRN) SUP 1 2C 53 [5] (1C 53 [30]).
||-----|
```

```
*****
* Replace BLUE comparator 2C 48 [17] (GREEN 1C 48 *
* [18]). Repeat test IN-L, channel 2 ; fault is *
* still present. *
*****
```

```
||-----| |
|| YES NO---| Replaced comparator was faulty |
||-----|
||-----|
|| Replace static monitoring change over unit C 56|
||-----|
|| [1]
||-----|
```

Chart 187 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

```
*****-----
* TEST U-R, CHANNEL 2, DEFECTIVE. *| GROUND EQUIPMENT REQUIRED |
* GONG WARNING AND PFC WARNING LIGHT *-----
* ARE NOT ACTIVATED AND THE TWO RED *| DESCRIPTION          PART NO. |
* WARNING LIGHTS ARE OFF ON ICOVOL *-----
* INDICATOR *| MULTIMETER          |
*****| CIRCUIT BREAKER SAFETY |
| CLIPS.          |
*****-----
```

```
*****
* On ICOVOL indicator (First Officer's instrument *
* panel) the two magnetic indicators display G (M) *
*****
```

```
|||-----
NO      YES---| Replace static monitoring change over unit |
|||          | C 56 [1] |
|||          |-----
```

```
*****
* Remove BLUE comparator 2C 48 [17] (GREEN 1C 48 *
* [18]). On rack connector 2C 48-AB (1C 48-AB), *
* measure 28 VDC voltage between pins 19 and 13. *
*****
```

```
|||-----
28V      0V---| Replace circuit breaker RUDDER MON LOGIC BLUE |
|||          | (GRN) SUP 2C 63 [7] (1C 63 [32]). |
|||          |-----
```

```
*****
* Replace BLUE comparator 2C 48 [17] GREEN 1C 48 *
* [18]). Repeat test U-R, channel 2 : fault is still *
* present *
*****
```

```
|||-----
YES      NO---| Replaced comparator was faulty |
|||          |-----
|||          | Replace static monitoring change over unit C 56 |
|||          | [1] |
|||          |-----
```

Chart 188 (Sheet 1 of 1)

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### D. Close-Up

- (1) On shelf 8-216 (8-215) close cover of indicating unit on front face of the BLUE comparator 2C 48 (GREEN 1C 48).
- (2) Carry out Close-Up operations of Procedure to set Flight Controls in electrical mode. Ref. 27-00-00, Servicing.

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ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[1] Static Monitoring change over unit	216AS	8-216	C56	Electronics rack-RH	27-37-12 R/I	27-30-01
[2] Flight Control Unit		9-211	C57	Overhead panel	27-36-15 R/I	27-30-01
[3] Circuit breaker 28 VDC		5-213	2C55	Map Ref. D 12	24-50-00 R/I	27-37-01
[4] Circuit breaker 28 VDC		5-213	2C58	Map Ref. D 13	24-50-00 R/I	27-37-01
[5] Circuit breaker 28 VDC		5-213	2C53	Map Ref. D 11	24-50-00 R/I	27-37-02
[6] Circuit breaker 28 VDC		5-213	2C59	Map Ref. D 14	24-50-00 R/I	27-37-02
[7] Circuit breaker 28 VDC		5-213	2C63	Map Ref. C 12	24-50-00 R/I	27-27-01
[8] Circuit breaker 28 VDC		5-213	2C62	Map Ref. C 11	24-50-00 R/I	27-27-01
[9] Power Flight Control Unit	653JB	653	C101	Underwing	27-34-52 R/I	27-30-01
[10] Power Flight Control Unit	553JB	553	C102	Underwing	27-34-52 R/I	27-30-01
[11] Power Flight Control Unit	652JB	652	C103	Underwing	27-34-52 R/I	27-30-01
[12] Power Flight Control Unit	552JB	552	C104	Underwing	27-34-52 R/I	27-30-01

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ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[13] Power Flight Control Unit	651JB	651	C105	Underwing	27-34-53 R/I	27-30-01
[14] Power Flight Control Unit	551JB	551	C106	Underwing	27-34-53 R/I	27-30-01
[15] Power Flight Control Unit	352CR	352	C78	Vertical stabilizer	27-24-31 R/I	27-30-01
[16] Power Flight Control Unit	351CL	351	C79	Vertical stabilizer	27-24-31 R/I	27-30-01
[17] BLUE Flight Control surface monitoring comparator	216AS	8-216	2C48	Electronics rack RH	27-37-11 R/I	27-30-01
[18] GREEN Flight Control surface monitoring comparator	215AS	8-215	1C48	Electronics rack LH	27-37-11 R/I	27-30-01
[19] Autostabilization computer No.2	216AS	8-216	2C31	Electronics rack RH	22-22-11 R/I	27-30-01
[20] Autostabilization computer No.1	215AS	8-215	1C31	Electronics rack LH	22-22-11 R/I	27-30-01
[21] Circuit breaker 28 VDC		2-213	2C46	Map Ref. D 2	24-50-00 R/I	27-37-04
[22] Circuit breaker 28 VDC		2-213	1C46	Map Ref. G 2	24-50-00 R/I	27-37-03
[23] Circuit breaker 28 VDC		2-213	2C47	Map Ref. D1	24-50-00 R/I	27-37-06

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ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[24] Circuit breaker 28 VDC		2-213	1C47	Map Ref. G 1	24-50-00 R/I	27-37-05
[25] Circuit breaker 28 VDC		2-213	2C49	Map Ref. D 3	24-50-00 R/I	27-27-03
[26] Circuit breaker 28 VDC		2-213	1C49	Map Ref. G 3	24-50-00 R/I	27-27-02
[27] Circuit breaker 28 VDC		1-213	1C58	Map Ref. M 13	24-50-00 R/I	27-37-01
[28] Circuit breaker 28 VDC		1-213	1C55	Map Ref. M 12	24-50-00 R/I	27-37-01
[29] Circuit breaker 28 VDC		1-213	1C59	Map Ref. M 14	24-40-00 R/I	27-37-02
[30] Circuit breaker 28 VDC		1-213	1C53	Map Ref. M 11	24-50-00 R/I	27-37-02
[31] Circuit breaker 28 VDC		1-213	1C62	Map Ref. N 11	24-50-00 R/I	27-27-02
[32] Circuit breaker 28 VDC		1-213	1C63	Map Ref. N 12	24-50-00 R/I	27-27-02
[33] Relay	15-216	12-216	C112	Circuit breaker panel		27-30-02
[34] Relay	15-216	12-216	C111	Circuit breaker panel		27-30-02
[35] BLUE static inverter protection unit	216CS	2-216	2C72	Electronics rack RH	27-35-12 R/I	27-35-01
[36] GREEN static inverter protection unit	215CS	2-215	1C72	Electronics rack LH	27-35-12 R/I	27-35-01

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ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[37] Relay jack hydraulic supply selector unit	216AS	10-216	C298	Electronics rack RH	27-34-72 R/I	27-30-02
[38] BLUE JAM caption light		4-211	C305	Overhead panel	27-34-74 R/I	27-34-02
[39] GREEN JAM caption light		4-211	C306	Overhead panel	27-34-74 R/I	27-34-02
[40] Diode		4-211	C307	Overhead panel		27-34-02
[41] INNER ELEVON warning light		2-212	C404	First Officer's instrument panel	27-36-13 R/I	27-37-06
[42] RELAY JACK switch		4-211	C303	Overhead panel - relay jack unit	27-34-73 R/I	27-34-02
[43] Diode		4-211	C308	Overhead panel		27-34-02
[44] Circuit breaker 28 VDC		1-213	C281	Map Ref. N 17	24-50-00 R/I	27-34-02
[45] Air data computer 1	215BS	6-215	1F71	Electronics rack LH	34-00-00 R/I	22-22-05
[46] Air data computer 2	216BS	6-216	2F71	Electronics rack RH	34-00-00 R/I	22-22-05
[47] Relay	215BS	6-215	1F106	Electronics rack		22-22-05
[48] Relay	216BS	6-216	2F106	Electronics rack		22-22-05

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ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[49] Diode Assembly	216AS	8-216	C86	Electro- nics rack RH		27-36-03
[50] Diode	216AS	8-216	C85-B	Diode assy C86		27-36-03
[51] Diode	216AS	8-216	C85-A	Diode assy C86		27-36-03
[52] Diode	216AS	8-216	C85-G	Diode assy C86		27-36-03
[53] Diode	216AS	8-216	C85-H	Diode assy C86		27-36-03
[54] Diode	216AS	8-216	C85-F	Diode assy C86		27-36-03

Component Identification  
Table 101

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**MAINTENANCE MANUAL**  
**ROLL CONTROL - ADJUSTMENT/TEST**

**1. Jamming Microswitch Check**

**A. General**

The purpose of this test is to check the correct operation of Power Flight Control Unit and Relay Jack jamming microswitches.

**B. Functional Test of PFCU Jamming Microswitches**

**(1) Equipment and Materials**

---

**DESCRIPTION**

**PART NO.**

---

R

Tool - Jamming Detector

P. 285 07 0042

Circuit Breaker Safety Clips

Ground Service Telephones

Lockwire Dia 0.8 mm (0.032 in.)  
Corrosion Resistant Steel

**(2) Prepare**

- (a) Hydraulic systems must not be pressurized ; depressurize Blue (Ref. 29-12-00, Servicing), Green (Ref. 29-11-00, Servicing), and Yellow (Ref. 29-21-00, Servicing) hydraulic systems.
- (b) On SERVO CONTROLS unit on overhead panel, make certain that the two switches are in NORMAL position.
- (c) On panel 1-213, trip safety and tag circuit breaker PFC IND (map ref. N18).
- (d) Open access door 151DB.
- (e) In zone 151, disconnect connector C290A on pressure switch C290, and in zone 152, disconnect connector C292A on pressure switch C292.
- (f) On panel 1-213, remove safety clip and tag and reset circuit breaker PFC IND (C287, map ref. N18).

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- R (g) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFCs INV GRN FAIL IND	1-213	1C 73	M15
AUDIO WARN SYS SUP 1		W 371	M21
PFCs ALL SURFACES MON		1C 54	M13
GRN SUP			
MWS SUP 1		W 252	N21
AUDIO WARN SYS SUP 2	5-213	W 372	C17
MWS SUP 2		W 251	D15
PFCs INV BLUE FAIL IND		2C 73	E11
PFCs ALL SURFACES MON		2C 54	E12
BLUE SUP			
ROOF PNL LT TEST SUP	15-216	L1002	D13

- R (h) Remove fairings :

553 JB giving access to PFCU - LH outer elevon  
552 JB giving access to PFCU - LH middle elevon  
551 JB giving access to PFCU - LH inner elevon  
651 JB giving access to PFCU - RH inner elevon  
652 JB giving access to PFCU - RH middle elevon  
653 JB giving access to PFCU - RH outer elevon  
352 CR giving access to PFCU - upper rudder  
351 CL giving access to PFCU - lower rudder.

- R (i) On each elevon PFCU

- R (i1) Cut lockwire safetying attachment bolts of PFCU input lever protective cover.

- R (i2) Unscrew and remove attachment bolts.

- R (i3) Remove protective cover.

- R (j) On each rudder PFCU

- R (j1) Cut lockwire safetying attachment bolts of PFCU input lever protective cover.

- R (j2) Unscrew and remove attachment bolts.

- R (j3) Remove protective cover.

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- (k) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).
- Gong must sound
  - On overhead panel
    - PFC warning light must illuminate
    - On Flight Control Unit, BLUE INVERTER and GREEN INVERTER FAIL warning lights and MECH JAM warning light must illuminate.

NOTE : Other aural warning or indicator lights which are not mentioned are not taken into account.

- (l) On Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in OFF INV position, and make certain that O & M ELEVONS, IN ELEVONS and RUDDER switches are in MECH position.
- BLUE INVERTER and GREEN INVERTER FAIL warning lights must extinguish.

- (m) Momentarily press PFC warning light.
- PFC warning light must extinguish.

- (n) On SERVO CONTROLS unit, momentarily press push-button T located below BLUE JAM caption light.
- Gong must sound
  - BLUE JAM caption light must illuminate, then extinguish
  - PFC warning light must illuminate.

- (o) Momentarily press PFC warning light
- PFC warning light must extinguish.

- (p) On SERVO CONTROLS unit, momentarily press push-button T located below GREEN JAM caption light.
- Gong must sound
  - GREEN JAM caption light must illuminate, then extinguish
  - PFC warning light must illuminate.

- (q) Momentarily press PFC warning light
- PFC warning light must extinguish.

### (3) Test

NOTE : The test to be carried out to check the jamming microswitches is identical for each of the eight power flight control units on the aircraft. Check of the microswitches can be carried out in any sequence.

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## MAINTENANCE MANUAL

- R
- (a) Position tool P. 285 07 0042 on the spring box and microswitch assembly on the aft part of the PFCU (for test of Blue spool valve).
  - (b) Carefully turn tool operating handle in a clockwise direction until limit is reached (hold at limit for at least one second).
    - Gong must sound
    - On SERVO CONTROLS unit, BLUE JAM caption light must illuminate
    - PFC warning light must illuminate.
  - (c) Turn tool handle in counter-clockwise direction, and remove tool.
    - BLUE JAM caption light and PFC warning light must remain illuminated.
  - (d) On panel 5-213, trip circuit breaker PFCS ALL SURFACES MON BLUE SUP (map ref. E12)
    - This operation must have no effect on illumination of BLUE JAM caption light and PFC warning light.
  - (e) On panel 1-213, trip circuit breaker PFCS ALL SURFACES MON GRN SUP (map ref. N13), then reset it.
    - BLUE JAM caption light and PFC warning light must extinguish (PFC warning light must then illuminate after a delay of approx. one second and gong must sound).
  - (f) On panel 5-213, set circuit breaker PFCS ALL SURFACES MON BLUE SUP (map ref. E12).
    - Operation has no effect.
  - (g) Momentarily press PFC warning light
    - PFC warning light must extinguish.
- R
- (h) Position tool P. 285 07 0042 on the spring box and microswitch assembly on forward part of the PFCU (for test of Green spool valve).
  - (i) Repeat operation (b) above
    - Gong must sound
    - On SERVO CONTROLS unit, GREEN JAM caption light must illuminate
    - PFC warning light must illuminate.
  - (j) Repeat operation (c) above
    - GREEN JAM caption light and PFC warning light must remain illuminated.

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## MAINTENANCE MANUAL

- (k) On panel 1-213, trip circuit breaker PFCS ALL SURFACES MON GRN SUP (map ref. N13).
  - This operation must have no effect on illumination of GREEN JAM caption light and PFC warning light.
- (l) On panel 5-213, trip circuit breaker PFCS ALL SURFACES MON BLUE SUP (map ref. E12) then reset it.
  - GREEN JAM caption light and PFC warning light must extinguish (PFC warning light must then illuminate after a delay of approx. one second and gong must sound).
- (m) Carry out successively operations (a) to (b) above on the eight PFCU on the aircraft.

### (4) Close-Up

- (a) On Flight Control Unit on overhead panel, place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position.
- (b) On panel 1-213, trip safety and tag circuit breaker PFC IND (map ref. N18).
- (c) In zone 151, connect connector C290A on pressure switch C290, and in zone 152, connect connector C292A on pressure switch C292.
- (d) Close access door 151DB.
- (e) On panel 1-213, remove safety clip and tag and reset circuit breaker PFC IND (map ref. N18).
  - On SERVO CONTROLS unit, check that BLUE L PRESS and GREEN L PRESS caption lights are illuminated.
- (f) De-energize the aircraft electrical network and disconnect electrical ground power unit.  
(Ref. 24-41-00, Servicing).
- (g) On each PFCU, position protective cover and attachment bolts.
- (h) Tighten attachment bolts.
- (i) Safety attachment bolts with lockwire.
- (j) Position and attach PFCU fairings.

### C. Functional Test of Relay Jack Jamming Microswitches

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### (1) Equipment and Material

DESCRIPTION	PART NO.
Tool - Jamming Detector	CT1 P289-45-002

### (2) Prepare

- (a) Hydraulic systems must not be pressurized ; de-pressurize Blue (Ref. 29-12-00, Servicing), Green (Ref. 29-11-00, Servicing) and Yellow (Ref. 29-21-00, Servicing) hydraulic systems.
- (b) Open access door 121FB.
- (c) Open floor panel 213DF.
- (d) On overhead panel
  - (d1) On Flight Control Unit, make certain that BLUE INVERTER and GREEN INVERTER switches are in PWR OFF position.
  - (d2) On SERVO CONTROLS unit, make certain that the two selector switches are in NORMAL position.
  - (d3) On RELAY JACK unit, make certain that switch is in NORM position.
- (e) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
AUDIO WARN SYS SUP 1	1-213	W 371	M21
RELAY JACK HYD SEL IND & SUP		C 281	N17
MWS SUP 1		W 252	N21
AUDIO WARN SYS SUP 2	5-213	W 372	C17
MWS SUP 2		W 251	D15

- (f) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).
  - Gong must sound

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- PFC warning light must illuminate.

NOTE : Other aural warnings or indicator lights which are not mentioned are not taken into account.

- (g) Momentarily press PFC warning light
  - PFC warning light must extinguish.

- R
- R
- (h) On RELAY JACK unit, momentarily press BLUE JAM push-button TEST.
  - Gong must sound
  - BLUE JAM caption light must illuminate then extinguish.
  - PFC warning light must illuminate.

- R
- (i) Momentarily press PFC warning light
  - PFC warning light must extinguish

- R
- (j) On RELAY JACK unit, momentarily press GREEN JAM push-button TEST.
  - Gong must sound
  - GREEN JAM caption light must illuminate then extinguish
  - PFC warning light must illuminate.

- R
- (k) Momentarily press PFC warning light
  - PFC warning light must extinguish.

### (3) Test

NOTE : This test is in two parts :  
The first part serves to check action of jamming microswitches on relay jack spool valve jamming warning system when Autopilot is not engaged.  
The second part serves to check the result of operation of AFCS control unit AP1 and AP2 switches on the jamming warning system of the spool valves of any one of the relay jacks.  
Correct results of the second part of the test serve to confirm correct operation of appropriate stages of AP1 and AP2 switches.

#### (a) First Part

NOTE : The functional test described below is identical for each of the three relay jacks (roll : C8, yaw : C10, or pitch : C6).

- (a1) On central part of glareshield, on AFCS control unit, check that AP1 and AP2 switches

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are not in engaged position.

(a2) From flight compartment, install tool CT1P 289 45 002 on relay jack spring box (for Blue spool valve, forward part of relay jack).

(a3) Fully squeeze handles of tool, hold them in this position for at least one second, then release them and remove tool.

- Gong must sound
- On overhead panel
  - On RELAY JACK unit, BLUE JAM caption light must illuminate.
  - switch must illuminate.
- PFC warning light must illuminate.

R

(a4) On RELAY JACK unit, place switch in GREEN ONLY then NORM position.

R

- BLUE JAM caption light must extinguish.

(a5) Momentarily press PFC warning light

- PFC warning light must extinguish.

(a6) In zone 121, position tool CT1P 289 45 002 on relay jack spring box, the Blue jamming microswitch of which was checked above (for Green spool valve, aft part of PFCU).

(a7) Fully squeeze handles of tool, hold them in this position for at least one second, then release them and remove tool.

- Gong must sound
- On overhead panel
  - On RELAY JACK unit, GREEN JAM caption light must illuminate.
- PFC warning light must illuminate

R

(a8) On RELAY JACK unit, place switch in BLUE ONLY then NORM position.

R

- GREEN JAM caption light must extinguish.

(b) Second Part

NOTE : This part of the test is to be carried out once only on one of the three relay jacks. Due to ease of access, the Yaw Relay Jack has been chosen.

(b1) Trip, safety and tag the following circuit breakers :

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
AP/FD COMP 1 CONT	13-215	1C 18	A5
AP/FD COMP 2 SUP	13-216	2C 18	F18
(b2) On central part of glareshield, on AFCS control unit, engage AP1 switch and hold it in this position.			
(b3) From flight compartment, position tool CT1P 45 002 on yaw relay jack C10 spring box (Blue spool valve jamming microswitch).			
(b4) Fully squeeze handles of tool, hold in this position for less than half a second, then release them. <ul style="list-style-type: none"><li>- Gong must sound</li><li>- On overhead panel<ul style="list-style-type: none"><li>- PFC warning light must illuminate</li><li>- On RELAY JACK unit, GREEN JAM caption light must illuminate.</li></ul></li></ul>			
(b5) On RELAY JACK unit, place switch in BLUE ONLY then NORM position. <ul style="list-style-type: none"><li>- GREEN JAM caption light must extinguish.</li></ul>			
(b6) In zone 121, position tool CT 1P 289 45 002 on yaw relay jack C10 spring box (Green spool valve jamming microswitch).			
(b7) Fully squeeze handles of tool, hold them in this position for less than half a second, then release them and remove tool. <ul style="list-style-type: none"><li>- Gong must sound</li><li>- On overhead panel<ul style="list-style-type: none"><li>- PFC warning light must illuminate</li><li>- On RELAY JACK unit, GREEN JAM caption light must illuminate.</li></ul></li></ul>			
(b8) On RELAY JACK unit, place switch in BLUE ONLY then NORM position. <ul style="list-style-type: none"><li>- GREEN JAM caption light must extinguish.</li></ul>			
(b9) Momentarily press PFC warning light. <ul style="list-style-type: none"><li>- PFC warning light must extinguish.</li></ul>			

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(b10) On AFCS control unit, release AP1 switch then engage AP2 switch and hold it in this position.

(b11) Repeat operations (b3) and (b4) above

- Gong must sound
- On overhead panel
- PFC warning light must illuminate
- On RELAY JACK unit, BLUE JAM caption light must illuminate.

(b12) On RELAY JACK unit, place switch in GREEN JAM then NORM position.

- BLUE JAM caption light must extinguish.

(b13) Release AP2 switch.

(b14) Remove safety clips and tags, and set the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER		MAP REF.
AP/FD COMP 1 CONT	13-215	1C	18	A5
AP/FD COMP 2 SUP	13-216	2C	18	F18

### (4) Close-Up

(a) De-energize the aircraft electrical network and disconnect electrical ground power unit.  
(Ref. 24-41-00, Servicing).

(b) Close and attach access door 121FB.

(c) Position and attach floor panel 213DF.

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## MAINTENANCE MANUAL

### 2. Check of Power Flight Control Unit and Relay Jack Electrovalve Opening Minimum Voltage

**WARNING :** MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN 24-00-00 SERVICING.

#### A. General

The purpose of this test is to make certain that the voltages enabling the opening of the PFCU and RJ electrovalves are not less than 3 volts for the PFCU's and 2 volts for the RJ's.

#### B. Check of PFCU electrovalves

##### (1) Equipment and Materials

DESCRIPTION	PART NO.
Test Set - PFCU and Relay Jack Electrovalves	PCO 9162
Circuit Breaker Safety Clips	
Ground Power Unit - Hydraulic - Power and Preliminary Testing	EMH 398E
Voltmeter DC 0-5 volts - 1%	

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### (2) Prepare

- (a) Take the precautions described in the previous WARNING paragraph.
- (b) On shelf 8-216, remove unit C110 (Ref. 27-36-17, Removal/Installation).
- (c) On equipment PC09162, make certain that EXT-INT (Off-On) switch is in EXT (off) position and B-V (Blue-Green) switch is in B (Blue) position.
- (d) Connect equipment PC09162 in place of unit C110 (Take care not to damage electrical connector pins).
- (e) Carry out Prepare paragraph operations of Procedure to set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (f) On panel 5-215, make certain that circuit breaker PFCS TEST UNIT DC SUP (Map. Ref. A5) is set.
- (g) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFCS INV GRN FAIL IND	1-213	1C 73	M15
PFCS INV BLUE FAIL IND	5-213	2C 73	E11

- (h) Connect voltmeter to equipment sockets
- (i) At overhead panel :
  - On SERVO CONTROLS unit, place lower selector switch in BLUE L.PRESS position.
  - On Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in OFF INV position.

### (3) Test

- (a) Connect hydraulic ground power unit and pressurize yellow hydraulic system (Ref. 29-21-00, Servicing)
  - BLUE L.PRESS caption light must extinguish
  - Elevons must deflect up to neutral position

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## MAINTENANCE MANUAL

(check on IC0VOL indicator).

- (b) Reduce pressure delivered by ground power unit to 150 bars (2200 psi) approx. ; check that, on HYDRAULIC MANAGEMENT panel, yellow hydraulic pressure indicator displays this value.
- (c) On equipment PC09162, place EXT-INT (Off-On) switch in INT (On) position.
  - Check that no rudder or elevon deflects.
  - Equipment voltmeter must read 3 plus or minus 0.2 volts.
- (d) Slowly rotate (1° elevon per second) pitch trim wheel then return trim wheel to zero position :
  - Pressure read on yellow pressure indicator at HYDRAULIC MANAGEMENT panel must not be less than 130 bars (1900 psi) approx.
  - Elevons must deflect accordingly, then return to neutral.
- (e) Slowly rotate (1° elevon per second) yaw trim knob then return trim knob to zero position :
  - Pressure read on yellow pressure indicator must not be less than 130 bars (1900 psi) approx.
  - Rudders must deflect accordingly, then return to neutral.
- (f) On equipment PC0 9162, place EXT-INT (off-on) switch in EXT (off) position then B=V (Blue=Green) switch in V (Green) position.
- (g) On overhead panel, on SERVO CONTROLS unit, place lower selector switch in GREEN L.PRESS position :
  - GREEN L.PRESS caption light must extinguish and BLUE L.PRESS caption light must illuminate.
- (h) On equipment PC0 9162, place EXT-INT (OFF-ON) switch in INT (On) position :
  - Make certain that no rudder or elevon deflects.
  - Equipment voltmeter must read 3 plus or minus 0.2 volts
- (i) Repeat steps (d) and (e) above.
  - Results must be identical.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (j) On equipment PCO 9162, place EXT-INT (OFF-ON) switch in EXT (OFF) position.
  - (k) On overhead panel :
    - On SERVO CONTROLS unit, place lower selector switch in NORMAL position.
    - On Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position.
  - (l) Shut down pressurization of yellow hydraulic system (Ref. 29-21-00, Servicing).
  - (m) Disconnect equipment voltmeter.
  - (n) Remove equipment PCO 9162.
  - (o) Install unit C110 (Ref. 27-36-17, Removal/Installation).
  - (p) Increase pressure of hydraulic ground power unit to 280 bars (4000 psi).
  - (q) Carry out Prepare and Procedure paragraphs of Procedure to set Flight Controls in Blue electrical mode (Ref. 27-00-00, Servicing).
  - (r) Deflect control column and rudder pedals
    - ICOVOL magnetic indicators must display B.
    - Elevons and rudders must deflect according to orders given by control column and rudder pedals
  - (s) On overhead panel, on Flight Control Unit, place the three O&M ELEVONS, IN ELEVONS and RUDDER switches in GREEN position.
    - On ICOVOL indicator, the 8 magnetic indicators must display G.
  - (t) Deflect control column and rudder pedals
    - ICOVOL magnetic indicators must display G during operation.
    - Elevons and rudders must deflect according to orders given by control column and rudder pedals
- (4) Close-Up
- (a) Carry out close-up operations of Procedure to set Flight Controls in electrical mode

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## MAINTENANCE MANUAL

(Ref. 27-00-00, Servicing).

- (b) Remove safety clips and tags and set the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFCS INV GRN FAIL IND	1-213	1C 73	M15
PFCS INV BLUE FAIL IND	5-213	2C 73	E11

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### C. Check of Relay Jack Electrovalves

#### (1) Equipment and Materials

DESCRIPTION	PART NO.
Ground Power Unit - Hydraulic - Power and Preliminary Testing	EMH 398E
Power Supply 2VDC	Accumulator Cell
Ohmmeter (to Check Circuit Continuity)	

#### (2) Prepare

- (a) Take the precautions described in the previous WARNING paragraph.
- (b) Remove pitch AP/FD computer No.1 (1C12)  
(Ref. 22-12-11, Removal/Installation).
- (c) Connect power supply :
  - Terminal + to terminal AA1 of receptacle 1C12
  - Terminal - to terminal AA35 of receptacle 1C12
- (d) Carry out Prepare paragraph operations of Procedure to set Flight Controls in mechanical mode  
(Ref. 27-00-00, Servicing).
- (e) Connect hydraulic ground power unit and pressurize yellow system to 4000 psi (280 bars)  
(Ref. 29-21-00, Servicing).
- (f) On overhead panel, on SERVO CONTROLS unit, place lower selector switch in BLUE L.PRESS position :
  - Elevons must deflect up to neutral position
  - BLUE L.PRESS caption light must extinguish
- (g) Reduce pressure delivered by hydraulic ground power unit to 150 bars (2200 psi) approx. :  
Check that on HYDRAULIC MANAGEMENT panel, yellow hydraulic pressure indicator reads this value.

#### (3) Test

- (a) Connect ohmmeter between terminals BA 28 and AA 39 of receptacle 1C12

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## MAINTENANCE MANUAL

- Ohmmeter must indicate continuity.

(b) At glareshield panel centre section, on AFCS control unit, place and hold AP1 switch in engaged position.

- Ohmmeter connected between terminals BA 28 and AA 39 of receptacle 1C12 must still indicate continuity.

NOTE : If it indicates discontinuity, disconnect then connect ohmmeter between terminals BA 37 and AA 39 of receptacle 1C12 (AP1 switch held in engaged position)  
If ohmmeter indicates continuity between terminals BA 37 and AA 39, replace pitch relay jack C6 (Ref. 27-34-14, Removal/Installation).

(c) Release AP 1 switch.

(d) Disconnect ohmmeter, then connect it between terminals BA 28 and AA 38 of receptacle 1C12  
- It must indicate continuity.

(e) Engage and hold engaged AP 1 switch.  
- Ohmmeter connected between terminals BA 28 and AA 38 of receptacle 1C12 must still indicate continuity :

NOTE : If it indicates discontinuity, disconnect then connect ohmmeter between terminals BA 37 and AA 38 of receptacle 1C12 (AP 1 switch held in engaged position).  
- If ohmmeter indicates continuity between terminals BA 37 and AA 38, replace yaw Relay Jack C10 (Ref. 27-24-12, Removal/Installation).

(f) Release AP1 switch.

(g) Disconnect ohmmeter, then connect it between terminals BA 28 and AA 37 of receptacle 1C12.  
- Ohmmeter must indicate continuity.

(h) Engage AP1 switch and hold it in this position.  
- Ohmmeter connected between terminals BA 28 and AA 37 of receptacle 1C12 must still indicate continuity

NOTE : If it indicates discontinuity, disconnect then connect ohmmeter between terminals

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BA

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## MAINTENANCE MANUAL

BA 37 and AA 37 of receptacle 1C12 (AP1 switch held in engaged position)  
- If ohmmeter indicates continuity between terminals BA 37 and AA 37, replace roll Relay Jack C8 (Ref. 27-14-12, Removal/Installation).

- (i) Release AP1 switch ; disconnect ohmmeter and electrical power supply.
  - (j) Install pitch AP/FD computer No.1 (1C12) (Ref. 22-12-11, Removal/Installation).
  - (k) Remove pitch AP/FD computer No.2 (2C12) (Ref. 22-12-11, Removal/Installation).
  - (l) Connect electrical power supply :  
Terminal + to terminal AA 1 of receptacle 2C12  
Terminal - to terminal AA 35 of receptacle 2C12
  - (m) On overhead panel, on SERVO CONTROLS unit, place lower selector switch in GREEN L.PRESS position  
- BLUE L.PRESS caption light must illuminate and  
GREEN L.PRESS caption light must extinguish.
  - (n) Repeat steps (a) to (j) above, replacing.
    - Computer 1C12 by computer 2C12
    - Receptacle 1C12 by receptacle 2C12
    - AP1 engage switch by AP2 engage switch.
    - Results must be identical.
    - Notes are applicable except that the Relay Jack Green electrovalve has to be replaced and not the relay jack itself.
    - The referenced documents remain valid.
  - (o) On hydraulic ground power unit, set pressure to 280 bars (4000 psi) approx.
  - (p) Carry out tests after removal of pitch AP computers No.1 and No.2 (Ref. 22-12-11, Adjustment/Test).
- (4) Close-Up
- (a) Carry out Close-up operations of Procedure to set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).

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R

BA

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**END OF THIS  
SECTION**

**NEXT**

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## MAINTENANCE MANUAL

### MECHANICAL CONTROL CHANNEL - DESCRIPTION AND OPERATION

#### 1. General

R The mechanical control linkage between the flight compartment  
R and the PFCU's is a stand-by system used in the event of  
electrical channel failure.

#### 2. Description (Ref. Fig. 001 )

R The mechanical control channel is made up of the following  
R items :

- R - Handwheels
- Chains
- Torque tubes
- Control rods
- R - Artificial feel and integral trim assembly
- Synchro packs
- R - Autopilot force limiter
- R - Relay jack
- Load limiting mechanism
- Jam detection strut
- Cable tension regulator
- Control cables
- Mixing unit
- Spring rod for outer and middle elevons, rigid rods for  
inner elevons
- Bulkhead pressure seals
- Control rods and bellcranks in the wings
- Power flight control units (PFCUs)
- R - Elevons 1, 2, 3, 4, 5 and 6 for each wing.

#### 3. Load Limiting Mechanism (Ref. Fig.002 and 003)

R The load limiting mechanism is composed of two parts pivoting  
R about a common axis and installed on the relay jack support  
chassis. It comprises a spring pot directly controlled by the  
relay jack and an output lever to the control linkage down-  
stream.

R The spring pot consists of two chambers each equipped with two  
R concentric springs fitted around and loading a spring retainer.

R The spring retainers each receive a piston operated by a spigot  
R hinged on the roller carrying arm.  
R The roller carrying arm pivots on the spring pot housing.

EFFECTIVITY: ALL

BA

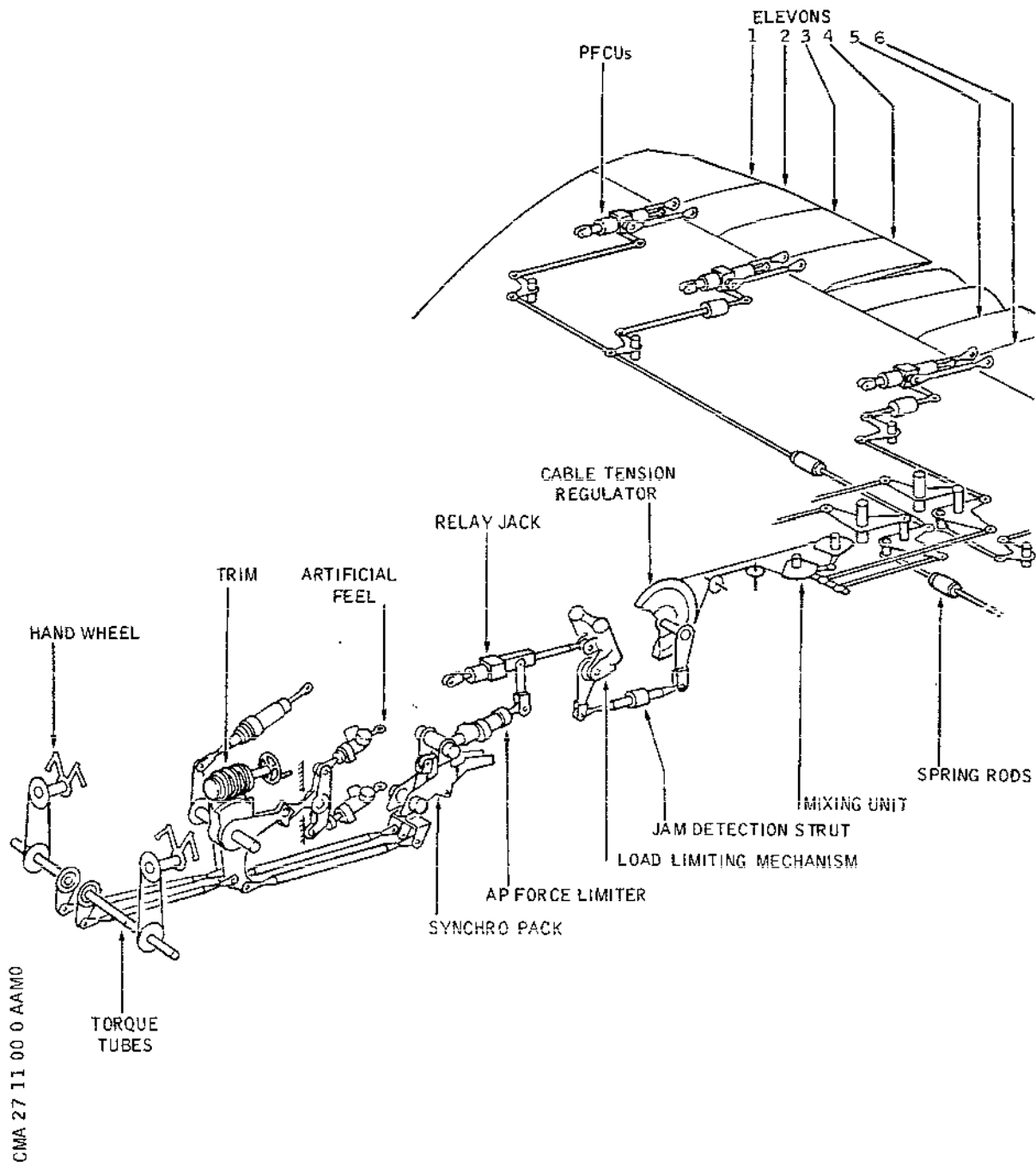
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## MAINTENANCE MANUAL



Mechanical Roll Control  
Figure 001

R

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## MAINTENANCE MANUAL

R The output lever is equipped with a cam which engages the roller  
R on the roller carrying arm.

R Under the action of the relay jack, the spring pot drives the  
R output lever via the roller maintained in the cam notch by the  
R loading of the springs. If the load exerted on the lever exceeds  
R the opposing load of the springs, the roller carrying arm com-  
R presses the springs via the pistons and the spring retainers.  
R The roller leaves its notch and rolls on the cam profile.

R As the load exerted on the lever decreases, the cam profile and  
R the action of the springs tend to return the roller to its  
R neutral position in the cam notch.

#### 4. Cable Tension Regulator (Ref. Fig.004 and 005)

R The tension regulator, fitted aft of the relay jack chassis  
R beneath the passenger compartment floor, comprises a compen-  
R sating mechanism, two cable quadrants and two slack absorber  
jacks.

R The compensating system forms an assembly pivoting between two  
support plates attached to the structure.  
The hub, the main part of the system, comprises two machined  
flanges perpendicular to the pivoting axis.  
R Between these two flanges are attached two split cylinders  
R guiding two springs, and a balance arm sliding on a locking  
shaft.

R The cable quadrants pivot independently about the compensating  
R system on bearings.

R The slack absorber jacks connect each quadrant to one end of  
R the compensating system balance arm.

R Because of different coefficients of expansion of materials  
R (structure/cables), temperature variations cause a change in  
cable tensions. The object of the regulator is to compensate  
for these differences in tension.

R When cable tension increases, the quadrants pivot, pulling on  
R the balance arm via the slack absorber jacks. Under the effect  
R of the balanced load applied, the balance arm slides along the  
R locking shaft compressing the compensating springs. A new  
balanced position of the system is obtained, corresponding to  
an adjusted cable tension.

R When cable tension decreases, the compensating springs push  
R back the balance arm along the locking shaft. The slack absor-  
R ber jacks transmit the movement and pivot the quadrants. Correct

EFFECTIVITY: ALL

BA

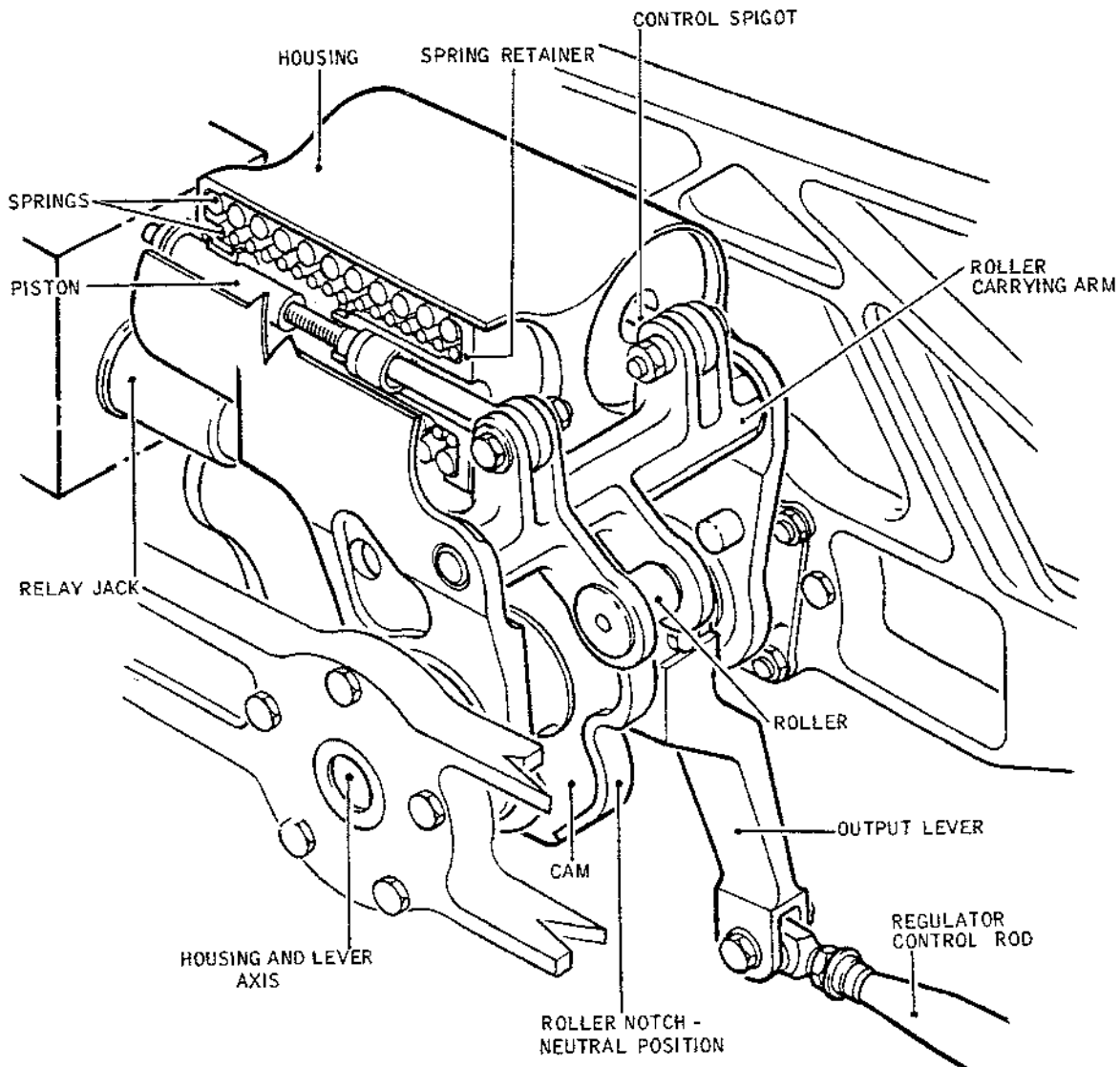
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## MAINTENANCE MANUAL



CMA 27 11 00 0 ACM0

Load Limiting Mechanism - Description  
Figure 002

R

EFFECTIVITY: ALL

BA

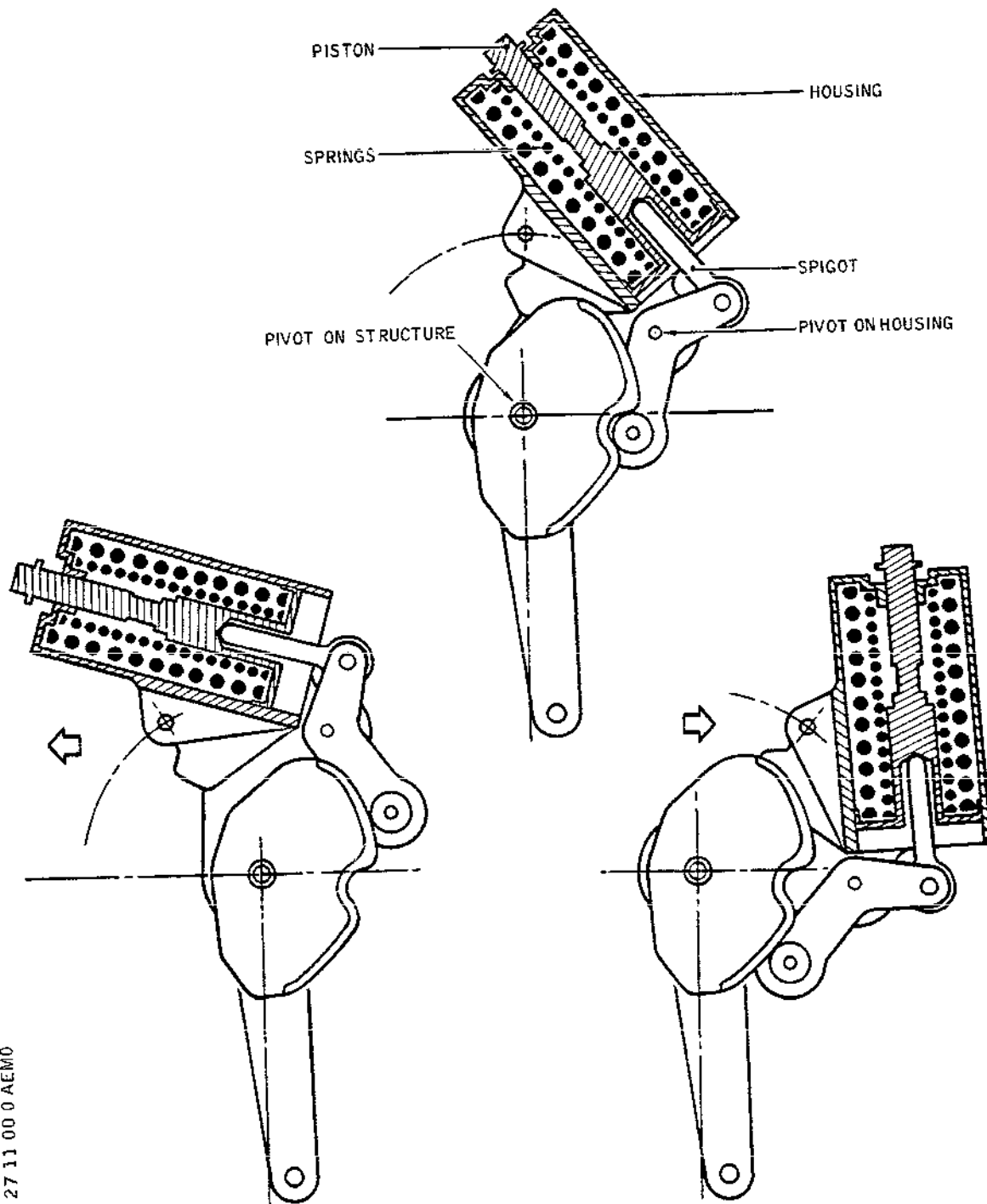
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## MAINTENANCE MANUAL



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Load Limiting Mechanism - Operation  
Figure 003

R

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## MAINTENANCE MANUAL

cable tension is maintained.

- R When a control load is applied, the control lever operates the  
R compensating mechanism assembly. The quadrant which actuates  
the cables must overcome the inertia and friction of the control  
linkage.  
R The balance arm held by the slack absorber jack of the quadrant  
loaded, pivots and wedges against the locking shaft, neutralizing the compensating system. The regulator assembly then acts  
R as a single pulley.  
R The balance arm, via the second slack absorber jack, maintains  
a load opposite to the movement of the assembly on the second  
quadrant and consequently, a tension on the cable.

### 5. Mixing Unit (Ref. Fig. 006 )

- R The mixing unit is installed between frames 69 and 70 beneath  
R the passenger compartment floor. It consists of two independent  
stages.  
R The upper stage controls the inner elevons and the lower stage  
the middle and outer elevons.

The mixing unit comprises :

- R An assembly of four quadrants and crank levers joined and pivoted via support beams anchored on the structure.
- R A crank lever assembly pivoted on a beam and used to mix the pitch and the roll commands.
- R To the left of the assembly, two cable quadrants (R1, R2) of opposite and combined displacement, form the roll mixing input system.
- R The forward quadrant (R1) is fitted with two crank levers pivoted on the same pin. The lower crank lever which is longer than  
R the upper crank lever, controls the middle and the outer elevon  
R linkage, whereas the upper crank lever controls the inner  
R elevons.  
R These crank levers determine the variations of displacement  
in roll between the inner elevons, and the middle and the outer  
R elevons to minimize yaw moment.

To the right of the assembly, two cable quadrants (P1, P2) of opposite and combined displacement, form the pitch mixing input system.

- R The forward quadrant (P1) is fitted with two crank levers pivoting on the same pin. The lower crank lever, which is shorter  
R than the upper crank lever, controls the middle and the outer  
R elevons.  
R These crank levers determine the variations of displacement

EFFECTIVITY: ALL

BA

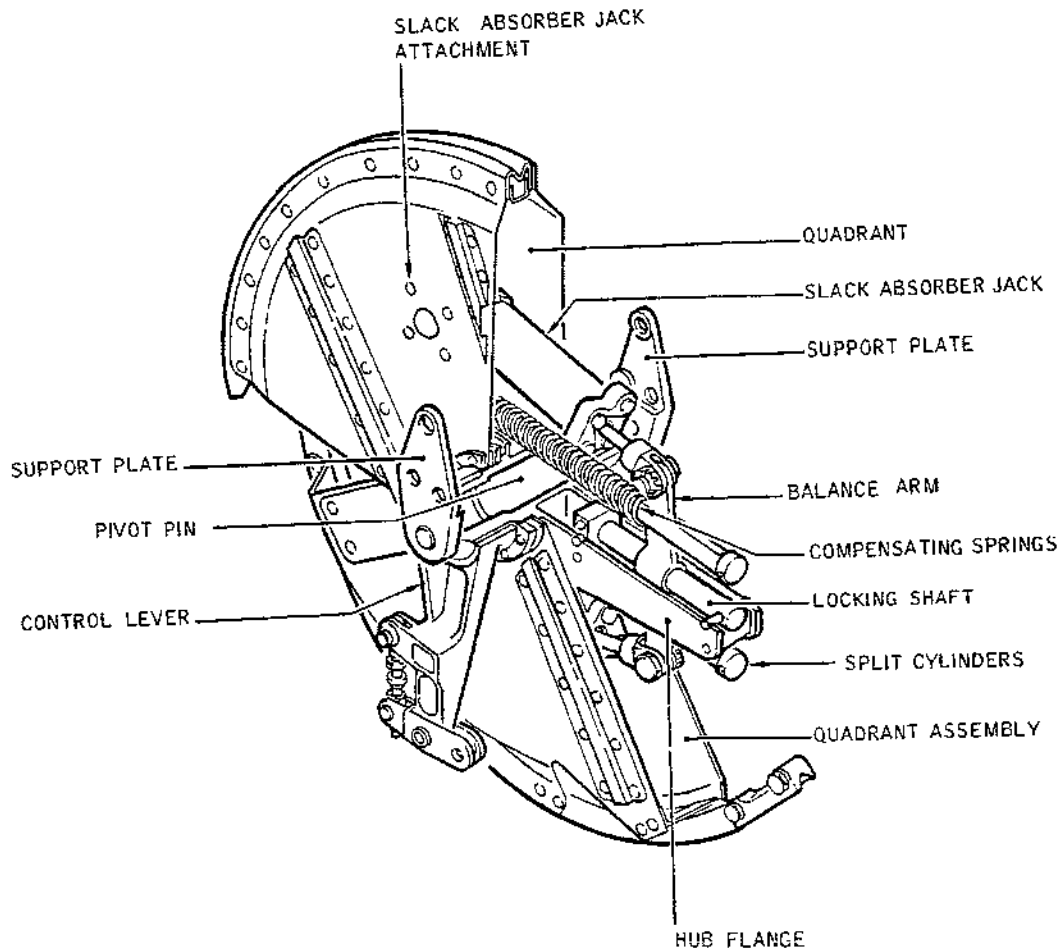
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Cable Tension Regulator - Description  
Figure 004

R

EFFECTIVITY: ALL

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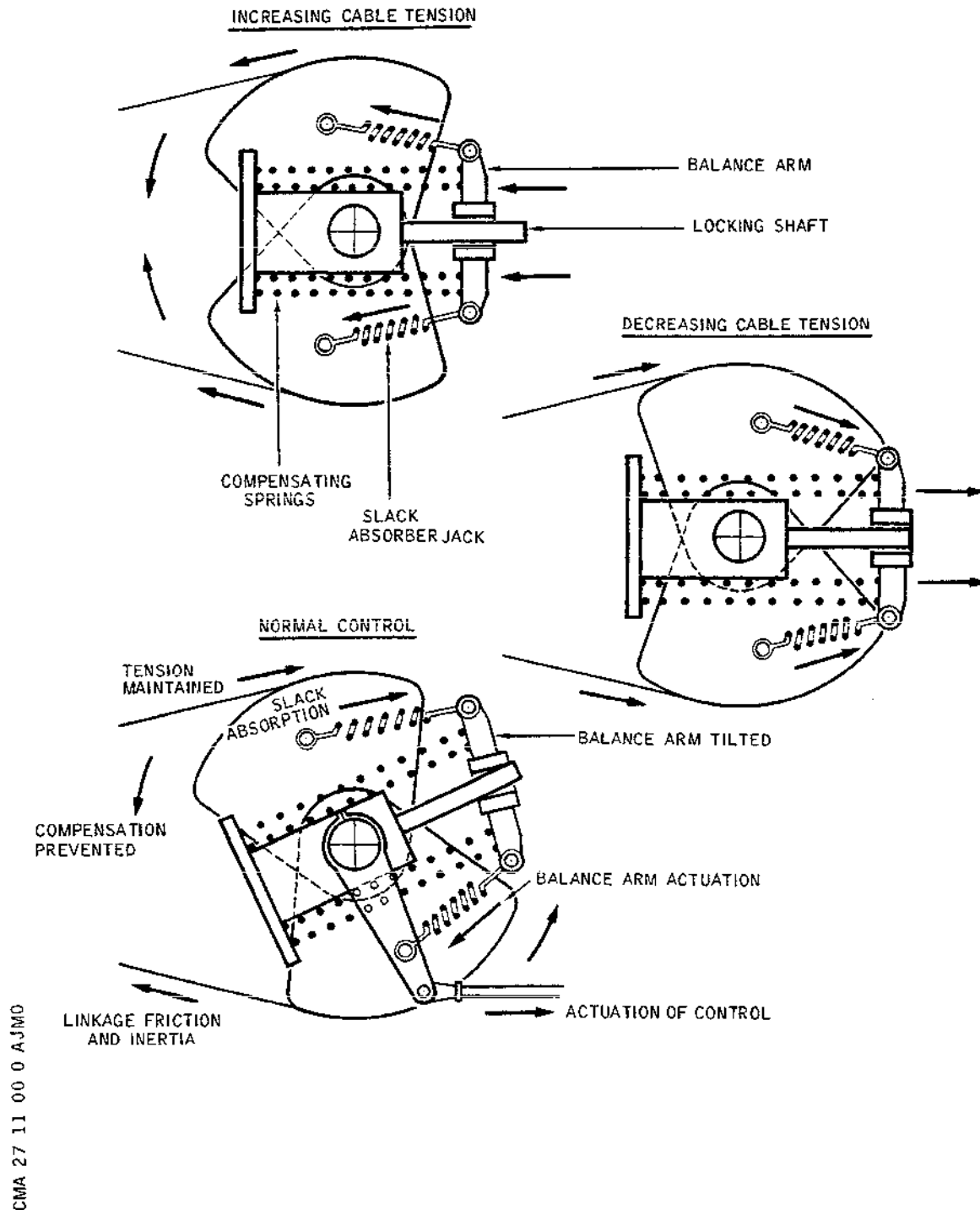
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## MAINTENANCE MANUAL



Cable Tension Regulator - Operation  
Figure 005

R

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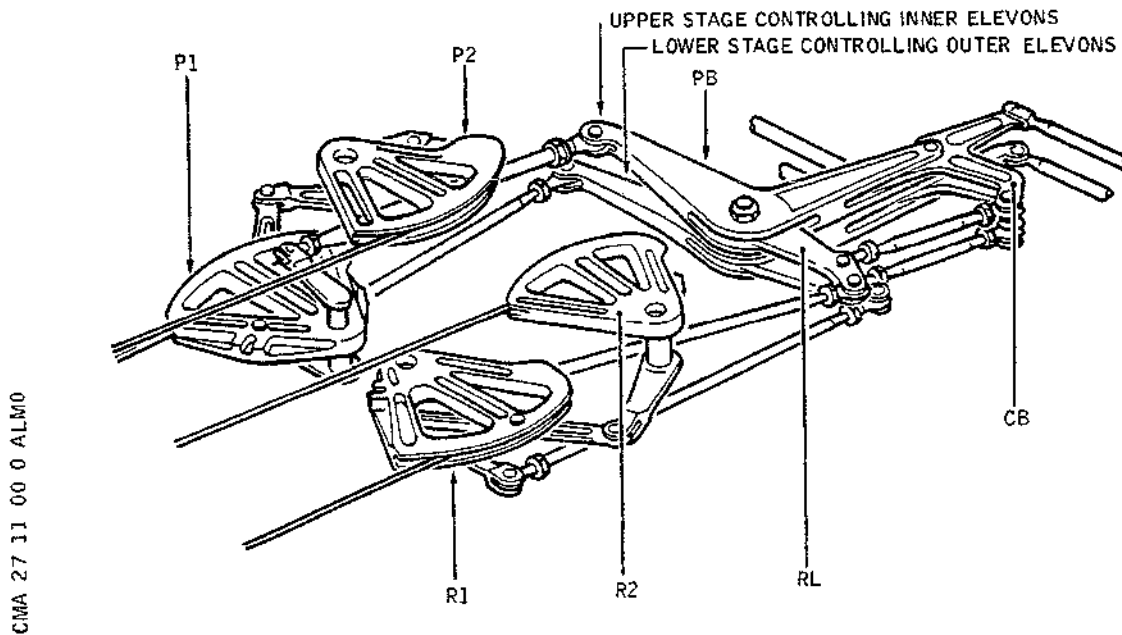
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## MAINTENANCE MANUAL

between the middle and outer elevons.



Mixing Unit  
Figure 006

- R
- R The crank lever comprises two superimposed bellcranks (PB) controlled by the pitch cable quadrants and two superimposed
- R crank levers (RL) controlled by the roll quadrants. At the rear
- R two other superimposed bellcranks (CB) distribute the movements to each wing ; they serve communally both pitch and roll.
- R The two independent stages of the mixing unit operate on the same principle.
- R Only the displacement values are different. Therefore only one stage is described.
- A. Roll Control  
(Ref. Fig. 007 )
- R The quadrants R1 and R2 are operated by the roll control cables.
- R Quadrants P1 and P2 are immobile in the absence of pitch commands. Therefore bellcrank PB is immobile. In its move-
- R ment, quadrant R1 via rod 1 drives the crank lever RL

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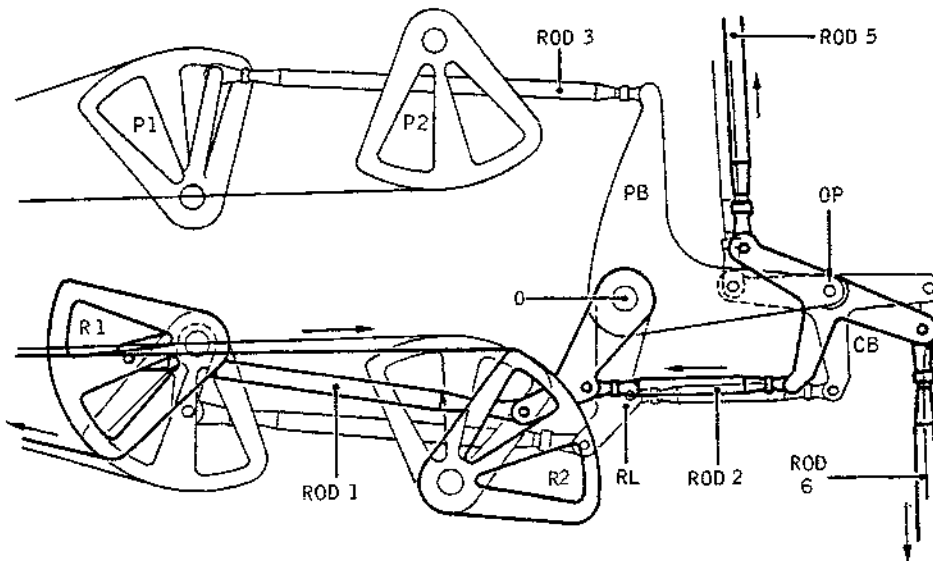
## MAINTENANCE MANUAL

pivoted at O.

R The crank lever RL via rod 2 drives the bellcrank CB which pivots about point OP (fixed in absence of pitch commands).

R The bellcrank CB drives the linkage in each wing.

R Maximum control handwheel displacement  $45^\circ$  from one side of neutral to the other. Elevons displacement, outer and middle  $\pm 20^\circ$ , inner  $\pm 14^\circ$ .



CMA 27 11 00 0 ANM0

One Stage of Mixing Unit - Roll Control  
Figure 007

### B. Pitch Control (Ref. Fig. 008 )

The quadrants P1 and P2 are operated by the pitch cables.

R Quadrants R1 and R2 are immobile in the absence of roll  
R commands. Crank lever RL is immobile.

R In its movement, the quadrant P1 via rod 3 drives the  
R bellcrank PB which pivots about the fixed point O.

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## MAINTENANCE MANUAL

R The bellcrank PB drives the bellcrank CB which, connected  
R to the fixed crank lever RL displaces in parallel, operating  
the control linkage in each wing.

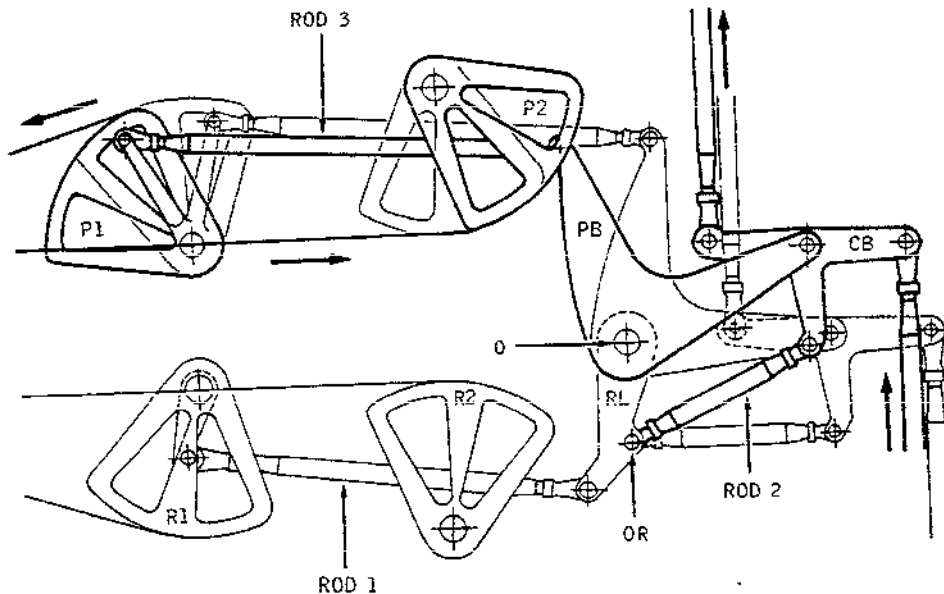
R Maximum control column displacement :  
R - Nose down  $9^{\circ} 16'$

Nose up, spring pot assembly compressed  $10^{\circ} 44'$ .

Maximum elevon deflection :

- With spring pot assembly compressed :  $17^{\circ}$  nose down and  
nose up.  
R - Spring pot assembly not compressed :  $17^{\circ}$  nose down and  $15^{\circ}$   
nose up.

CMA 27 11 00 0 AQMO



One Stage of Mixing Unit - Pitch Control  
Figure 008

R

### C. Mixing (Ref. Fig.009 and 010)

In mixing, only the pivot points of the quadrants and the point O remain fixed. According to the flight configuration, the commands add or subtract for each wing. The ele-

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## MAINTENANCE MANUAL

R vons of the same position therefore have different de-  
R flection.

R For a maximum nose down or nose up position of the control  
R column, with spring pot assembly compressed ; a roll de-  
R flection of  $2^{\circ} 52'$  can be obtained.

R For a maximum nose up position of the control column with  
spring pot assembly not compressed, a roll deflection of  $4^{\circ}$   
can be obtained.

EFFECTIVITY: ALL

BA

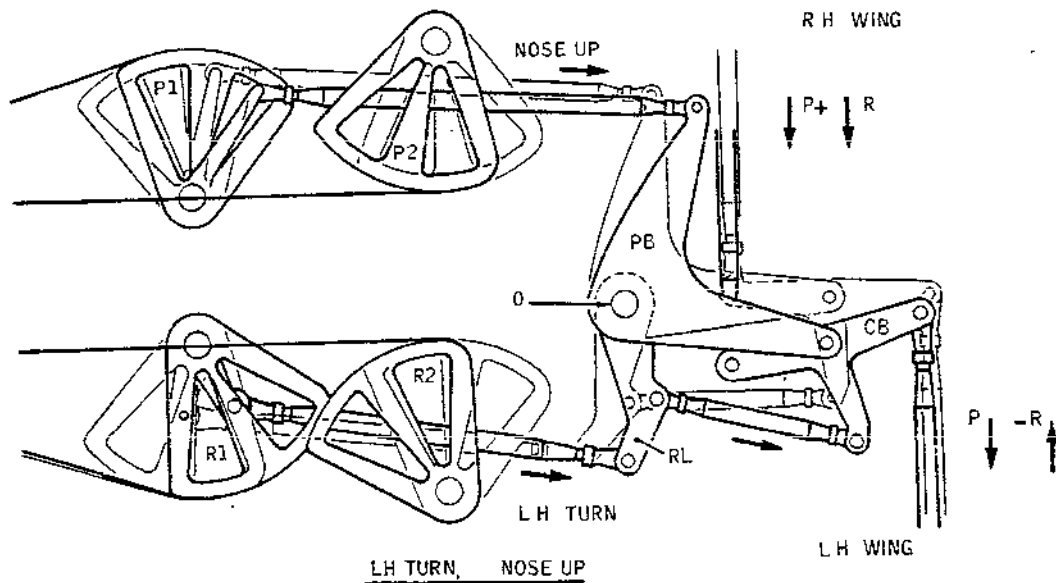
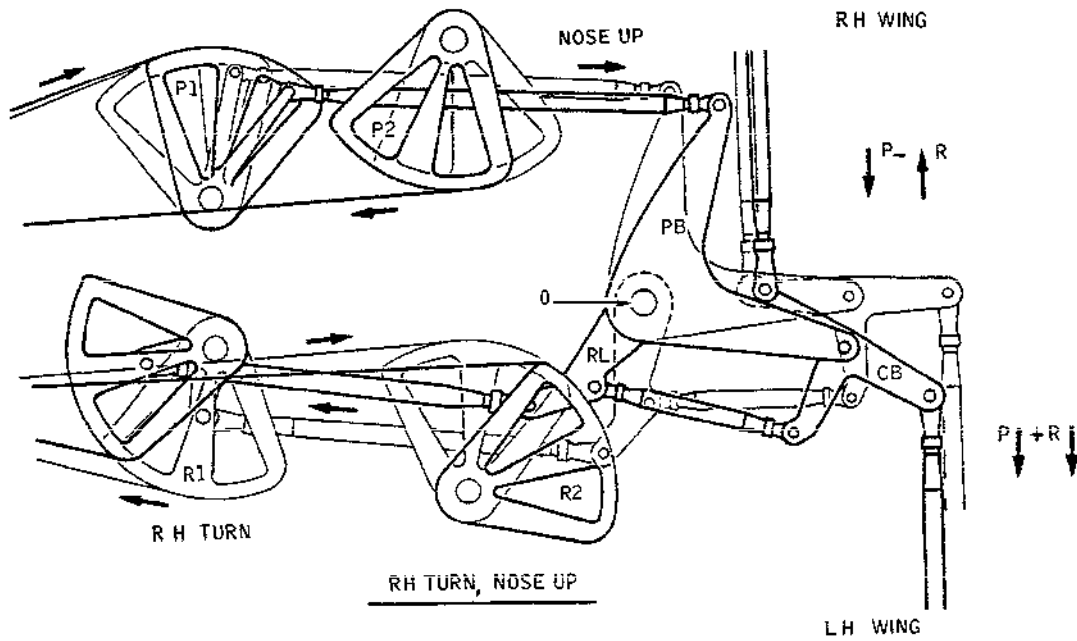
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CMA 27 11 00 0 ASM0

Mixing Operation  
Figure 009

R

EFFECTIVITY: ALL

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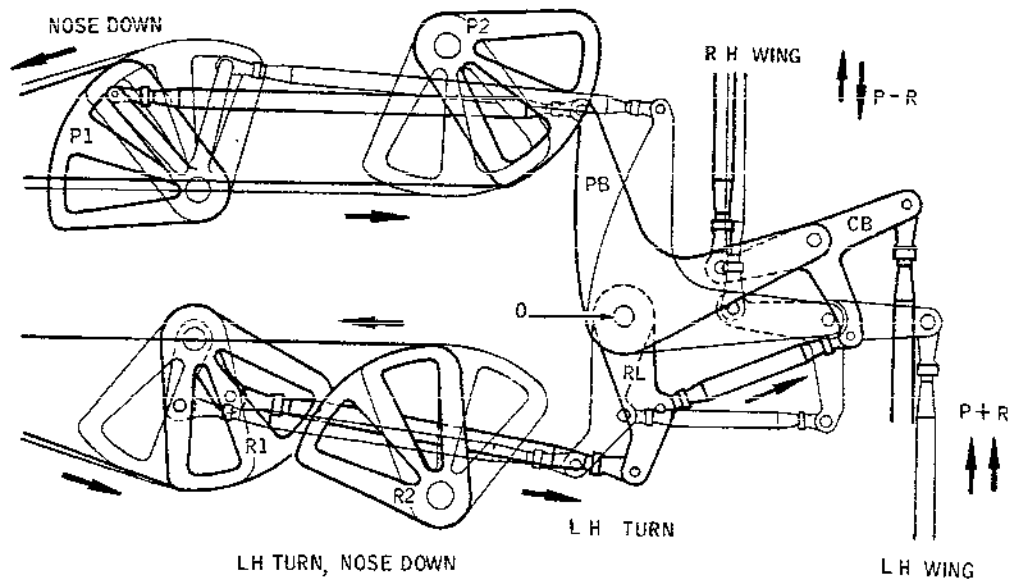
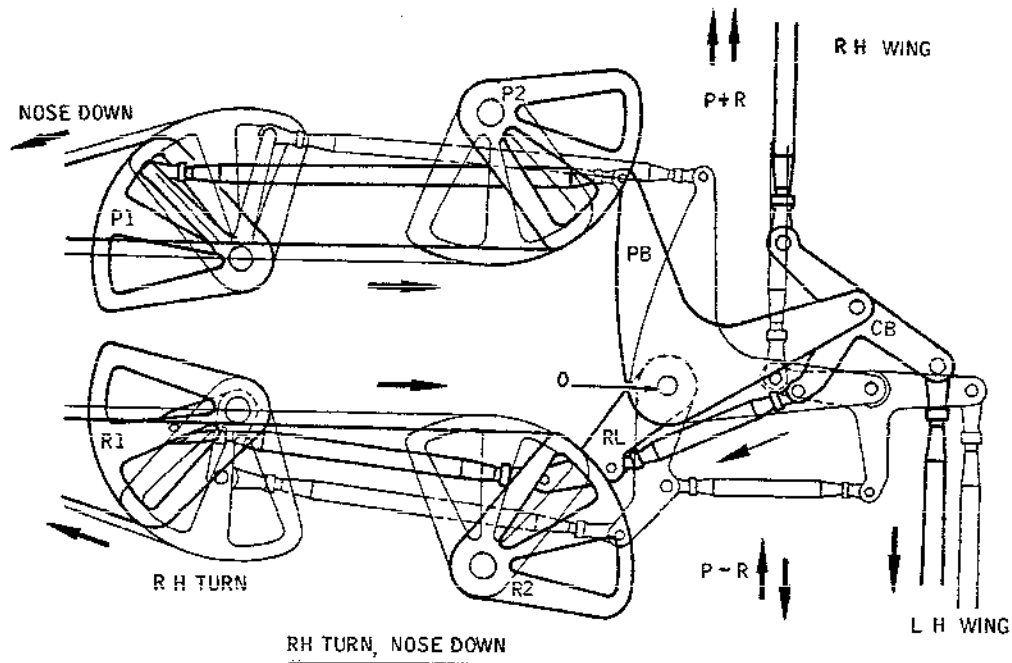
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## MAINTENANCE MANUAL



CMA 27 11 00 0 AUM0

Mixing Operation  
Figure 010

R

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## MAINTENANCE MANUAL

### 6. Elevons (Ref. Fig.011 and 012)

R The elevons are connected in pairs by means of a shackle. Each  
R elevon is operated by the two rods of a PFCU.  
R Each elevon is hinged on the wing structure and connected to a  
PFCU control rod.

EFFECTIVITY: ALL

BA

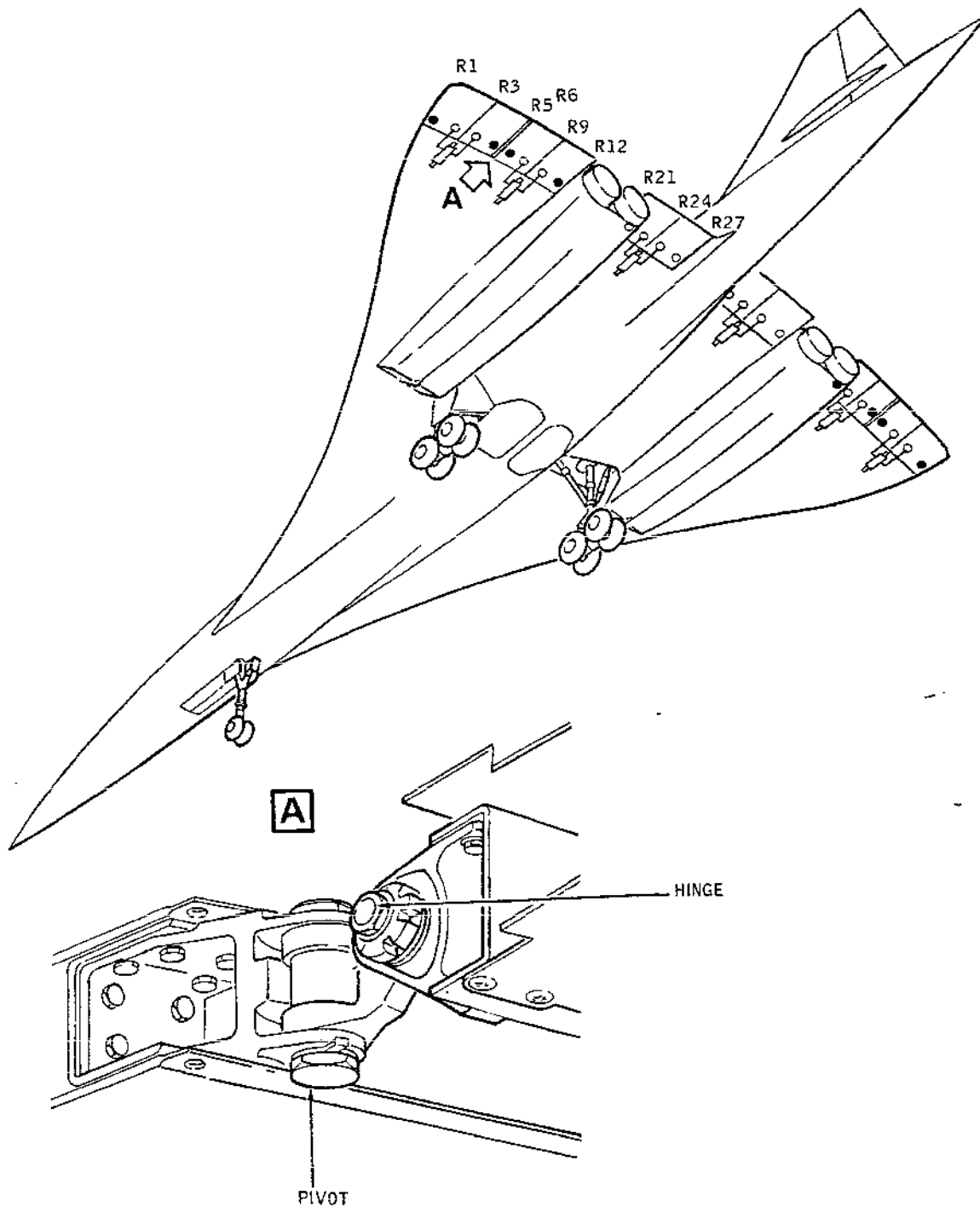
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## MAINTENANCE MANUAL



CMA 27 11 00.0 AWMCO

Elevon Hinges  
Figure 011

R

EFFECTIVITY: ALL

BA

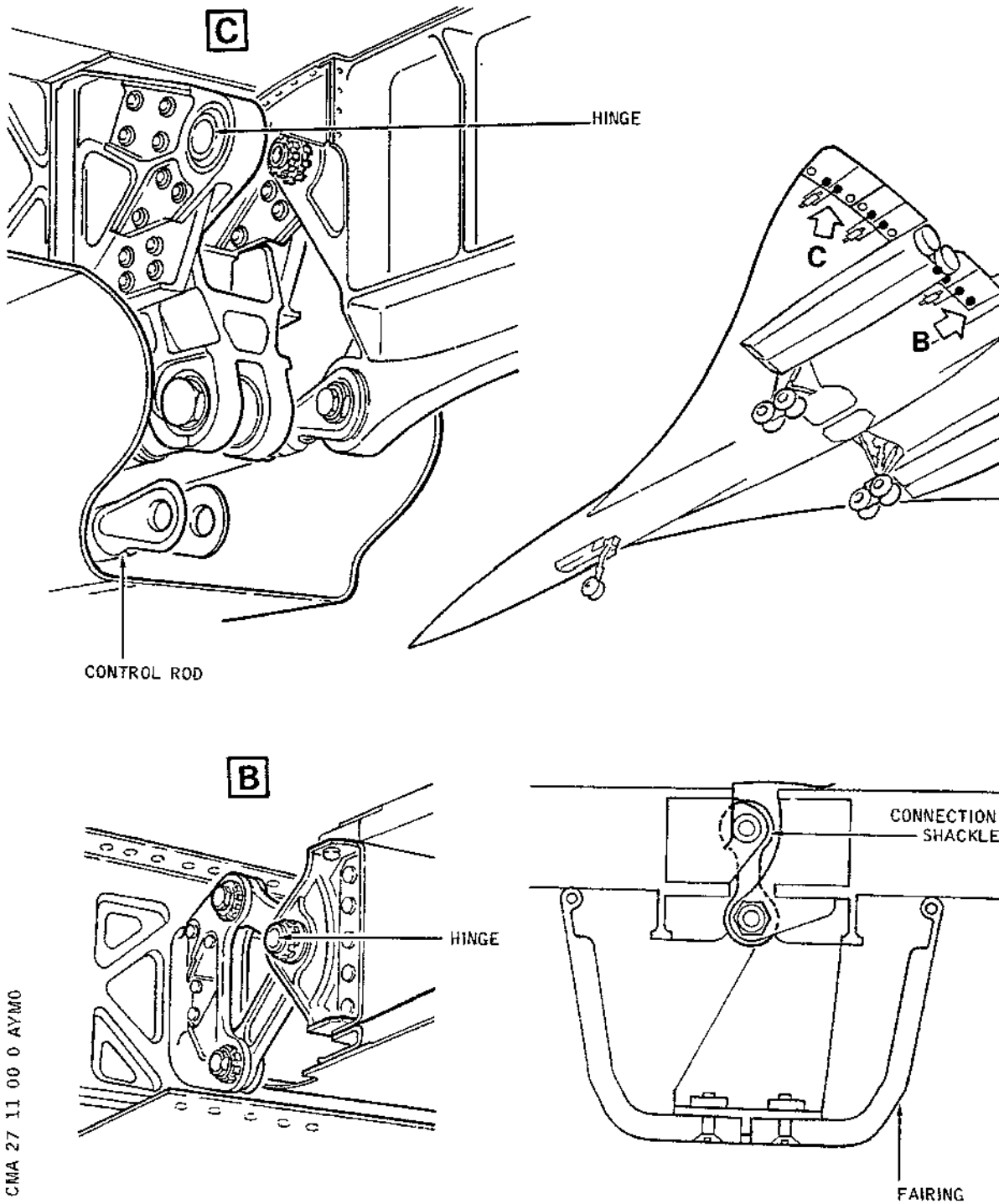
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Elevon Hinges and Connections  
Figure 012

R

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### 7. Operation of Each Control Section

#### R A. Forward Fuselage Section (Ref. Fig. 013 )

R The roll control handwheels, installed on the Captain's and First Officer's control columns drive a chain, the ends of which are extended by two cables which run inside the control column down to two guide pulleys fitted below the floor.

These pulleys lead the cables forward where they are anchored to two quadrants integral with the corresponding roll torque tube.

In addition to the cable quadrants, the Captain's torque tube comprises :

- Two end of travel stops
- A crank lever which controls the artificial feel input lever via a rod
- R - A crank lever which controls the flight data recorder potentiometers.

In addition to the cable quadrants, the First Officer's torque tube comprises :

- A control lever which actuates the artificial feel input lever via a rod
  - A cam, on which runs a roller integral with the First Officer's pitch torque tube.
- This system ensures a direct limitation of the travel of the linkages in pitch-roll mixing.

Twin rods, in parallel, link the artificial feel input lever to the resolver control lever for the electrical control channel.

R The input lever to the synchro packs drives an autopilot force limiter spring rod with its upper crank.

R The spring rod directly actuates the spool valves of a relay jack used to compensate the inertia due to the length of the linkage, and as an interconnection of the autopilot with the flight controls.

R The relay jack drives the mechanical linkage via a load limiting mechanism which protects the downstream linkage.

#### R B. Centre Fuselage Section

R At the load limiting mechanism output, a jam detection strut equipped with a microswitch drives the cable tension regulator which maintains the cables at the correct tension

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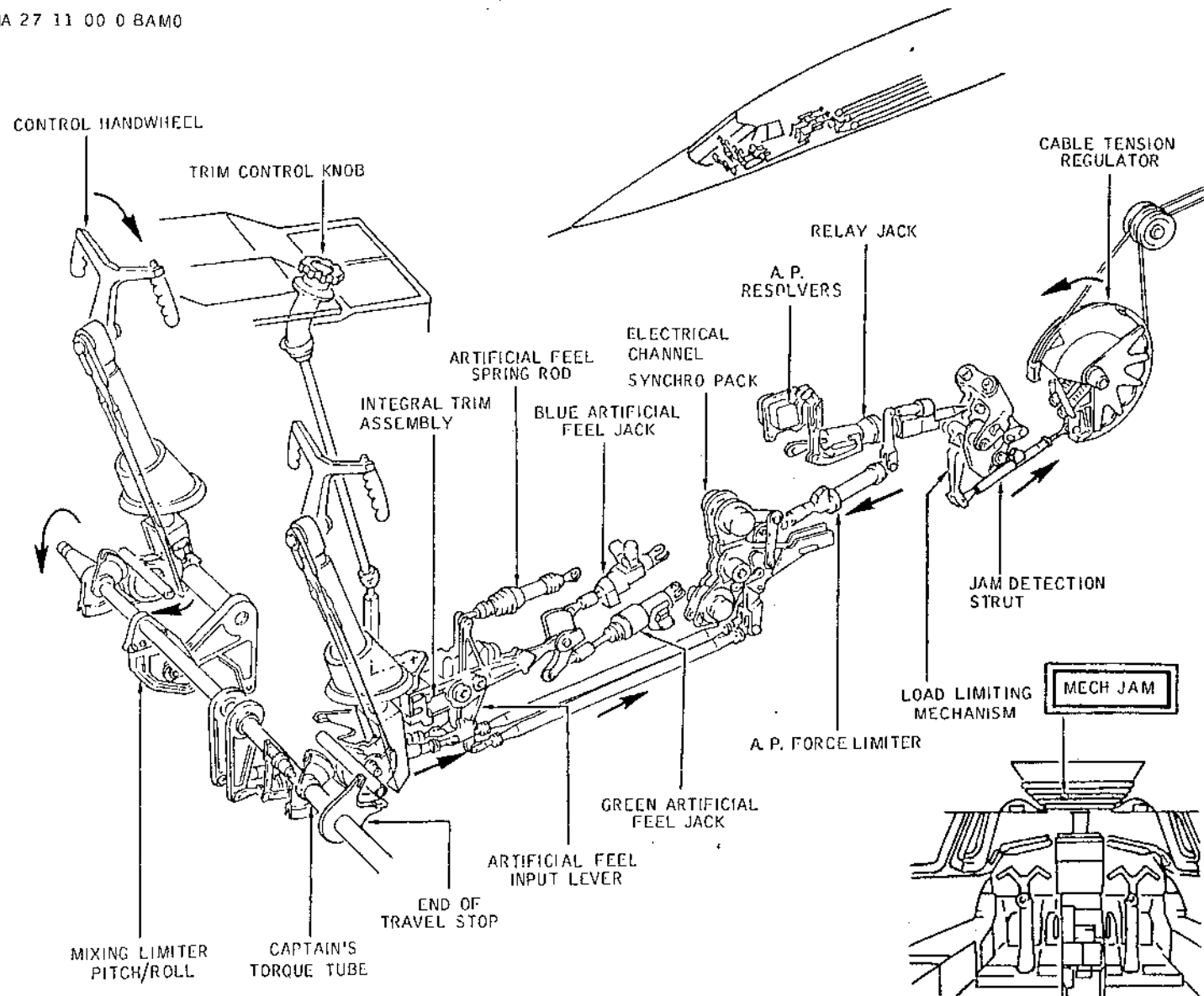
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CMA 27 11 00 0 BAM0



Roll Control Linkage in Fuselage  
Figure 013

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despite length variations caused by thermal expansions.

R In the event of the mechanical controls jamming, compression  
R of the jam detection strut acting on the microswitch causes  
R the MECH JAM warning light on the overhead panel to illuminate.

R The cables anchored to the tension regulators run under  
the cabin floor, guided by pulleys, and are then attached  
to two cable quadrants forming the input to a double mixing  
unit.

R The latter comprises two stages of superimposed bellcranks,  
R the upper stage set controlling the inner elevons, and the  
R lower stage controlling the middle and outer elevons.

R This arrangement serves to modify the control ratio between  
the elevons.

These bellcranks are also operated by the pitch control.

R In this manner they ensure the mixing of the mechanical  
R pitch/roll commands.

### C. Wing Section (Ref. Fig. 014 )

R At the mixing unit output, four rods, (two rigid rods for  
R inner elevon control and two spring rods for middle and  
R outer elevon control) drive two double rod and bellcrank  
R assemblies mounted in pressure seals, one for each wing.

R The control linkage, consisting of two rods per wing run  
the length of the web behind the wing spar box in an un-  
R pressurized zone. These rods, connected to a bellcrank at  
R rib 26, transmit their respective travel to a bellcrank at  
R rib 24. This bellcrank transmits movement to control the  
R outer and middle elevons and, via a spring rod, the spool  
R valve of the PFCU operating the inner elevon.

R The control of the outer and middle elevons consists of a  
single linkage from rib 24 onwards and is comprised of  
R nine rods and seven bellcranks located respectively at  
ribs 22, 19, 15, 12, 9, 6 and 3.

R The servo controls are located at ribs 9 and 3. They operate  
the elevons via fixed rods anchored to the body of the  
servo control and to the control surface.

R The PFCU spool valves are controlled by rigid rods for outer  
R elevons and spring rods for middle elevons.

### 8. Operation

R When the Captain's and First Officer's control handwheels are  
operated, their rotational movement, transmitted through the

EFFECTIVITY: ALL

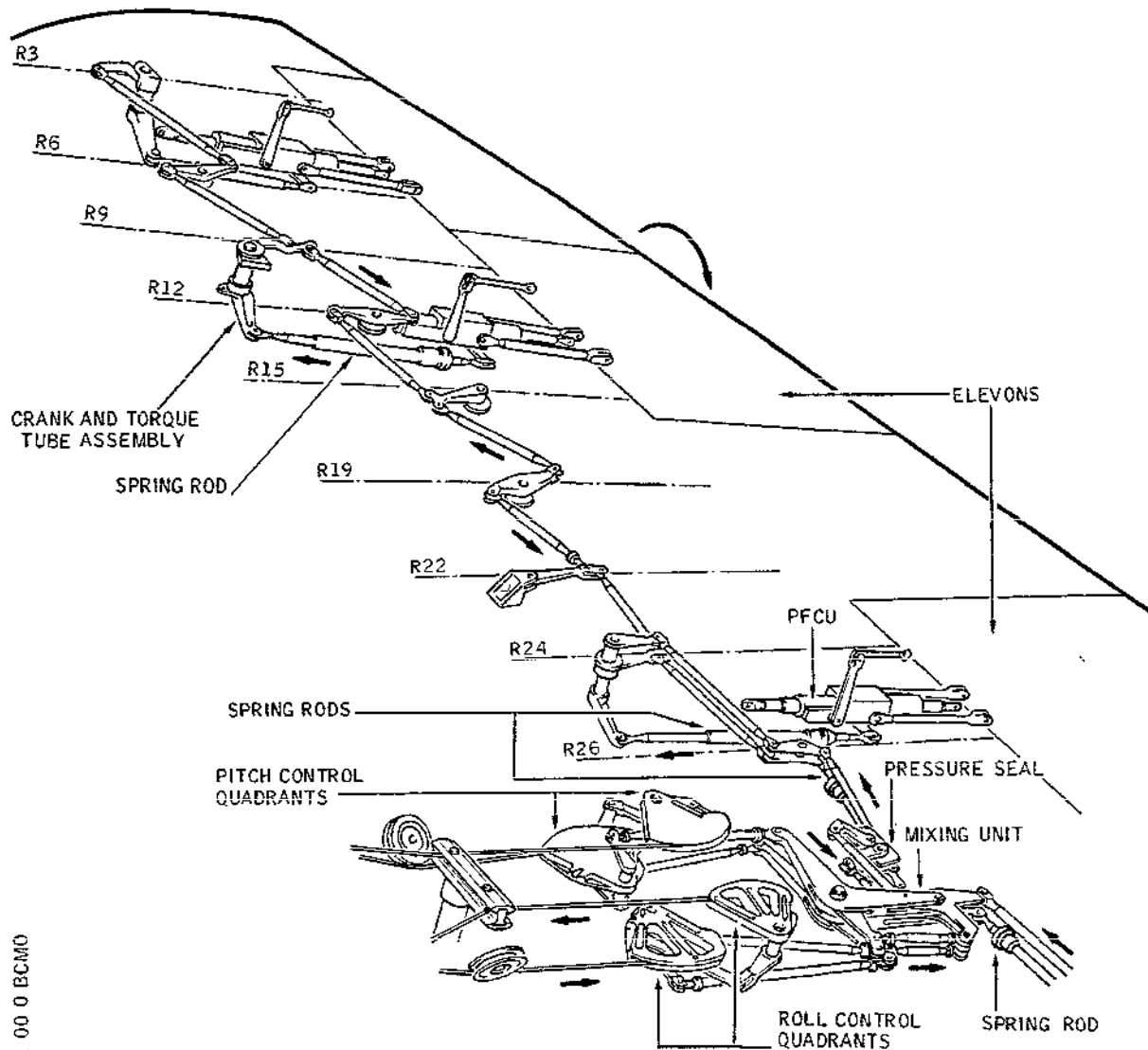
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CMA 27 11 00 0 BCMO

Roll Control Linkage in Wing  
Figure 014

R

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R columns, becomes a linear movement from the torque tubes onward.  
R This linear movement via a rod, actuates the relay jack input  
R crank lever.  
R The displacement of this crank lever opens the relay jack spool  
R valves, hydraulic pressure is admitted, the body of the relay  
R jack displaces and causes the rotation of the cable tension  
R regulators. The cables actuate the mixing unit which drives a  
R system of rods and cranks, and the input levers of the six  
R PFCU's. The displacement of these levers controls the spool  
R valves of each of the PFCU's, hydraulic pressure is admitted to  
R the pistons, the PFCU bodies displace and cause the elevons to  
deflect.

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### MECHANICAL CONTROL - TROUBLE SHOOTING

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN 24-00-00, SERVICING.

#### 1. General

The following trouble shooting procedures are intended to enable faults found in the Roll mechanical channel to be rectified.

These procedures are divided as follows :

- Trouble shooting in the event of resistance (friction) encountered when moving Flight Controls.
- Trouble shooting, downstream of the relay jack.
- Trouble shooting ; control surfaces (elevons) do not return to neutral.

The defect can be isolated with the aid of the trouble shooting procedures and traced through OK and NOT OK paths to the appropriate charts or other specified rectification action as may be necessary. If a defect occurs perform the appropriate rectification action, then repeat the operation at which the defect was encountered to ensure the operation is OK.

Bracketed numbers in the procedures and charts indicate items on the component identification table (Ref. Table 101).

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## MAINTENANCE MANUAL

The table provides information, including component location.

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## MAINTENANCE MANUAL

### 2. Resistance (friction) encountered when moving Flight Controls

#### A. General

This chapter provides a method of locating resistance (friction) encountered in a limited range of elevon deflection when moving Flight Controls.

This friction which may occur within a limited range of the total deflection of the Flight Controls corresponds to mechanical problems located between Flight Controls and the associated Relay Jack. The proposed method is valid only for this type of fault and must not, under any circumstances be used following reports that excessive load must be applied to deflect Flight Controls throughout their total travel range.

In this case refer to paragraph 4 :

Control surfaces (elevons) do not return to neutral.

#### B. Prepare

##### (1) Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Access platform 9 ft. 8 in. (2.96 m)	
--------------------------------------	--

(2) Take the precautions described in the previous WARNING paragraph.

(3) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).

(4) Turn handwheel from stop to stop and check for friction during actuation.

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## MAINTENANCE MANUAL

### C. Trouble Shooting

\*\*\*\*\*  
\* Remove artificial feel spring rod [1]. \*  
\* With Flight Controls in mechanical mode and hydraulic system pressurized, turn handwheel from stop \*  
\* to stop. \*  
\* Resistance (friction) encountered \*  
\*\*\*\*\*

OK	NOT OK--	Replace spring rod [1]
----	----------	------------------------

\*\*\*\*\*  
\* Shut down pressurization of hydraulic system (Ref. \*  
\* 27-00-00, Servicing, Procedure to set Flight \*  
\* Controls in mechanical mode.) \*  
\* Open door 121DB, disconnect the 4 rods from \*  
\* integral trim assembly lower lever. \*  
\* Operate artificial feel mechanism by actuating \*  
\* integral trim assembly lower lever \*  
\* Actuation is carried out freely \*  
\*\*\*\*\*

OK	NOT OK--	Actuation is not carried out freely Resistance (friction) encountered Ref. Chart 101
----	----------	--

\*\*\*\*\*  
\* Remove the two rods between torque tube and \*  
\* integral trim assembly lower lever. \*  
\* Turn captain's then First Officer's handwheel. \*  
\* Actuation is carried out freely \*  
\*\*\*\*\*

OK	NOT OK--	Actuation is not carried out freely Resistance (friction) encountered when moving Flight Controls Ref. Chart 102
----	----------	--

\*\*\*\*\*  
\* Remove AP force limiter [2] \*  
\* Actuate lever of synchro pack \*  
\* Actuation is carried out freely \*  
\*\*\*\*\*

OK	NOT OK--	Replace synchro pack [12]
----	----------	---------------------------

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* Install AP force limiter without safetying it. \*  
\* Immobilize synchro pack with rigging pin D925252 \*  
\* 001. Take the precautions described in the \*  
\* previous warning paragraph. \*  
\* Set Flight Controls in mechanical mode (Ref 27-00-\*  
\* 00, Servicing) \*  
\* Remove AP force limiter [2] \*  
\* CAUTION : DO NOT ALTER POSITION OF RELAY JACK \*  
\* INPUT LEVER WHEN REMOVING OR INSTALLING \*  
\* AP FORCE LIMITER \*  
\* By means of a spring scale, check load required \*  
\* to actuate input lever of Relay Jack. Load \*  
\* applied to the end of lever is less than 1 daN. \*  
\* (2.25 lbf.) \*  
\*\*\*\*\*

||  
OK  
||

NOT OK--

-----  
| Load applied to input lever is greater than |  
| 1 daN (2.25 lbf.) |  
Replace relay jack [3]

\*\*\*\*\*  
\* Replace AP Force limiter [2] \*  
\* Install spring rod [1] \*  
\* Install rods between integral trim assembly \*  
\* and torque tube. \*  
\* Bolt, special washer, flat washer, nut. \*  
\* Torque to between : \*  
\* On integral trim assembly, 45 and 50 lbf. in. \*  
\* (0.52 and 0.60 m.daN.) \*  
\* On torque tube, 27 and 32 lbf. in. (0.30 and 0.36 \*  
\* m.daN) \*  
\* Safety with cotter pin. \*  
\* Install rods between integral trim assembly \*  
\* and synchro pack. \*  
\* Bolt, special washer, flat washer, nut. \*  
\* Torque to between 27 and 32 lbf. in. (0.30 and \*  
\* 0.60 m.daN) Safety with cotter pin. \*  
\* Remove rigging pins from resolvers. \*  
\* Shut down pressurization of hydraulic systems \*  
\* (Ref 27-00-00, Servicing, Procedure to set Flight \*  
\* Controls in mechanical mode) \*  
\* Close access doors and panels \*  
\* Remove tools and access platforms. \*  
\*\*\*\*\*

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* ACTUATION IS NOT CARRIED OUT FREELY\*  
\* RESISTANCE (FRICTION) ENCOUNTERED \*  
\*\*\*\*\*

\*\*\*\*\*  
\* The 4 rods are disconnected ; integral trim \*  
\* assembly lower lever is free. \*  
\* Manually rotate rocker arm of artificial feel \*  
\* jacks. \*  
\* This operation is carried out freely \*  
\*\*\*\*\*

||  
OK  
||

NOT OK

\*\*\*\*\*  
\* Replace integral trim \*  
\* assembly [4] \*  
\*\*\*\*\*

\*\*\*\*\*  
\* Disconnect Green artificial feel jack \*  
\* Check that piston slides freely and pivots freely \*  
\* on its attachment point. \*  
\*\*\*\*\*

||  
OK  
||

NOT OK--| Replace green jack [5] |

\*\*\*\*\*  
\* Disconnect Blue artificial feel jack \*  
\* Check that piston slides freely and pivots freely \*  
\* on its attachment point \*  
\*\*\*\*\*

||  
OK  
||

NOT OK--| Replace Blue jack [6] |

-----  
Replace artificial feel jack rocker arm [11]

Chart 101

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* ACTUATION IS NOT CARRIED OUT FREELY\*  
\* RESISTANCE (FRICTION) ENCOUNTERED \*  
\* WHEN MOVING FLIGHT CONTROLS \*  
\*\*\*\*\*

\*\*\*\*\*  
\* Disconnect all controls (rods and cables) connect-\*  
\* ed to Captain's and First Officer's torque tubes \*  
\* [7] \*  
\* Check that torque tubes move freely on their hinge\*  
\* points \*  
\*\*\*\*\*

OK NOT OK--|-----| Replace the relevant torque tube [7] |  
|-----|

\*\*\*\*\*  
\* On Captain's side only, check that flight data \*  
\* recorder potentiometer can be moved freely \*  
\*\*\*\*\*

OK NOT OK--|-----| Replace potentiometer [8] |  
|-----|

\*\*\*\*\*  
\* Check that fairlead pulleys at control column base\*  
\* deflect freely. \*  
\*\*\*\*\*

OK NOT OK--|-----| Replace fairlead pulleys at frame 2A [9] |  
|-----|

\*\*\*\*\*  
\* Check that handwheels deflect freely from stop to \*  
\* stop \*  
\*\*\*\*\*

NOT OK--|-----| Remove control column force detector [10] and  
|-----| replace faulty components |  
|-----|

Chart 102

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## MAINTENANCE MANUAL

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[1] Spring rod	213BF	121			27-12-12 R/I	
[2] AP force limiter	121FB	121			27-11-19 R/I	
[3] Relay jack	121FB	121			27-14-12 R/I	
[4] Integral trim assembly	121DB	121			27-13-12 R/I	
[5] Artificial feel jack- Green	121DB	121			27-14-15 R/I	
[6] Artificial feel jack- Blue	213BF	121			27-14-13 R/I	
[7] Torque tube	113DB 121AB	121			27-11-15 R/I	
[8] Potentiometer	113BB 121AB	121			31-31-17 R/I	
[9] Fairlead pulley at frame 2A	113DB 121AB	121			27-11-13 R/I	
[10] Control column force detector				On Captain and First Officer handwheel	27-39-71 R/I	
[11] Artificial feel rocker arm	121DB	121			27-12-13 R/I	
[12] Synchro pack	121FB	121		Under floor	27-16-11 R/I	

Component Identification  
Table 101

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### 3. Trouble shooting, downstream of the relay jack

#### A. General

This paragraph deals with trouble shooting of Flight Controls mechanical channel jamming detection circuit downstream of pitch and roll relay jacks (MECH JAM warning, on overhead panel, on Flight Control Unit).  
The following trouble shooting is common to pitch and roll axes.

#### B. Prepare

##### (1) Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins - Synchro Pack	D925252000
Access Platform 3.220 m (10 ft. 7 in.)	
(2) Take the precautions described in the previous WARNING paragraph.	
(3) Carry out "Prepare" paragraph operations of Procedure to set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).	

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### C. Trouble Shooting

\*\*\*\*\*  
\* When aircraft electrical network is energized \*  
\* MECH JAM warning must be visible on Flight Control \*  
\* Unit on overhead panel. (Hydraulic systems not \*  
\* pressurized, elevons in down position and pitch \*  
\* trim set to zero) \*  
\*\*\*\*\*

OK	NOT OK--	No pitch mechanical channel jamming detection : MECH JAM warning light is not illuminated Ref. Chart 107
----	----------	--

\*\*\*\*\*  
\* On circuit breaker panel 1-213, trip, safety and \*  
\* tag circuit breaker PFCs ALL SURFACES MON GRN SUP \*  
\* (Map Ref. N13). On overhead panel, on Flight \*  
\* Control Unit MECH JAM warning light must remain \*  
\* illuminated. \*  
\*\*\*\*\*

OK	NOT OK--	Loss of redundancy of jamming detection supply system : MECH JAM warning light goes off. Ref. Chart 108
----	----------	---

\*\*\*\*\*  
\* Set circuit breaker previously tripped \*  
\* then on circuit breaker panel 5-213, trip, safety \*  
\* and tag circuit breaker PFCs ALL SURFACES MON BLUE \*  
\* SUP (Map Ref. E12). \*  
\* On overhead panel, on Flight Control Unit MECH JAM \*  
\* warning light must remain illuminated. \*  
\*\*\*\*\*

OK	NOT OK--	Loss of redundancy of jamming detection supply system : MECH JAM warning light goes off. Ref. Chart 109
----	----------	---

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## MAINTENANCE MANUAL

OK

\*\*\*\*\*  
\* Reset circuit breaker previously tripped. \*  
\* Pressurize Blue and Green hydraulic systems (Ref \*  
\* 29-11-00 and 29-12-00, Servicing.) \*  
\* - Elevons must return to trimmed position. \*  
\* - On overhead panel \*  
\* - On SERVO CONTROLS unit, BLUE L.PRESS and GREEN \*  
\* L.PRESS caption lights must go off \*  
\* - Cancel out PFC warning, if it is present, by \*  
\* pressing PFC warning light on master warning panel \*  
\* - On Flight Control Unit press and hold MECH JAM \*  
\* warning light : it must remain illuminated, gong \*  
\* must sound and on master warning panel PFC warning \*  
\* light must illuminate. \*  
\*\*\*\*\*

OK

NOT

OK--

MECH JAM warning light goes off and PFC warning  
light does not illuminate.  
Replace Flight Control Unit C 57 [13]

OK

NOT

OK--

MECH JAM warning light remains illuminated and  
PFC warning light does not illuminate (gong  
does not sound)

Ref. Chart 110

\*\*\*\*\*  
\* Release MECH JAM warning light : this warning \*  
\* light and PFC warning light must go off \*  
\*\*\*\*\*

OK

NOT

OK--

No disconnection of MECH JAM warning self-  
holding function : MECH JAM warning light does  
not go off.  
Replace Flight Control Unit C 57 [13].

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||  
OK  
||

\*\*\*\*\*  
\* At zone 121, open access doors 121 GB and 121 FB \*  
\* then immobilize roll resolvers with rigging pin \*  
\* D925252001. \*  
\* Manually actuate jam detection strut C 269 \*  
\* located between Relay Jack C8 and roll cable \*  
\* tension regulator, in order to compress its \*  
\* microswitch. On Flight Control Unit MECH JAM \*  
\* warning light must illuminate \*  
\*\*\*\*\*

		-----	No detection of roll mechanical channel jamming : MECH JAM warning light is not illuminated.
OK	NOT OK--	-----	Replace jam detection strut C 269 [15] after checking whether current flows through micro- switch in compressed position

\*\*\*\*\*  
\* Remove pin D925252001 \*  
\* On Flight Control Unit, press MECH JAM warning \*  
\* light and release it : it goes off. \*  
\* Move control column from stop to stop \*  
\* MECH JAM warning must not appear. \*  
\*\*\*\*\*

		-----	Loss of MECH JAM warning 800 ms timing : this warning only appears after rapid control actuation
OK	NOT OK--	-----	Replace Flight Control Unit C 57 [13]
		-----	MECH JAM warning appears after a slow pitch control actuation
OK	NOT OK--	-----	Ref. Chart 111

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* Move control handwheel from stop to stop \*  
\* MECH JAM warning must not appear. \*  
\*\*\*\*\*

		-----
OK	NOT OK--	MECH JAM warning appears after a slow roll control actuation Ref. Chart 112
		-----

\*\*\*\*\*  
\* End of mechanical control trouble shooting \*  
\* downstream of Relay Jacks \*  
\*\*\*\*\*

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\*\*\*\*\*  
 \* NO PITCH MECHANICAL CHANNEL JAMMING\* | GROUND EQUIPMENT REQUIRED |  
 \* DETECTION : MECH JAM WARNING LIGHT \*  
 \* IS NOT ILLUMINATED \* | DESCRIPTION PART NO |  
 \*\*\*\*\*

MULTIMETER	_____
ACCESS PLATFORM	_____
3.220 m (10 ft. 7 in.)	_____
CIRCUIT BREAKER	_____
SAFETY CLIPS	_____

\*\*\*\*\*  
 \* On overhead panel, place and hold LO-HI-TEST \*  
 \* switch in TEST position \*  
 \* MECH JAM warning light illuminates \*  
 \*\*\*\*\*

		-----
YES	NO---	Ref. 33-14-00, Trouble Shooting
		-----

\*\*\*\*\*  
 \* On circuit breaker panel 1-213 and 5-213, trip \*  
 \* safety and tag circuit breakers PFCS ALL SURFACES \*  
 \* MON GRN SUP and PFCS ALL SURFACES MON BLUE SUP \*  
 \* (Map Ref. N 13 and E 12). At zone 121 open access \*  
 \* door 121 GB. \*  
 \* WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 \*  
 \* AND 3 PROHIBITING PRESSURIZATION OF BLUE \*  
 \* GREEN AND YELLOW HYDRAULIC SYSTEMS BY \*  
 \* HYDRAULIC GROUND POWER UNIT \*  
 \* DISPLAY A WARNING NOTICE AT FLIGHT \*  
 \* ENGINEER'S STATION PROHIBITING USE OF \*  
 \* GROUND PRESSURIZING SYSTEM ELECTRIC \*  
 \* PUMPS \*  
 \* On Jam detection strut C 268 disconnect electrical \*  
 \* connector then check jamming microswitch \*  
 \* continuity measured between pins A and B. \*  
 \*\*\*\*\*

		-----
OK	NOT OK--	Replace Jam Detection Strut C 268 [14]
		-----
		-----
		Replace Flight Control Unit C 57 [13]
		-----

Chart 107 (Sheet 1 of 1)

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```
| |
```

YES	NO---	Replace circuit breaker PFCS ALL SURFACES MON BLUE SUP [19]
-----		
-----		
		Replace Flight Control Unit C 57 [13]

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## MAINTENANCE MANUAL

```
*****
* LOSS OF REDUNDANCY OF JAMMING DETEC* | GROUND EQUIPMENT REQUIRED |
* TION SUPPLY SYSTEM : MECH JAM      * |-----|
* WARNING LIGHT GOES OFF              * | DESCRIPTION          PART NO |
*****
```

```
| MULTIMETER          _____ |
| CIRCUIT BREAKER     _____ |
| SAFETY CLIPS        _____ |
*****
```

```
*****
* On circuit breaker panel 1-213, trip, safety and *
* tag circuit breaker PFCS INV GRN FAIL IND        *
* (Map Ref. M 15)                                   *
* Unlock circuit breaker panel 15-216 and on shelf *
* 12-216 remove relay C 111 [17]                   *
* Check continuity on relay between pins C2 and C3  *
*****
```

```
||      |-----|
OK      NOT OK--| Removed relay was faulty |
||
```

```
*****
* Remove safety clip and tag and set previously *
* tripped circuit breaker :                     *
* Check on relay C111 base that voltage measured *
* between pin C3 and ground is 28 VDC            *
*****
```

```
||      |-----|
YES      NO---| Replace circuit breaker PFCS ALL SURFACES MON |
||          | GRN SUP [18] |
||          |-----|
||-----| Replace Flight Control Unit C 57 [13] |
||          |-----|
```

Chart 109 (Sheet 1 of 1)

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```
*****-----
* MECH JAM WARNING LIGHT REMAINS *| GROUND EQUIPMENT REQUIRED |
* ILLUMINATED AND PFC WARNING LIGHT *-----
* DOES NOT ILLUMINATE (GONG DOES NOT *| DESCRIPTION PART NO |
* SOUND) *-----
*****
| MULTIMETER
| CIRCUIT BREAKER
| SAFETY CLIPS
| ACCESS PLATFORM
| 3.220 m (10 ft. 7 in.)
| RIGGING PINS-
| SYNCHRO PACK D925252000
*****-----
```

```
*****
* On Flight Control Unit, release MECH JAM warning *
* light ; it must go off. *
*****
```

```
||
|| NO YES--| Press MECH JAM warning light : it illuminates |
||
|| NO YES--| Ref 33-13-00, Trouble shooting|
||
|| Replace Flight Control Unit C 57 [13] |
*****-----
```

```
*****
* Immobilize roll, yaw and pitch resolvers with pins*
* D925252001, D925252002 and D 925252003. *
* On circuit breaker panels 1-213 and 5-213, trip, *
* safety and tag circuit breakers PFCS ALL SURFACE *
* MON GRN SUP and PFCS ALL SURFACES MON BLUE SUP *
* (Map Ref. N 13 and E 12). Disconnect connectors *
* C 268 and C 269 from jam detection struts [14] and*
* [15] *
* Check continuity between pins A and B of each *
* microswitch C 268 and C 269. *
* Four cases are possible. *
* Case No1 : No continuity on C 268 and on C 269 *
* Case No2 : continuity on C 268 and on C 269 *
* Case No3 : continuity on C 269 only *
* Case No4 : continuity on C 268 only *
*****
```

```
||
||
||
```

Chart 110 (Sheet 1 of 2)

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-Case No1---	No continuity on C 268 and C 269 Replace Flight Control Unit C 57 [13]		
-Case No2---	Continuity on C 268 and C 269 Resistance (friction) is common to pitch and roll control. Connect electrical connectors C 268 and C 269. Trouble shooting shall be carried out as per method given in chart 111		
-Case No3---	Continuity on C 269 only Connect connector C 268, remove safety clips and tags and set previously tripped circuit breakers. Remove pin D925252003 from pitch resolvers. Move control column slowly : MECH JAM warning appears		
<table><tr><td>OK</td><td>NOT OK</td></tr></table>		OK	NOT OK
OK	NOT OK		
	<table><tr><td>Fault is common to both pitch and roll channels(Ref Chart 111)</td><td>Trouble shooting as per Chart 112</td></tr></table>	Fault is common to both pitch and roll channels(Ref Chart 111)	Trouble shooting as per Chart 112
Fault is common to both pitch and roll channels(Ref Chart 111)	Trouble shooting as per Chart 112		
-Case No4---	No continuity on C 268 only. Connect connector C 269. Remove safety clips and tags and set circuit breakers previously tripped and carry out trouble shooting as per Chart 111		

Chart 110 (Sheet 2 of 2)

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*****	
* MECH JAM WARNING APPEARS AFTER A	*   GROUND EQUIPMENT REQUIRED
* SLOW PITCH CONTROL ACTUATION	*
*****	
	DESCRIPTION PART NO
*****	
	RIGGING PINS-
	SYNCHRO PACK. D925252000
	RIGGING PIN-
*****	
	MIXING UNIT-
* On Flight Control Unit, press MECH	*   SERVO CONTROL. D921310000
* JAM warning light and release it ;	*   SPRING SCALE OR
* it goes off.	*   EQUIVALENT WITH
* Move control handwheel from stop to	*   0.3 % ERROR OR
* stop.	*   LESS
* MECH JAM warning light illuminates	*
*****	

		Set Flight Controls in electrical mode (Ref 27-00-00, Servicing)	
		Open access door 121 FB, immobilize roll, yaw and pitch resolvers with pins D925252001, D925252002 and D925252003.	
OK	NOT OK--	Open access door 121 GB. Disconnect jam detection strut from regulator.	
		By means of a spring scale, apply a load to cable tension regulator crank to actuate pitch linkage.	
		Load is less than 18 daN (40.56 lbf.)	
		OK	NOT OK
		Replace jam detection strut C 268 [14]	Load is greater than 18 daN (40.56 lbf.)
			Check for friction on pitch linkage between cable tension regulator and mixing unit. Remove defective component
OK			

Chart 111 (Sheet 1 of 4)

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* Set Flight Controls in electrical mode (Ref 27-00-\*  
\* 00, Servicing) \*  
\* Open access door 121 FB and immobilize roll, yaw \*  
\* and pitch resolvers with pins D925252001, D9252 \*  
\* 52002 and D925252003. \*  
\* Open floor panel 241 HF, immobilize mixing unit \*  
\* with pin D921310000. \*  
\* CAUTION : DURING OPERATIONS CARRIED OUT AT ZONE \*  
\* 241 TAKE ALL NECESSARY PRECAUTIONS IN \*  
\* ORDER TO AVOID INTRODUCING INADVERTENTLY \*  
\* TOOLS OR MISCELLANEOUS ITEMS IN MIXING \*  
\* UNIT \*  
\* Disconnect upper rod, mixing unit/pressure seal \*  
\* at LH wing. \*  
\* Using a spring scale, check load necessary to \*  
\* actuate wing linkage throughout free travel range \*  
\* (servo controls in electrical mode) \*  
\* Load exerted is equal to or less than 0.5 daN \*  
\* (1.12 lbf.) \*  
\*\*\*\*\*

		Load is greater than 0.5 daN (1.12 lbf.)
		Check for resistance (friction) :
		At LH pressure seal.
OK	NOT OK--	On LH wing inner elevon mechanical control.
		Check load necessary to displace input lever of
		servo control [20] (PFCU)
		Remove defective component.

\*\*\*\*\*  
\* Disconnect upper rod, mixing unit/RH wing pressure \*  
\* seal. By means of a spring scale, check load \*  
\* necessary to actuate wing linkage throughout free \*  
\* travel range (servo controls in electrical mode). \*  
\* Load is equal to or less than 0.5 daN (1.12 lbf.) \*  
\* for a crank deflection angle of plus or minus 5° \*  
\* then increases up to 1.5 daN (3.37 lbf.) max. be- \*  
\* fore the end of linkage free travel range. \*  
\* (Servo Controls in electrical mode) \*  
\*\*\*\*\*

||  
OK NOT OK  
||

Chart 111 (Sheet 2 of 4)

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## MAINTENANCE MANUAL

OK

NOT OK--

Load is greater.  
Check for resistance (friction) ;  
At RH pressure seal  
On RH wing inner elevon mechanical control.  
Check load necessary to displace servo control  
[20] input lever.  
Remove defective component.

\*\*\*\*\*  
\* Install upper rods, mixing unit/pressure seals ; \*  
\* bolts, special washers, flat washers, nuts. \*  
\* Safety with cotter pin. \*  
\* Disconnect spring rods linking mixing unit to \*  
\* pressure seals (lower rods). \*  
\* Pressure seal cranks pivot counterclockwise. \*  
\* Manually assist this movement. After linkage has \*  
\* reached balance point, load necessary to actuate \*  
\* wing crank, in clockwise direction, must be \*  
\* less than the limits given in graph. \*  
\* (Ref. Fig. 101 ) \*  
\*\*\*\*\*

OK

NOT OK--

Actuating load is greater than limits given in  
graph.  
Check for resistance (friction) :  
At LH pressure seal  
On wing outer and middle elevon mechanical  
control.  
Check load necessary to displace PFCU [21]  
input lever.  
Remove defective component.

\*\*\*\*\*  
\* Repeat the same operation on RH wing pressure \*  
\* seal. \*  
\* Load applied must be less than limits given in \*  
\* graph \*  
\* (Ref. Fig. 101 ) \*  
\*\*\*\*\*

OK

NOT OK

Chart 111 (Sheet 3 of 4)

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OK

NOT OK--

Load applied is greater than limits given in graph.  
Check for resistance (friction) :  
At RH pressure seal  
On RH wing outer and middle elevon mechanical control  
Check load necessary to displace PFCU [21] input lever.  
Remove defective component.

\*\*\*\*\*  
\* Check for resistance at mixing unit \*  
\* section common to pitch and roll control.\*  
\*\*\*\*\*

Chart 111 (Sheet 4 of 4)

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## MAINTENANCE MANUAL

*****		-----
* MECH JAM WARNING APPEARS AFTER A	*	GROUND EQUIPMENT REQUIRED
* SLOW ROLL CONTROL ACTUATION	*	-----
*****		DESCRIPTION PART NO
*****		-----
* Take the precautions described in	*	RIGGING PINS -
* the previous WARNING paragraph.	*	SYNCHRO PACK. D925252000
* Set Flight Controls in electrical	*	RIGGING PIN
* mode (Ref 27-00-00, Servicing)	*	MIXING UNIT
* Open access door 121 FB and	*	SERVO CONTROL D921310000
* immobilize roll, yaw and pitch	*	
* resolvers with rigging pins D9252	*	PESON OR EQUIVALENT
* 52001, D925252002 and D925252003.	*	WITH 0.3 % ERROR
* Open access door 121 GB and	*	OR LESS
* disconnect jam detection strut from*	*	-----
* cable tension regulator.	*	
* By means of a spring scale, apply	*	
* a load to cable tension regulator	*	
* crank to actuate roll linkage.	*	
* Actuating load is less than 18 daN.*	*	
* (40.56 lbf.).	*	
*****		
OK	NOT OK-----	Load is greater than 18 daN (40.56
		lbf.) Check for resistance (friction)
		on roll control between cable tension
		regulator and mixing unit.
		Replace defective component.
Replace jam detection		-----
strut C 269 [15]		
		-----

Chart 112

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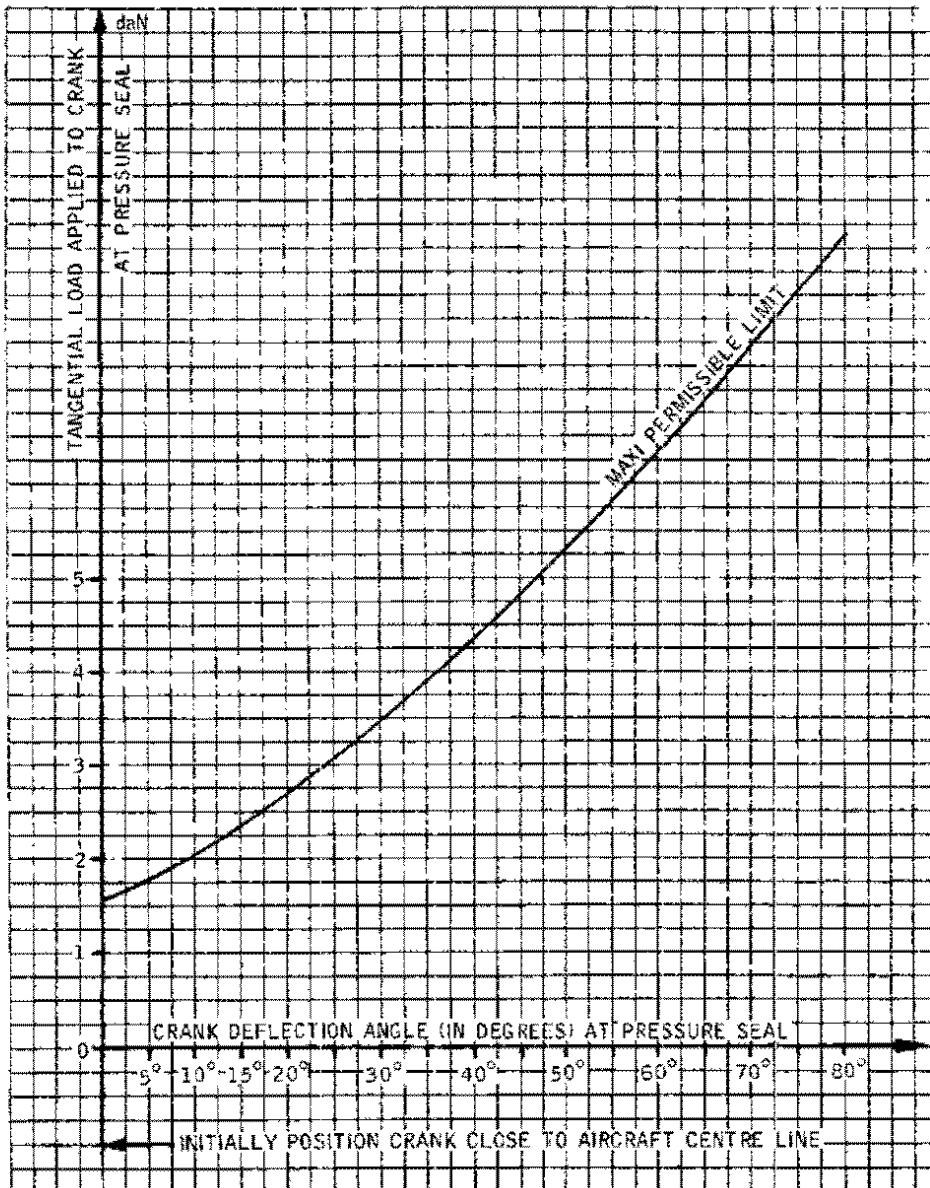
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## MAINTENANCE MANUAL



Graph No.1  
Figure 101

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## MAINTENANCE MANUAL

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[13] Flight control unit		4-211	C 57	Overhead panel	27-36-15 R/I	27-37-02
[14] Jam detection strut	121GB	122	C268	Under floor	27-31-21 R/I	27-37-02
[15] Jam detection strut	121GB	121	C269	Under floor	27-11-21 R/I	27-37-02
[16] Relay	15-216	12-216	C112	Electronics rack-RH		27-37-02
[17] Relay	15-216	12-216	C111	Electronics rack-RH		27-37-02
[18] Circuit breaker		1-213	1C 54	N 13	24-50-00 R/I	27-37-02
[19] Circuit breaker		5-213	2C 54	E 12	24-50-00 R/I	27-37-02
[20] Inner power flight control unit	JB,LL, LR,KB	551 or 651			27-34-53 I/C	27-36-01 27-36-02
[21] Outer and middle power flight control unit	JB,LL, LR,KB	553 or 552 or 653 or 652			27-34-52 I/C	27-36-01 27-36-02

Component Identification  
Table 101

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### 4. Control surfaces (elevons) do not return to neutral

#### A. General

This chapter provides a rapid method of locating play and resistance (friction) encountered in roll flight controls : play and resistance result in an unaccurate control of the aircraft.

Non-return of control surfaces is dealt with :

- in Blue, then Green, electrical channel.
- in mechanical channel only.

During non-return test and after flight control has reached the position corresponding to the required deflection, allow the latter to return to neutral slowly and without jerks up to balanced point and note reading immediately.

Only the operator required to perform test shall be present on the aircraft to the exclusion of other personnel.

#### B. Equipment and Materials

DESCRIPTION	PART NO.
Protractor, Elevon and Rudder	TE 2012000
Rigging pins - Synchro Pack	D925252000
Access Platform 3.672 m (12 ft.)	
Electrical Ground Power Unit	
Circuit Breaker Safety Clips	

#### C. Prepare

- (1) Set Flight Controls in mechanical mode (27-00-00, Servicing).
- (2) Set pitch and roll trim controls to zero.
- (3) Open door 121FB and immobilize pitch resolvers with rigging pin D925252003.
- (4) Turn control handwheel several times in both directions.
- (5) Trip, safety and tag the following circuit breaker :

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
STICK SHAKER SUP	1-213	W 513	P15
(6) Check that the following circuit breakers are set :			

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW "A" SYS SUP	1-213	G 292	M17
ADC1 28V SUP		1F 74	P12
ADC 26V SUP	2-213	1F 78	A 2
ROLL ART FEEL COMP 1 SUP		1C 243	E 3
ADC 1 115V SUP		1F 73	F 3
RH UC WEIGHT SW "B" SYS SUP	3-213	G 294	B 9

- (7) On ADC control panel (centre console)
- (a) Place ADC1 switch in ON position
  - (b) Place ADC1 TEST selector switch in position 1.
    - (b1) Amber ADC1 warning light must illuminate
    - (b2) After approximately 30 seconds Blue TEST indicator light must illuminate.
    - (b3) Press then release amber ADC1 warning light; it must go off.
- (8) On overhead panel on ARTIFICIAL FEEL engage switch unit No.1, engage ROLL switch. It must remain engaged.
- (9) Adjust potentiometer and voltmeter on protractor.

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### D. Trouble Shooting

\*\*\*\*\*  
\* Non-return to neutral in Blue, then Green electrical channel. \*  
\* Set Flight Controls in Blue electrical mode (Ref 27-00-00, Servicing). Make certain that pitch and roll trim controls are set to zero. \*  
\* On overhead panel, on ARTIFICIAL FEEL No.1 engage switch unit engage ROLL switch. \*  
\* Install protractors on LH wing outer and middle elevons. Move control handwheel several times in RH and LH directions. \*  
\* Turn control handwheel up to stop in LH direction. \*  
\* Allow handwheel to return to neutral slowly and without jerks. Note position of elevons (reading on voltmeter) \*  
\* Repeat operation in RH turn configuration and note position of elevons. \*  
\* Note variation between the two readings. \*  
\* On Flight Control Unit place O & M ELEVONS, IN ELEVONS and RUDDER switches in GREEN position. \*  
\* Turn control handwheel up to stop in LH direction \*  
\* Allow handwheel to return to neutral slowly and without jerks. Note position of elevons. \*  
\* Repeat operation in RH turn configuration and note position of elevons. \*  
\* Note variation between the two readings \*  
\* Difference between both positions on each channel \*  
\* is equal to or less than 15 minutes. \*  
\*\*\*\*\*

OK	NOT OK--	Differences are greater than 15 minutes on one channel or on the two Blue and Green electrical control channels. Carry on test following OK path and refer to chart 115 (paragraph 2) at the end of test.
OK	NOT OK--	Differences are greater than 15 minutes on one channel or on the two electrical control channels for one elevon only. Carry on test following OK path and refer to chart 115 (paragraph 5 or 6) at the end of test.

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* Install protractors on LH and RH wing inner \*  
\* elevons \*  
\* Turn control handwheel up to stop in LH direction \*  
\* Allow handwheel to return slowly and without jerks\*  
\* to neutral \*  
\* Note position of elevons (reading on voltmeter). \*  
\* Repeat operation in RH turn configuration and note\*  
\* position of elevons. \*  
\* On Flight Control Unit, place O & M ELEVONS, IN \*  
\* ELEVONS and RUDDER switches in BLUE position. \*  
\* Turn control handwheel up to stop in LH direction.\*  
\* Allow handwheel to return slowly and without jerks\*  
\* to neutral. \*  
\* Note position of elevons \*  
\* Note variation between readings. \*  
\* Difference between the two positions on each \*  
\* channel is equal to or less than 15 minutes. \*  
\*\*\*\*\*

OK	NOT OK--	Differences are greater than 15 minutes on one channel or on the two Blue and Green electrical control channels. Carry on test following OK path and refer to chart 115 (paragraph 3 or 4) at the end of test.
OK	NOT OK--	Differences are greater than 15 minutes on one channel or on the two Blue and Green electrical control channels for one elevon only. Carry on test following OK path and refer to chart 115 (paragraph 5 or 6) at the end of test.

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* Install protractors on RH wing outer and middle \*  
\* elevons. \*  
\* Turn control handwheel several times in RH and LH \*  
\* directions. \*  
\* Turn handwheel up to stop in LH direction. \*  
\* Allow handwheel to return slowly and without jerks \*  
\* to neutral. \*  
\* Note position of elevons (reading on voltmeter) \*  
\* Repeat operation in RH turn configuration and note \*  
\* position of elevons. \*  
\* Note variation between the two readings. \*  
\* On Flight Control Unit, place O & M ELEVONS, IN \*  
\* ELEVONS and RUDDER switches in GREEN position. \*  
\* Turn handwheel up to stop in LH direction \*  
\* Allow handwheel to return slowly and without jerks \*  
\* to neutral. \*  
\* Note position of elevons. \*  
\* Note variation between the two readings. \*  
\* Difference between the two positions on each \*  
\* channel is equal to or less than 15 minutes. \*  
\*\*\*\*\*

OK	NOT OK--	Differences are greater than 15 minutes on one channel or on the two Blue and Green electrical control channels. Carry on test following OK path and refer to chart 115 (paragraph 2)
	NOT OK--	Differences are greater than 15 minutes on one channel or on the two Blue and Green electrical control channels and for only one elevon. Carry on test following OK path and refer to chart 115 (paragraph 5 or 6) at the end of test
	NOT OK--	Differences are greater than 15 minutes on one channel or on the two Blue and Green electrical control channels and for all elevons. Refer to chart 115 (paragraph 1)

\*\*\*\*\*  
\* Elevon "non-return to neutral" tests are conclusi- \*  
\* ve in Green then Blue electrical channels. \*  
\* Continue test in mechanical channel. \*  
\*\*\*\*\*

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## MAINTENANCE MANUAL

||  
\*\*\*\*\*  
\* Non-return to neutral in mechanical channel. \*  
\* On Flight Control Unit place O & M ELEVONS, IN \*  
\* ELEVONS and RUDDER switches in MECH position. \*  
\* Turn control handwheel several times in RH and LH \*  
\* directions. \*  
\* Turn handwheel up to stop in LH direction. \*  
\* Allow handwheel to return slowly and without jerks \*  
\* to neutral and note position of elevons (reading \*  
\* on voltmeter). \*  
\* Repeat operation in RH turn configuration and note \*  
\* position of elevons. \*  
\* Note variation between the two readings. \*  
\* Difference between the two positions of mechanical \*  
\* channel is equal to or less than 30 minutes. \*  
\*\*\*\*\*

OK	NOT OK--	Difference is greater than 30 minutes on mechanical channel. Carry on test following OK path and refer to chart 116 (sheet 9) at the end of test
	NOT OK--	Difference is greater than 30 minutes on mechanical channel and for only one middle elevon. Carry on test following OK path and refer to chart 116 (sheet 6) at the end of test
	NOT OK--	Difference is greater than 30 minutes on mechanical channel and for only one outer elevon. Carry on test following OK path and refer to chart 116 (sheet 7) at the end of test

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* Install protractors on LH wing outer and middle \*  
\* elevons. \*  
\* Turn handwheel up to stop in LH direction. \*  
\* Allow handwheel to return slowly and without jerks \*  
\* to neutral. \*  
\* Note position of elevons (reading on voltmeter) \*  
\* Repeat operation in RH turn configuration and note \*  
\* position of elevons. \*  
\* Note variation between the two readings \*  
\* Difference between the 2 positions of mechanical \*  
\* channel is equal to or less than 30 minutes. \*  
\*\*\*\*\*

OK

NOT OK--

Difference is greater than 30 minutes on mechanical channel. Carry on test following OK path and refer to chart 116 (sheet 9) at the end of test

NOT OK--

Difference is greater than 30 minutes on mechanical channel and for the 2 wings. Carry on test following OK path and refer to chart 117, check of play in mixing unit.

NOT OK--

Difference is greater than 30 minutes on mechanical channel and for only one outer elevon. Carry on test following OK path and refer to chart 116 (sheet 7) at the end of test

NOT OK--

Difference is greater than 30 minutes on mechanical channel and for only one middle elevon. Carry on test following OK path and refer to chart 116 (sheet 6) at the end of test

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* Install protractor on RH and LH wing inner elevons\*  
\* Turn handwheel up to stop in LH direction. \*  
\* Allow handwheel to return slowly and without jerks\*  
\* to neutral. \*  
\* Note position of elevons (reading on voltmeter) \*  
\* Repeat operation in RH turn configuration and note\*  
\* position of elevons \*  
\* Note variation between the two readings \*  
\* Difference between the two positions of mechanical\*  
\* channel is equal to or less than 30 minutes. \*  
\*\*\*\*\*

OK	NOT OK--	Difference is greater than 30 minutes on mechanical channel and for both elevons. Refer to chart 117. Check of play in mixing unit.
	NOT OK--	Difference is greater than 30 minutes on mechanical channel and for only one elevon. Refer to chart 116 (Sheet 5)
	NOT OK--	Difference is greater than 30 minutes on mechanical channel and for the 3 elevons of one wing. Refer to chart 116 (sheet 1)
	NOT OK--	Difference is greater than 30 minutes on mechanical channel and for all elevons. Refer to chart 116 (sheet 10)

\*\*\*\*\*  
\* Elevon "non-return to neutral" tests are conclu- \*  
\* sive in mechanical channel. \*  
\* Flight Controls are in correct operating condition\*  
\*\*\*\*\*

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* DIFFERENCE IS GREATER THAN 15 MINUTES FOR ONE \*  
\* CHANNEL OR FOR THE TWO BLUE AND GREEN ELECTRICAL \*  
\* CONTROL CHANNELS \*  
\*\*\*\*\*

- (1) \*\*\*\*\*  
\* Difference is present on all elevons \*  
\*\*\*\*\*

-----  
| Play or resistance (friction) in front section |  
|-----| upstream of synchro pack. |  
Ref. Chart 118, sheet 1

- (2) \*\*\*\*\*  
\* Difference is present on outer and middle \*  
\* elevons for one channel only \*  
\*\*\*\*\*

-----  
| Replace synchro pack [12] ; play at CDX pack |  
|-----| rod of outer and middle elevons for channel |  
involved.

- (3) \*\*\*\*\*  
\* Difference is present on inner elevons for \*  
\* Blue or Green channel \*  
\*\*\*\*\*

-----  
| Replace synchro pack [12] ; play at shackle of |  
|-----| Blue or Green CDX pack. |  
-----

- (4) \*\*\*\*\*  
\* Difference is present on inner elevons for the \*  
\* two Blue and Green channels \*  
\*\*\*\*\*

-----  
| Replace synchro pack [12] ; play at linkage |  
|-----| common to the Blue and Green CDX packs. |  
-----

Chart 115 (Sheet 1 of 2)

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- (5) \*\*\*\*\*  
\* Difference is present on one elevon for one \*  
\* channel only \*  
\*\*\*\*\*

-----  
| Replace synchro pack on PFCU [21] or [20] |  
|----| depending on the elevon affected. |  
-----

- (6) \*\*\*\*\*  
\* Difference is present on one elevon for the \*  
\* two channels \*  
\*\*\*\*\*

-----  
| Play at feedback linkage on PFCU concerned |  
|----| [21] or [20]. |  
-----

Chart 115 (Sheet 2 of 2)

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*****		-----	
* DIFFERENCE IS GREATER THAN 30	*	GROUND EQUIPMENT REQUIRED	
* MINUTES ON MECHANICAL CHANNEL	*	-----	
*****		DESCRIPTION	PART NO
*****		-----	
* Difference is present on the 3	*	RIGGING PIN-	
* elevons of a wing.	*	MIXING UNIT-	
* On Flight Control Unit, place O & M	*	SERVO CONTROL.	D921310000
* ELEVONS, IN ELEVONS and RUDDER	*	RIGGING PINS-	
* switches in BLUE position.	*	SYNCHRO PACK.	D925252000
* Open door 121FB and immobilize	*	PROTRACTOR-	
* roll resolvers with rigging pin	*	ELEVON AND	
* D925252001.	*	RUDDER.	TE 2012000
* Open floor panels 241 HF and 241	*	GROUND POWER UNIT-	
* LF, and immobilize mixing unit with	*	HYDRAULIC- POWER	
* rigging pin D921310000	*	AND PRELIMINARY	
* CAUTION. WHEN INSERTING AND	*	TESTING.	EMH 398E
* REMOVING PINS TAKE ALL NECESSARY	*	ACCESS PLATFORM	
* PRECAUTIONS IN ORDER TO AVOID	*	3.672 m (12 ft.).	
*****		-----	
* INTRODUCING INADVERTENTLY TOOLS OR	*		
* MISCELLANEOUS ITEMS IN MIXING UNIT.	*		
* Disconnect rod linking mixing unit	*		
* to LH outer pressure seal : cotter	*		
* pin, nut, flat washer, special	*		
* washer, bolt.	*		
* NOTE : For removing bolt, it is	*		
* necessary to press plunger on head	*		
* of bolt to free the locking balls.	*		
* To actuate control throughout the	*		
* free travel range of PFCU, the load	*		
* applied to pressure seal crank at	*		
* rod attachment point is equal to or	*		
* less than 0.5 daN (1.12 lbf.)	*		
*****			

OK	NOT OK

Chart 116 (Sheet 1 of 12)

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## MAINTENANCE MANUAL

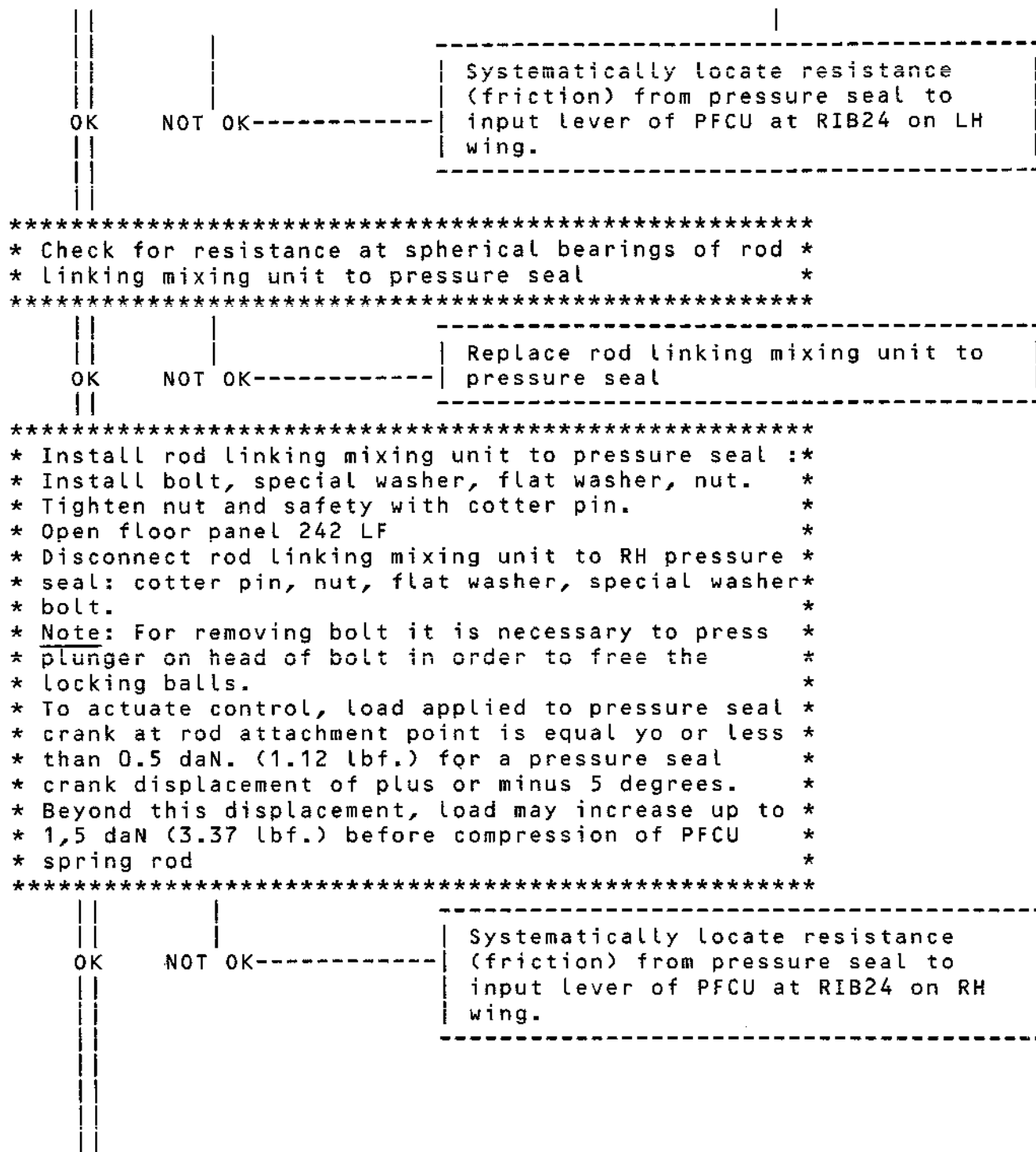


Chart 116 (Sheet 2 of 12)

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* Check spherical bearings of rod linking mixing \*  
\* unit to RH outer pressure seal for resistance \*  
\* (friction) \*  
\*\*\*\*\*

||  
OK NOT OK-----| Replace rod linking mixing unit to RH|  
|| | outer pressure seal. |  
-----|

\*\*\*\*\*  
\* Install rod linking mixing unit to pressure seal: \*  
\* install bolt, special washer, flat washer, nut. \*  
\* Tighten nut and safety with cotter pin. \*  
\* Disconnect spring rod between mixing unit and RH \*  
\* inner pressure seal ; cotter pin, nut, flat \*  
\* washer, special washer, bolt. \*  
\* NOTE : For removing bolt, it is necessary to press \*  
\* plunger on head of bolt to free the locking balls. \*  
\* Unbalance effect actuates pressure seal crank \*  
\* which pivots counterclockwise. \*  
\* Assist this movement until reaching balance point. \*  
\* Load necessary to actuate pressure seal crank and \*  
\* applied to rod attachment point does not exceed \*  
\* limits given by graph No.1. \*  
\*\*\*\*\*

||  
OK NOT OK-----| Systematically locate resistance |  
|| | (friction) from inner pressure seal |  
|| | to input levers of PFCUs at RIB9 and |  
|| | 3 on RH wing. |  
-----|

\*\*\*\*\*  
\* Check spring rod spherical bearings between mixing \*  
\* unit and RH inner pressure seal for resistance \*  
\*\*\*\*\*

||  
OK NOT OK-----| Replace spring rod between mixing |  
|| | unit and pressure seal |  
-----|

||  
||  
||

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||  
OK  
||

\*\*\*\*\*  
\* Install spring rod between mixing unit and RH \*  
\* inner pressure seal; install bolt, special washer,\*  
\* flat washer, nut; tighten nut and safety with \*  
\* cotter pin. \*  
\* Disconnect spring rod between mixing unit and LH \*  
\* inner pressure seal. Cotter pin, nut, flat washer,\*  
\* special washer, bolt. \*  
\* NOTE: For removing bolt, it is necessary to press \*  
\* plunger on head of bolt in order to free the \*  
\* locking balls. \*  
\* Unbalance effect actuates pressure seal crank \*  
\* which pivots counterclockwise. \*  
\* Assist this movement until reaching balance point.\*  
\* Load necessary to actuate pressure seal crank and \*  
\* applied to rod attachment point does not exceed \*  
\* limits given in chart No.2 \*  
\* (Ref. Fig. 102 ) \*  
\*\*\*\*\*

||  
OK  
||

NOT OK

-----  
| Systematically locate resistance from  
| pressure seal to input levers of  
PFCUs at RIB9 and 3 of LH wing

\*\*\*\*\*  
\* Check spherical bearings of spring rod between \*  
\* mixing unit and LH inner pressure seal for \*  
\* resistance (friction) \*  
\*\*\*\*\*

||  
OK  
||

NOT OK

-----  
| Replace spring rod between mixing  
unit and pressure seal.

\*\*\*\*\*  
\* Play at mixing unit. Ref. chart 117 (Sheet 1) \*  
\*\*\*\*\*

\*\*\*\*\*  
\* Install spring rod between mixing unit and LH \*  
\* inner pressure seal ; bolt, special washer, flat \*  
\* washer, nut. Safety with cotter pin. \*  
\* Remove rigging pins ; shut down pressurization of \*  
\* hydraulic systems (Ref. 27-00-00, Servicing) \*  
\*\*\*\*\*

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\*\*\*\*\*  
\* Difference is present only on one inner elevon. \*  
\* On flight Control Unit, place O & M ELEVONS, IN \*  
\* ELEVONS and RUDDER switches in BLUE position. \*  
\* Open door 121 FB and immobilize roll resolvers \*  
\* with rigging pin D925252001. \*  
\* Open floor panel 241 HF and immobilize mixing unit \*  
\* with rigging pin D921310000. \*  
\* WARNING: WHEN INSERTING AND REMOVING PINS TAKE ALL \*  
\* NECESSARY PRECAUTIONS IN ORDER TO AVOID INTRODU- \*  
\* CING INADVERTENTLY TOOLS OR MISCELLANEOUS ITEMS \*  
\* IN MIXING UNIT. \*  
\* Disconnect spring rod at RIB24 : cotter pin, nut, \*  
\* flat washer, special washer, bolt. \*  
\* NOTE: for removing bolt, it is necessary to press \*  
\* plunger on head of bolt in order to free the \*  
\* locking balls \*  
\* Apply a load of plus or minus 2 daN (4.52 lbf.) to \*  
\* bellcrank located at RIB24, at rod attachment \*  
\* point. Play measured at the same point is equal to \*  
\* less than 1 mm. (0.039 in.) \*  
\*\*\*\*\*

		-----	Systematically locate play from rod,
OK	NOT OK-----		linking mixing unit to pressure seal,
			to bellcrank at RIB24
			-----

\*\*\*\*\*  
\* Check that, when a radial load of plus or minus \*  
\* 1 daN (2.2 lbf.) is applied, radial play of rod is \*  
\* equal to or less than 0.4 mm. (0.0157 in.) \*  
\*\*\*\*\*

		-----	
OK	NOT OK-----		Replace spring rod.
			-----

-----  
| Play is located either at spring rod spherical |  
bearing or at PFCU input lever

\*\*\*\*\*  
\* Remove rigging pin D925252001 from resolvers \*  
\* Remove rigging pin D921310000 from mixing \*  
\* unit. \*  
\* Close doors and access panels. \*  
\* Remove access platforms. \*  
\*\*\*\*\*

Chart 116 (Sheet 5 of 12)

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\*\*\*\*\*  
\* Difference is present on only one middle elevon. \*  
\* On Flight Control Unit, place O & M ELEVONS, IN \*  
\* ELEVONS and RUDDER switches in BLUE position \*  
\* Open door 121 FB and immobilize roll resolvers \*  
\* with rigging pin D925252001. \*  
\* Open floor panel 241 HF and immobilize mixing \*  
\* unit with rigging pin D921310000. \*  
\* CAUTION : WHEN INSERTING AND REMOVING PINS TAKE \*  
\* ALL NECESSARY PRECAUTIONS IN ORDER TO AVOID INTRO- \*  
\* DUCING INADVERTENTLY TOOLS OR MISCELLANEOUS ITEMS \*  
\* IN MIXING UNIT. \*  
\* Open access door 543 AB (LH wing) or G43 AB (RH \*  
\* wing) \*  
\* Disconnect rod linking bellcrank at RIB9 to PFCU \*  
\* at RIB9 : cotter pin, nut, flat washer, special \*  
\* washer, bolt. \*  
\* NOTE : for removing bolt, it is necessary to press \*  
\* plunger on head of bolt in order to free the \*  
\* locking balls. \*  
\* Apply a load of plus or minus 2daN (4.52 lbf.) to \*  
\* lever of rod and bellcrank at RIB9, at rod attach- \*  
\* ment point. \*  
\* Play measured at the same point is equal to or \*  
\* less than 1.25 mm (0.0492 in.) \*  
\*\*\*\*\*

|| |-----  
OK NOT OK-----| Replace rod and bellcrank at RIB9[22]|  
|| |-----

\*\*\*\*\*  
\* Play is either at spherical bearing of rod linking \*  
\* rod and bellcrank at RIB9 to input lever of PFCU \*  
\* at RIB9 or at input lever of PFCU. \*  
\* Remove rigging pin D925252001 from resolvers. \*  
\* Remove rigging pin D921310000 from mixing unit \*  
\* Close doors and access panels. \*  
\* Remove access platforms. \*  
\*\*\*\*\*

Chart 116 (Sheet 6 of 12)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* Difference is present on only one outer elevon. \*  
\* On Flight Control Unit, place O & M ELEVONS, IN \*  
\* ELEVONS and RUDDER switches in BLUE position. \*  
\* Open door 121 FB and immobilize roll resolvers \*  
\* with rigging pin D925252001. \*  
\* Open floor panel 241 HF and immobilize mixing unit \*  
\* with rigging pin D921310000. \*  
\* CAUTION: WHEN INSERTING AND REMOVING PINS TAKE \*  
\* ALL NECESSARY PRECAUTIONS IN ORDER TO AVOID \*  
\* INTRODUCING INADVERTENTLY TOOLS OR MISCELLANEOUS \*  
\* ITEMS IN MIXING UNIT. \*  
\* Open access panel 543 AB (LH wing) or 643 AB \*  
\* (RH wing) \*  
\* Disconnect rod linking rod and bellcrank at RIB9 \*  
\* to input lever of PFCU at RIB9; cotter pin, nut, \*  
\* flat washer, special washer, bolt. \*  
\* NOTE: For removing bolt, it is necessary to press \*  
\* plunger on head of bolt in order to free the \*  
\* locking balls. \*  
\* On rod and bellcrank at RIB9, apply a load of \*  
\* plus or minus 2 daN (4.52 lbf.) to link rod atta- \*  
\* chment point and measure play at the same point. \*  
\* Open access panel 544 CB (LH wing) or 644 CB \*  
\* (RH wing). \*  
\* Disconnect rod linking rod and bellcrank at RIB3 \*  
\* to input lever of PFCU at RIB3; cotter pin, nut, \*  
\* flat washer, special washer, bolt. \*  
\* NOTE: For removing bolt, it is necessary to press \*  
\* plunger on head of bolt in order to free the \*  
\* locking balls. \*  
\* On lever of rod and bellcrank at RIB3, apply a \*  
\* load of plus or minus 2 daN (4.52 lbf.) to rod \*  
\* attachment point. \*  
\* Measure play at the same point. \*  
\* Difference between measured play is equal to or \*  
\* less than 0.3 mm (0.011 in.) \*  
\*\*\*\*\*

OK	NOT OK

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## MAINTENANCE MANUAL

OK

NOT OK

Check for play between rod and bell-  
crank at RIB9 and rod and bellcrank  
at RIB3

\*\*\*\*\*  
\* Play is located either at spherical bearing of rod\*  
\* between rod and bellcrank at RIB3 and input lever \*  
\* of PFCU, or at input lever of PFCU at RIB3 \*  
\*\*\*\*\*

\*\*\*\*\*  
\* Install rod between rod and bellcrank at RIB9 \*  
\* and input lever of PFCU; bolt, special washer, \*  
\* flat washer, nut, Safety with cotter pin. \*  
\* Remove rigging pin D921310000 from mixing unit. \*  
\* Remove rigging pin D925252001 from roll resolvers.\*  
\* Close doors and access panels. \*  
\* Remove access platforms. \*  
\*\*\*\*\*

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* Difference is present at outer and middle elevons \*  
\* on one wing only. \*  
\* On Flight Control Unit, place O & M ELEVONS, IN \*  
\* ELEVONS and RUDDER switches in BLUE position. \*  
\* Open door 121 FB and immobilize roll resolvers \*  
\* with rigging pin D925252001. \*  
\* Open floor panel 241 HF and immobilize mixing unit \*  
\* with rigging pin D921310000. \*  
\* CAUTION: WHEN INSERTING AND REMOVING PINS TAKE ALL \*  
\* NECESSARY PRECAUTIONS IN ORDER TO AVOID INTRODU- \*  
\* CING INADVERTENTLY TOOLS OR MISCELLANEOUS ITEMS \*  
\* IN MIXING UNIT. \*  
\* Open access door 541 AB (LH wing) or 641 AB (RH \*  
\* wing). Disconnect spring rod between mixing unit \*  
\* and pressure seal: cotter pin, nut, flat washer, \*  
\* washer, special washer, bolt. \*  
\* NOTE: For removing bolt, it is necessary to press \*  
\* plunger on head of bolt in order to free the \*  
\* locking balls. \*  
\* Check that when a load of plus or minus 1 daN \*  
\* (2.26 lbf.) is applied, radial play of spring rod \*  
\* is equal to or less than 0.4 mm (0.0157 in.) \*  
\*\*\*\*\*

OK	NOT OK-----	Replace spring rod linking mixing unit to pressure seal
----	-------------	---

\*\*\*\*\*  
\* Locate play between spherical bearings of spring \*  
\* rod and rod and bellcrank at RIB9. \*  
\*\*\*\*\*

\*\*\*\*\*  
\* Remove rigging pin D925252001 from resolvers. \*  
\* Remove rigging pin D921310000 from mixing unit. \*  
\* Close doors and access panels. \*  
\* Remove access platforms. \*  
\*\*\*\*\*

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* Difference is present at all elevons on both wings\*  
\* On flight Control Unit, place O & M ELEVONS, IN \*  
\* ELEVONS and RUDDER switches in BLUE position. \*  
\* Open door 121 FB and immobilize roll resolvers \*  
\* with rigging pin D925252001. \*  
\* On SERVO CONTROLS unit place lower selector switch\*  
\* in YELLOW/BLUE position. \*  
\* On Relay Jack unit, place switch in BLUE position \*  
\* Disconnect AP force limiter [2] \*  
\* Check that when a load of plus or minus 30 daN \*  
\* (67.5 lbf) is applied, variation of eye-end \*  
\* fitting to eye-end fitting centre distance is \*  
\* equal to or less than 0.24 mm (0.0094 in.) \*  
\*\*\*\*\*

		-----	
OK	NOT OK-----	Replace AP force limiter [2]	
		-----	

\*\*\*\*\*  
\* Install AP force limiter [2]. On SERVO CONTROLS \*  
\* unit place lower selector switch in NORMAL posi- \*  
\* tion. \*  
\* On RELAY JACK unit, place switch in NORM position \*  
\* Remove rigging pin D925252001 from resolvers. \*  
\* Open floor panel 241 HF and immobilize mixing unit\*  
\* with rigging pin D921310000. \*  
\* CAUTION: WHEN INSERTING AND REMOVING PINS TAKE ALL\*  
\* NECESSARY PRECAUTIONS IN ORDER TO AVOID INTRODU- \*  
\* CING INADVERTENTLY TOOLS OR MISCELLANEOUS ITEMS \*  
\* IN MIXING UNIT. \*  
\* Install a comparator and measure displacement of \*  
\* PFCU attachment fork end in order to determine \*  
\* play at spherical bearings. Measurement is perfor- \*  
\* med by setting roll trim to plus or minus 1 degree\*  
\* with a tolerance of minus 0, minus 0.2. \*  
\* Measured variation is equal to or less than \*  
\* 0.2 mm (0.0079 in.). \*  
\*\*\*\*\*

		-----	
OK	NOT OK-----	Replace Relay jack [8]	
		-----	

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* Immobilize roll resolvers with rigging pin \*  
\* D925252001. \*  
\* Disconnect jam detection strut [15] \*  
\* Check strut for resistance (friction) or play at \*  
\* spherical bearings. \*  
\* Check that when a load of plus or minus 18 daN \*  
\* (40.5 lbf.) is applied, variation of eye-end \*  
\* fitting to eye-end fitting centre distance is \*  
\* equal to or less than 0.25 mm (0.0098 in.) \*  
\*\*\*\*\*

||  
OK  
||

NOT OK-----| Replace jam detection strut [15] |

\*\*\*\*\*  
\* Check that load limiting mechanism [23] is free of \*  
\* play \*  
\*\*\*\*\*

||  
OK  
||

NOT OK-----| Replace load limiting mechanism [23] |

\*\*\*\*\*  
\* Operate control. \*  
\* To do this, load to be applied to head of cable \*  
\* tension regulator crank is equal to or less \*  
\* than 5.6 daN (12.6 lbf.) in electrical mode. \*  
\*\*\*\*\*

||  
OK  
||

NOT OK-----

Resistance (friction) is caused by :  
- ball bearings of cable tension regulator  
- wear of cables  
- wear of fairleads  
- mixing unit  
- guide pulley ball bearings.

\*\*\*\*\*  
\* Check cable tension indicated by cable tension \*  
\* regulator marker \*  
\*\*\*\*\*

||  
OK  
||

NOT OK

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## MAINTENANCE MANUAL

OK

NOT OK

Adjust cable tension

\*\*\*\*\*  
\* By actuating cable tension regulator crank \*  
\* throughout its travel, check that play measured \*  
\* between head of crank and a quadrant of the \*  
\* tension regulator is equal to or less than \*  
\* 1.2 mm (0.0472 in.) \*  
\*\*\*\*\*

OK

NOT OK

Replace cable tension regulator [24]

Replace mixing unit (Ref Chart 117 (Sheet 1))

\*\*\*\*\*  
\* Remove rigging pin D925252001 from roll \*  
\* resolvers. \*  
\* Connect jam detection strut [15]. \*  
\* Close doors and access panels. \*  
\* Remove access platforms \*  
\*\*\*\*\*

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## MAINTENANCE MANUAL

\*\*\*\*\*  
 \* CHECK OF PLAY IN MIXING UNIT \* | GROUND EQUIPMENT REQUIRED |  
 \*\*\*\*\*

DESCRIPTION	PART NO
ZERO RIGGING DEVICE-RELAY CHASSIS.	D925019000
RIGGING PINS- SYNCHRO PACK.	D925252000
SPRING SCALE 50 daN WITH 0.3 PER CENT ERROR OR LESS	

\*\*\*\*\*  
 \* Set flight Controls in Blue Electrical mode (Ref \*  
 \* 27-00-00, Servicing) \*  
 \* Make certain that roll and pitch trim controls \*  
 \* are set to zero \*  
 \* On overhead panel, on ARTIFICIAL FEEL unit No1 and\*  
 \* No2, make certain that PITCH and ROLL switches are\*  
 \* in OFF position. \*  
 \* Open door 121 FB and immobilize roll and pitch \*  
 \* resolvers with rigging pins D925252001 and D9252 \*  
 \* 52003. \*  
 \* Install equipment D925019000. Open door 541 AB. \*  
 \* Disconnect the two rods linking mixing unit to LH \*  
 \* wing pressure seal connection ; cotter pin, nut \*  
 \* flat washer, special washer, bolt. \*  
 \* NOTE: For removing bolt, it is necessary to press \*  
 \* plunger on head of bolt in order to free the \*  
 \* locking balls. \*  
 \* Play of triple output levers of mixing unit to LH \*  
 \* wing, measured at rod attachment point and under a \*  
 \* load of plus or minus 2 daN (4.52 lbf.) applied to \*  
 \* the same point, is equal to or less than 0.25 \*  
 \* mm (0.0335 in.). \*  
 \*\*\*\*\*

OK	NOT OK-----	Replace mixing unit [25]
----	-------------	--------------------------

-----  
Permissible play

Chart 117 (Sheet 1 of 2)

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```
*****
* Connect the two rods linking mixing unit to pres= *
* sure seal connection in LH wing : bolt, special *
* washer, flat washer, nut. Safety with cotter pin. *
* Remove rigging pins D925252001 and D925252003 *
* from resolvers. *
* Remove equipment D925019000. *
* Close doors and access panels. *
* Remove access platforms. *
*****
```

Chart 117 (Sheet 2 of 2)

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## MAINTENANCE MANUAL

*****	
* DIFFERENCE IS GREATER THAN 30 MINU-	* GROUND EQUIPMENT REQUIRED
* TES ON MECHANICAL CHANNEL AND	*
* GREATER THAN 15 MINUTES ON ONE CHAN	* DESCRIPTION PART NO
* NEL OR ON THE TWO BLUE AND GREEN	*
* ELECTRICAL CONTROL CHANNELS	*
*****	
	RIGGING PINS-
	SYNCHRO PACK. D925252000
	PROTRACTOR-ELEVON
	AND RUDDER- TE2012000
	GROUND POWER UNIT
	HYDRAULIC - POWER
	AND PRELIMINARY
	TESTING- EMH398E
	ACCES PLATFORM
	3.672 m (12 ft.)
	COMPARATOR
	SPRING SCALE
	50 daN WITH 0.3
	PER CENT ERROR
	OR LESS

\*\*\*\*\*  
\* Set Flight Controls in Blue electrical mode (Ref. \*  
\* 27-00-00, Servicing) Make certain that pitch and \*  
\* roll trim controls are set to zero. Immobilize \*  
\* pitch resolvers with rigging pins. \*  
\* Install protractor on LH outer elevon \*  
\* Turn handwheel several times in RH and LH direct- \*  
\* ion. \*  
\* Turn handwheel in RH direction until elevon \*  
\* deflects 12° minimum. \*  
\* Allow handwheel to return to neutral slowly and \*  
\* without jerks \*  
\* Place a comparator under horizontal arm of inte- \*  
\* gral trim assembly at 180 mm of its hinge point. \*  
\* Turn handwheel in LH direction until elevon \*  
\* deflects by approximately the same value as above. \*  
\* Allow handwheel to return to neutral slowly and \*  
\* without jerks. \*  
\* Non-return of integral trim assembly horizontal \*  
\* arm read on comparator is equal to or less \*  
\* than 0.3 mm (0.0118 in.) \*  
\*\*\*\*\*

		-----	
OK	NOT OK	-----	Ref. Sheet 4

Chart 118 (Sheet 1 of 8)

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* On SERVO CONTROLS unit place lower selector switch\*  
\* in YELLOW/BLUE position. \*  
\* On RELAY JACK unit, place switch in BLUE position.\*  
\* Open door 121 FB. \*  
\* Disconnect rods between trim and synchro pack, at \*  
\* resolver ; cotter pin, nut washer, bolt. \*  
\* On input crank of resolver and at attachment point\*  
\* of rod, apply a load of plus or minus 2 daN (4.52 \*  
\* lbf.) Play measured at the same point is equal to \*  
\* or less than 0.45 mm (0.0177 in.) \*  
\*\*\*\*\*

||  
OK NOT OK-----| Replace synchro pack [12] |  
||

\*\*\*\*\*  
\* On integral trim assembly, disconnect rods \*  
\* between trim and torque tube: cotter pin, nut, \*  
\* washers, bolt : \*  
\* At rod attachment point on integral trim assembly \*  
\* apply a load of plus or minus 2.5 daN (5.85 lbf.) \*  
\* Play measured at the same point is less than \*  
\* or equal to 0.4 mm (0.0157 in.). \*  
\*\*\*\*\*

||  
OK NOT OK-----| Replace integral trim assembly [4] |  
| (play between gears and/or at hinge |  
point)

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||  
OK  
||

\*\*\*\*\*  
\* Remove rigging pins from resolvers. \*  
\* Shut down pressurization of hydraulic systems \*  
\* (27-00-00, Servicing, procedure to set Flight \*  
\* Controls in electrical mode). \*  
\* Open access door 151 DB, depressurize Blue, Green \*  
\* and Yellow hydraulic systems. \*  
\* Open access door 153 BB, depressurize hydraulic \*  
\* tanks by unscrewing tank depressurization valves \*  
\* by a few turns. Check pressure drop on pressure \*  
\* indicators. Tighten depressurization valves and \*  
\* safety with lockpins. \*  
\* Disconnect AP force limiter [2]. \*  
\* Resolver input bellcrank being in balance \*  
\* position, apply a load to this bellcrank at \*  
\* rod attachment point to drive resolvers. Load must \*  
\* be equal to or less than 0.3 daN (0.67 lbf.) \*  
\*\*\*\*\*

||  
OK  
||

NOT OK-----| Replace synchro pack [12] |

-----  
| Replace ends of rods between trim and synchro |  
pack

\*\*\*\*\*  
\* Connect rod linking trim to torque tube at trim \*  
\* level ; bolt, special washer, flat washer, nut. \*  
\* Torque to between 45 and 50 lbf. in. (0.52 to 0.60 \*  
\* m.daN) Safety with cotter pin. \*  
\* Install AP force limiter [2]. \*  
\* Close doors and access panels. \*  
\* Remove access platforms. \*  
\*\*\*\*\*

Chart 118 (Sheet 3 of 8)

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\*\*\*\*\*  
\* Difference is greater than 0.3 mm (0.0118in.) \*  
\* Disconnect artificial feel spring rod [1] \*  
\* Check that when a load of plus or minus 2.5 daN \*  
\* (5.85 lbf.) is applied, variation of eye-end \*  
\* fitting to eye-end fitting centre distance is \*  
\* equal to or less than 0.15 mm (0.0059 in). \*  
\*\*\*\*\*

OK	NOT OK-----	Replace artificial feel spring rod [1]
----	-------------	--

\*\*\*\*\*  
\* On torque tube disconnect rod between torque \*  
\* tube and integral trim assembly : cotter pin, nut, \*  
\* flat washer, special washer, bolt. \*  
\* By means of a spring scale, operate Captain's \*  
\* handwheel. Carry out full travel displacement \*  
\* in LH and RH direction. \*  
\* Results must correspond with graph No3 \*  
\* (Ref. Fig. 103 ) \*  
\*\*\*\*\*

OK	NOT OK-----	Ref. chart 118 (Sheet 7)
----	-------------	--------------------------

\*\*\*\*\*  
\* Carry out the same operation on First Officer's \*  
\* handwheel. Results must correspond with graph No.2\*  
\*\*\*\*\*

OK	NOT OK-----	Resistance (friction) is caused by : - ball bearing of control column hinge point - wear of chains, cables or gear. - ball bearings of guide pulley hinge shaft at control column base. - ball bearings of torque tube
----	-------------	--

\*\*\*\*\*  
\* Check spherical bearings of rods between torque \*  
\* tube and integral trim assembly for play or \*  
\* resistance (friction) \*  
\*\*\*\*\*

OK	NOT OK
----	--------

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## MAINTENANCE MANUAL

OK	NOT OK-----	Replace ends of rods linking torque tubes to integral trim assembly
----	-------------	---

\*\*\*\*\*  
\* On Flight Control Unit, place O & M ELEVONS, IN \*  
\* ELEVONS and RUDDER switches in BLUE position. \*  
\* On SERVO CONTROLS unit place lower selector switch\*  
\* in YELLOW/BLUE position. \*  
\* On RELAY JACK unit, place switch in BLUE position.\*  
\* Disconnect AP force limiter [2] \*  
\* On SERVO CONTROLS unit place lower selector switch\*  
\* in NORMAL position. \*  
\* On RELAY JACK unit place switch in NORM position. \*  
\* On Flight Control Unit place O & M ELEVONS, IN \*  
\* ELEVONS and RUDDER switches in MECH position. \*  
\* Check that load necessary to actuate relay jack \*  
\* and applied to head of input lever is equal to \*  
\* or less than 1 daN (2.26 lbf.) \*  
\*\*\*\*\*

OK	NOT OK-----	Replace Relay Jack [3]
----	-------------	------------------------

\*\*\*\*\*  
\* Check AP force limiter spherical bearings for \*  
\* resistance (friction) \*  
\*\*\*\*\*

OK	NOT OK-----	Replace AP force limiter [2]
----	-------------	------------------------------

Chart 118 (Sheet 5 of 8)

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* Shut down pressurization of hydraulic systems \*  
\* (Ref 27-00-00, Servicing, Procedure to set Flight \*  
\* controls in electrical mode) \*  
\* Open door 151 DB, depressurize Blue, Green and \*  
\* Yellow hydraulic systems. \*  
\* Open door 153 BB, depressurize hydraulic tanks \*  
\* by unscrewing tank depressurization valves by \*  
\* a few turns. Check pressure drop on pressure \*  
\* indicators. Tighten hydraulic tank depressuriza- \*  
\* tion valves and safety with lockpins. \*  
\* Open door 121 FB. \*  
\* Disconnect the two artificial feel jacks from A.F \*  
\* rocker arm : Green jack [5] Blue jack [6] \*  
\* Manually pivot A.F rocker arm, no resistance \*  
\* (friction) is present. \*  
\*\*\*\*\*

||  
OK  
||

NOT OK-----| Refer to chart 118 (sheet 8) |

-----  
| Replace integral trim assembly [4] (friction is |  
present at hinge points)

\*\*\*\*\*  
\* Install rod linking torque tube and integral trim \*  
\* assembly; special washer, flat washer, nut. \*  
\* Torque to between 27 and 32 lbf. in. (0.30 and \*  
\* 0.36 m.daN) \*  
\* Safety with cotter pin. \*  
\* Connect the two artificial feel jacks ; Green \*  
\* jack [5], Blue jack [6] \*  
\* Close doors and access panels. \*  
\* Remove access platforms. \*  
\*\*\*\*\*

Chart 118 (Sheet 6 of 8)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* On Captain's side, disconnect Flight data recorder\*  
\* potentiometer. \*  
\* By means of a spring scale, operate handwheel. \*  
\* Operating load is given in graph No.4, First \*  
\* Officer's. \*  
\* (Ref. Fig. 104 ) \*  
\*\*\*\*\*

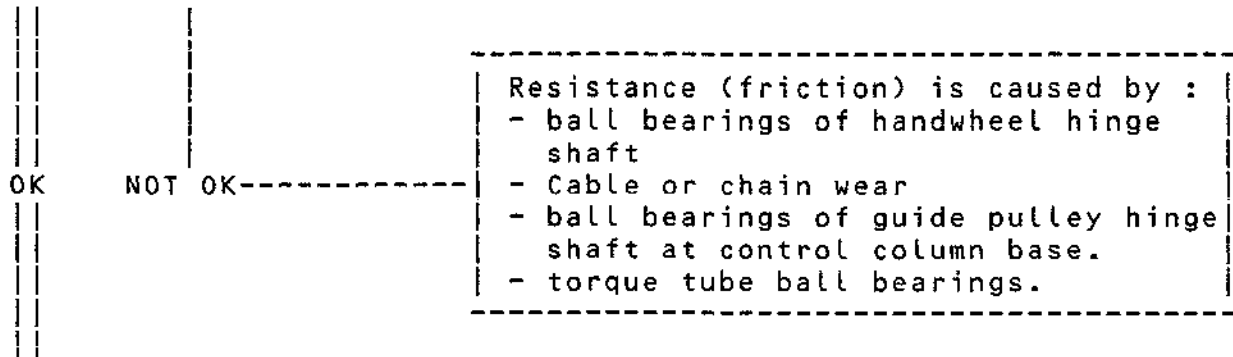


Chart 118 (Sheet 7 of 8)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* Disconnect Green artificial feel jack [5] \*  
\* Check that jack rod slides easily and that \*  
\* spherical bearings can move freely. \*  
\*\*\*\*\*

		-----	-----
OK	NOT OK	-----	Replace Green artificial feel jack [5]
			-----

\*\*\*\*\*  
\* Disconnect Blue artificial feel jack [6] \*  
\* Check that jack rod slides easily and that \*  
\* spherical bearings can move freely. \*  
\*\*\*\*\*

		-----	-----
OK	NOT OK	-----	Replace Blue artificial feel jack [6]
			-----

Replace artificial feel rocker arm of integral	
trim assembly [11]	

Chart 118 (Sheet 8 of 8)

EFFECTIVITY: ALL

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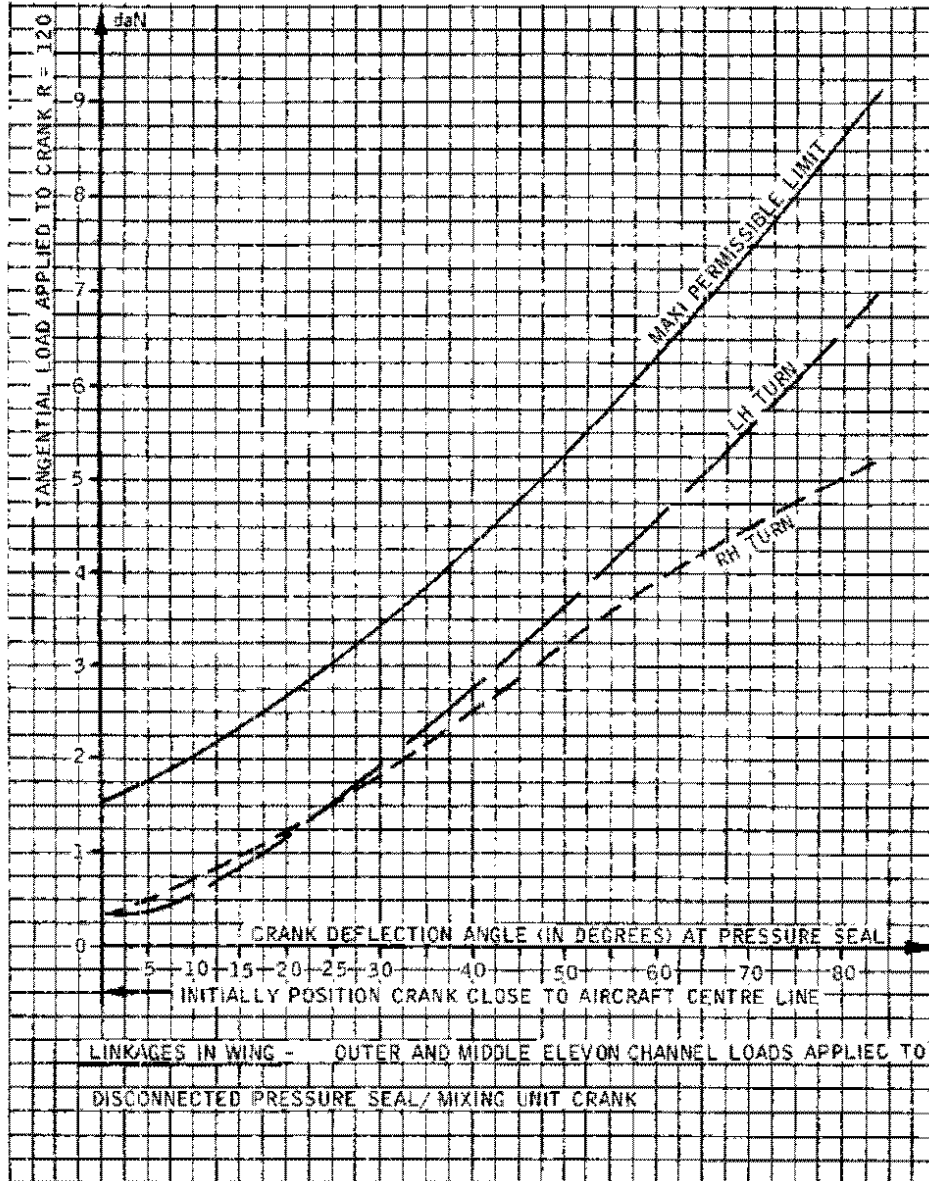
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## MAINTENANCE MANUAL



CMA 27 11 00 I ACMO

Graph No.2  
Figure 102

EFFECTIVITY: ALL

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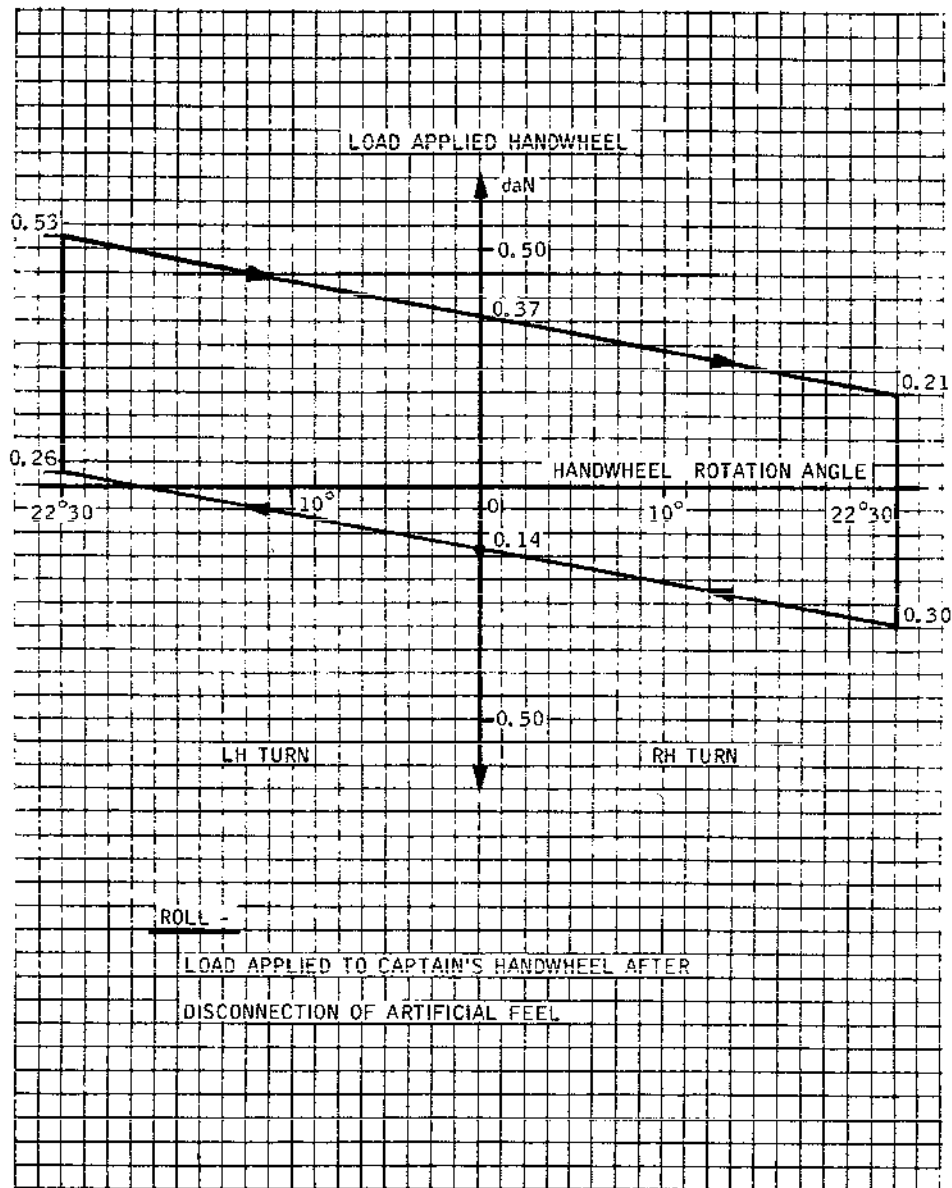
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## MAINTENANCE MANUAL



Graph No.3  
Figure 103

EFFECTIVITY: ALL

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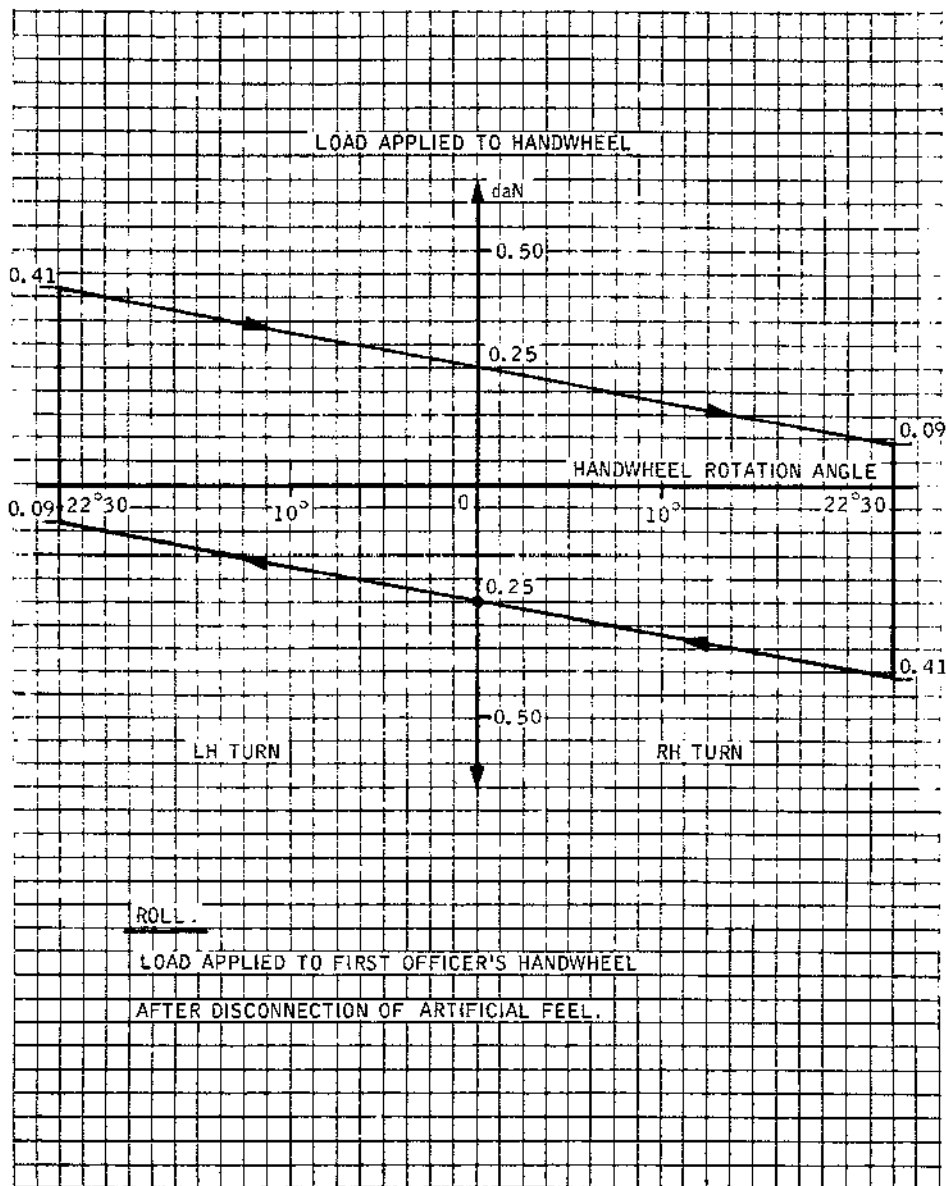
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CMA 27 11 00 1 AEMO

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## MAINTENANCE MANUAL



CMA 27 11 00 1 ACMO

Graph No.4  
Figure 104

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[1] Artificial feel spring rod	213BF	121			27-12-12 R/I	
[2] AP force limiter	121FB	121			27-11-19 R/I	
[3] Relay jack	213EF	213			27-14-12 R/I	
[4] Integral trim assembly	121DB	121			27-13-12 R/I	
[5] Artificial feel jack - Green	121DB	121			27-14-15 R/I	
[6] Artificial feel jack - Blue	213BF	213			27-14-13 R/I	
[11] Artificial feel rocker arm	121DB	121			27-12-13 R/I	
[12] Synchro pack	121FB	121			27-16-11 R/I	
[15] Jam detection strut	121GB	121			27-11-21 R/I	
[20] Inner power flight control unit	JB,LL LR,KB	551 or 651			27-34-53 R/I	
[21] Outer and middle power flight control unit	JB,LL LR,KB	553 or 552 or 653 or 652			27-34-52 R/I	
[22] Rod and bellcrank at wing RIB9	543AB or 643AB	543 or 643			27-31-44 R/I	
[23] Load limiting mechanism	121GB	121			27-11-16 R/I	

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## MAINTENANCE MANUAL

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[24] Cable tension regulator	231JF	231			27-11-17 R/I	
[25] Mixing unit	241HF 241JF	241			27-31-32 R/I	

Component Identification  
Table 101

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# *Concorde*

## MAINTENANCE MANUAL

### MECHANICAL CONTROL - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

This topic deals with the removal/installation of the mechanical control components in fuselage section between Frame 8 and Frame 71.

#### 2. Guide Pulleys and Control Cables (Ref. Fig. 401 )

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Zero Rigging Device - Relay Chassis	E925019000
Rigging Pin - Mixing Unit Servo Control	D921310000
Rigging Pins - Synchro Pack	D925252000
Locking Equipment - Cable Tension Regulator	D921606000
Access Platforms 3.672 m (12 ft.)	
Circuit Breaker Safety Clips	

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# Concorde

## MAINTENANCE MANUAL

DESCRIPTION	PART NO.
Lockwire Dia. 0.028 in. (0.7 mm) Corrosion Resistant Steel	
Cable Grip	D921620000
Tensiometer	

### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (3) Check that pitch, yaw and roll trim controls are set to zero.
- (4) Open door 121FB, immobilize Pitch and Roll resolvers with rigging pins D925252001 and D925252003.
- (5) Install equipment E925019010, E925019013 and E925019012.
- (6) Open floor panel 241HF and immobilize mixing unit with rigging pin D921310000.
- (7) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).

**WARNING :** DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY ALSO A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZATION SYSTEM ELECTRIC PUMPS.

MAKE CERTAIN THAT NO PERSONEL IS WORKING ON MECHANICAL LINKAGE BETWEEN MIXING UNIT AND ELEVONS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT, PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

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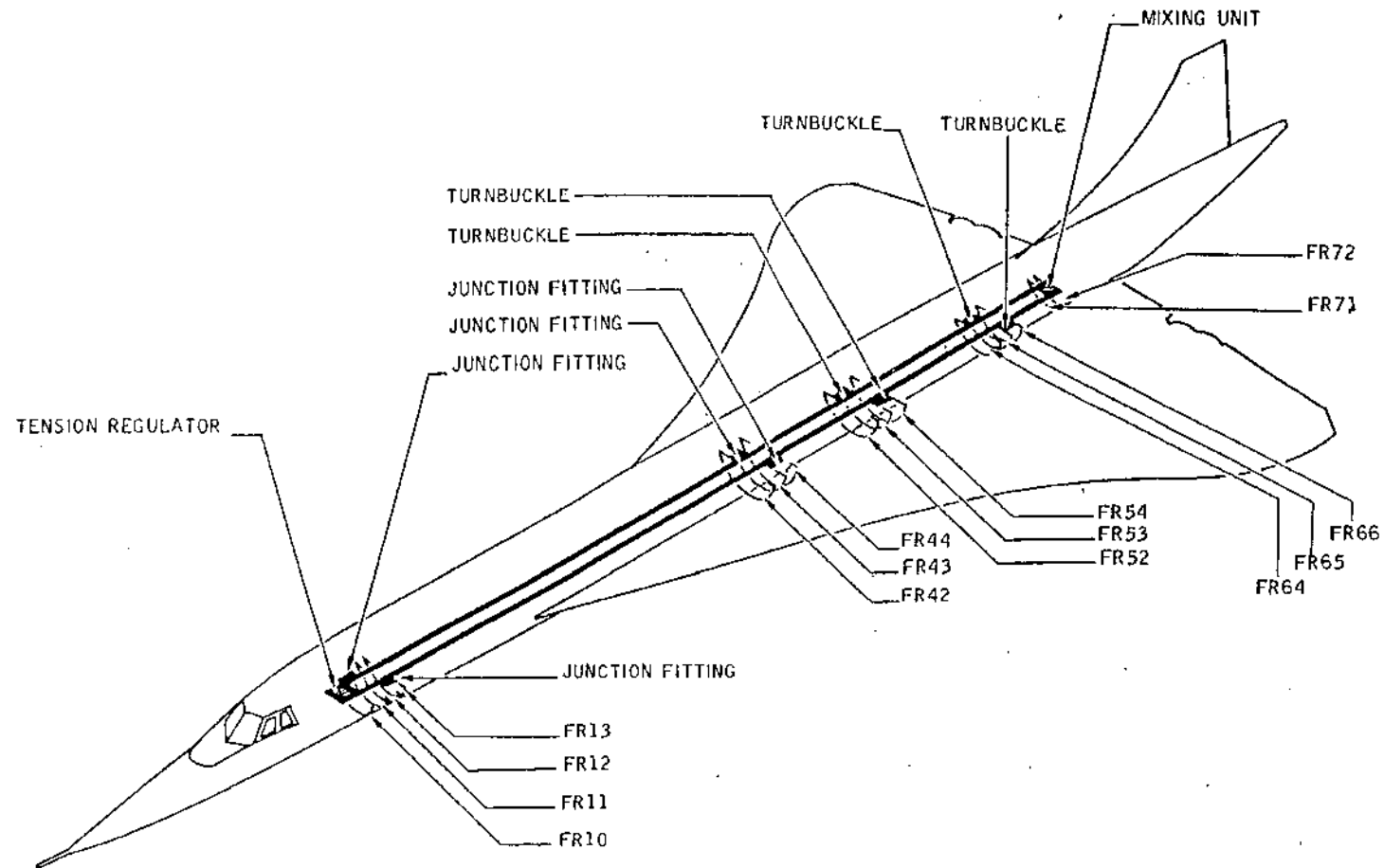
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## MAINTENANCE MANUAL

CMA 27 11 00 4 AAMU



Control Cables  
Figure 401

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## MAINTENANCE MANUAL

(8) Trip, Safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22
(9) Open door 151DB, depressurize Blue, Green and Yellow hydraulic systems (Ref. 29-11-00, 29-12-00 and 29-21-00, Servicing).			
(10) Open door 121GB and floor panel 215AF giving access to cable tension regulators.			
(11) Open floor panel 231JF, giving access to cable turn-buckles.			
(12) Open floor panels corresponding to cable lengths or to pulleys to be removed.			
(a) Pulleys			
Pulley located between frames 9 and 10 : 215AF			
Pulley located at frame 67 : 241AF			
Pulley located at frame 68 : 241AF			
(b) Roll cables			
(b1) RH cable			
Cable length from tension regulator to cable junction fitting located between frames 10 and 11 : panels 215AF and 215BF.			
Cable length from junction fitting (between frames 10 and 11) to junction fitting located between frames 42 and 43 : panels 215BF, 215CF, 221AF, 221DF, 221HF, 221LF, 221QF, 221UF, 221XF, 223AF, 223DF, 223LF, 223SF, 231AF.			
Cable length from junction fitting (between frames 42 and 43) to turnbuckle located between frames 52 and 53 : panels 231AF, 231DF, 231GF, 231HF, 231JF.			

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

Cable length from turnbuckle (between frames 52 and 53) to turnbuckle located between frames 64 and 65 : panels 231JF, 233AF, 233BF, 233CF, 233FF, 233JF.

Cable length from turnbuckle (between frames 64 and 65) to mixing unit : panels 233JF, 241AF, 241BF, 241EF.

### (b2) LH cable

Cable length, from tension regulator to junction fitting located between frames 12 and 13 : panels 215BF, 215AF, 215CF, 221AF.

Cable length from junction fitting (between frames 12 and 13) to junction fitting located between frames 43 and 44 : panels 221AF, 221DF, 221HF, 221LF, 221QF, 221UF, 221XF, 223AF, 223DF, 233LF, 223SF, 231AF.

Cable length from junction fitting (Between frames 43 and 44) to turnbuckle located between frames 53 and 54 : 231AF, 231DF, 231GF, 231HF, 231JF.

Cable length from turnbuckle (between frames 53 and 54) to turnbuckle located between frames 65 and 66 : panels 231JF, 233AF, 233BF, 233LF, 233FF, 233JF.

Cable length from turnbuckle (between frames 65 and 66) to mixing unit : panels 233JF, 241AF, 241BF, 241EF.

### C. Remove Guide Pulleys (Ref. Fig. 403 )

- (1) Remove locking clips (3) from turnbuckles corresponding to the pulley to be removed.  
Turn turnbuckles symmetrically until a sufficient tension, enabling installation of locking equipment D921606000 on the regulator, is obtained.
- (2) Install locking equipment D921606000 on regulator.
- (3) Slacken cables until the pulley can be removed.
- (4) On the support of the pulley to be removed, remove the cable guard if necessary, (cotter, nut, washer and bolt)

EFFECTIVITY: ALL

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# *Concorde*

## MAINTENANCE MANUAL

- (5) Remove cotter and unscrew nut of pulley bolt, remove washer and pulley bolt.

### D. Preparation of replacement component

### E. Install guide pulleys (Ref. Fig. 402 )

- (1) Engage cable in pulley throat.  
Position pulley on its support.  
Install bolt, washer, tighten nut, safety with cotter.  
Torque to between 0.46 and 0.58 m.daN (40 and 50 lbf.in.)

NOTE : There must be a clearance of 1 mm minimum (0.039 in.) between the pulley side plates and its support and 0.022 to 0.060 in. (0.6 to 1.5 mm) between pulleys and spacers.

- (2) Tighten cables symmetrically until tension reaches the normal value.

- (3) On pulley support, install cable guard.

NOTE : The compensation locking equipment D921606000 of the tension regulator maintains the two side plates at adjustment point 10.

- (4) Tighten turnbuckles symmetrically until a sufficient and equal tension of both cables, enabling easy removal of the regulator locking equipment, is obtained.
- (5) Remove locking equipment (D921606000) from tension regulator.
- (6) Note temperature in the adjacent cable area and adjust tension according to the cable tension adjustment graph.
- (7) Cable tension adjustment must always be symmetrical. The index on the centre drum must coincide with the point chosen on the graph.  
Tension : 25 daN (56.2 lbf.)
- (8) Check that tension is equally distributed between both cables, by removing rigging pins E925019105 from equipment E925019013 (easy removal of rigging pins).
- (9) Safety turnbuckles using locking clips.
- (10) Remove safety clip and tag and set circuit breaker

EFFECTIVITY: ALL

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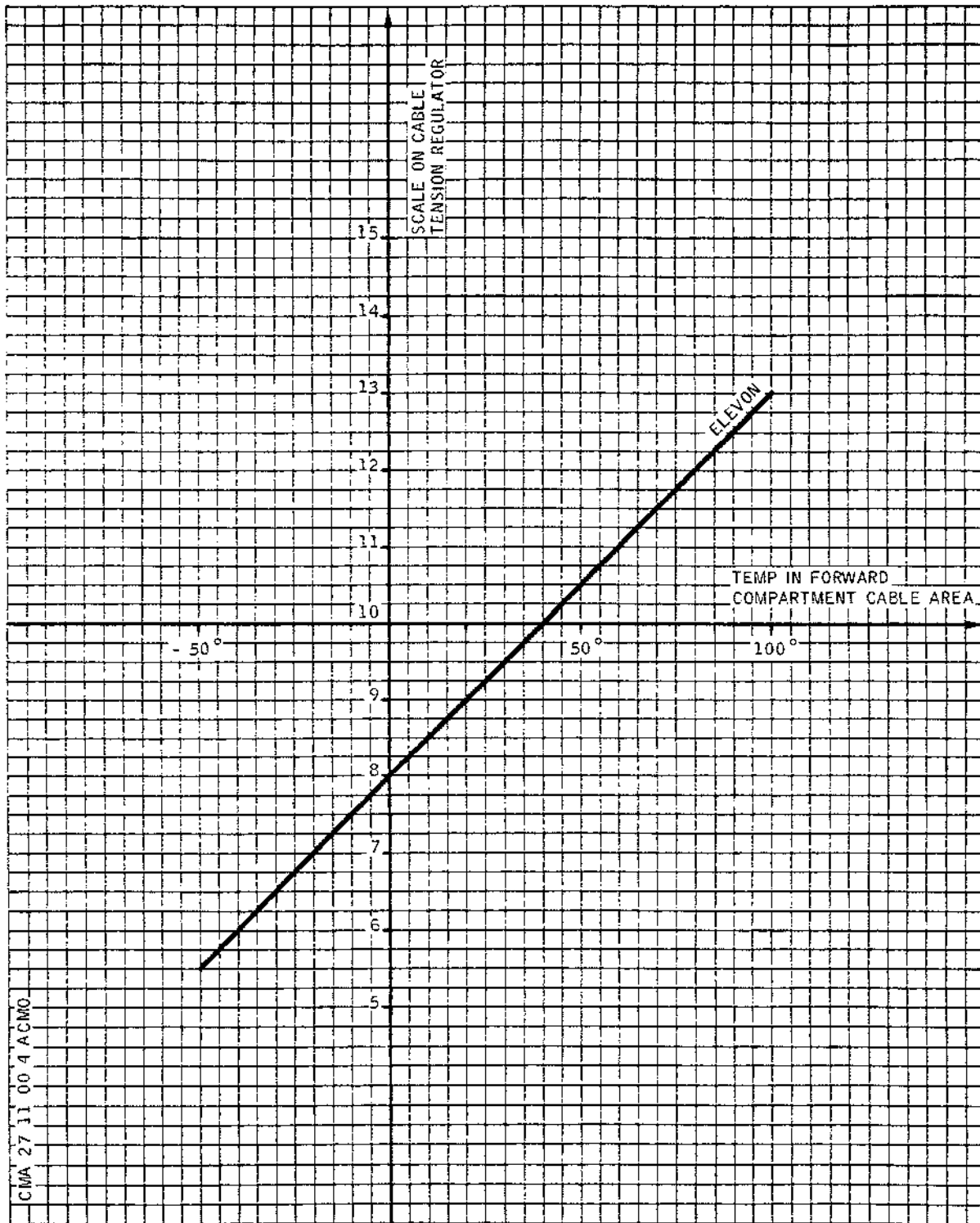
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## MAINTENANCE MANUAL



Cable tension adjustment graph  
according to temperature  
Figure 402

R

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## MAINTENANCE MANUAL

M626, panel 15-216, Map Ref. F22.

- (11) Remove warning notices.
  - (12) Set Flight Controls in mechanical mode  
(Ref. 27-00-00, Servicing).
  - (13) Remove equipment E925019012, E925019013, E925019010 and  
remove rigging pin D921310000 from mixing unit.
  - (14) Remove rigging pins D925252001 and D925252003 from  
pitch and roll resolvers.
  - (15) Shut down pressurization of hydraulic systems  
(Ref. 27-00-00, Servicing, Procedure to set Flight  
Controls in mechanical mode).
- F. Remove cables up to turnbuckles, frame 65 before mixing unit  
(Ref. Fig.403 and 404)
- (1) Disengage locking clips (3) from turnbuckles to be re-  
moved  
Turn turnbuckles symmetrically until a tension, enabling  
installation of locking equipment D921606000 on  
regulator, is obtained.  
Install locking equipment.
  - (2) On cable length to be removed, proceed as follows :
    - (a) Turnbuckle (Ref. Fig. 403 )
      - (a1) Disengage locking clips and slacken cables  
symmetrically until they can be removed.
      - (a2) Slide sleeve assembly (2). Separate cable  
ends (1) and (4).
    - (b) Junction fittings (Ref. Fig. 403 )  
Disengage locking clips (1) slide outer sleeve  
(2). Separate cable ends (3) and (4).  
  
Install equipment D921620000 (cable grip). This  
equipment maintains tension of cables remaining  
on the aircraft.
  - (3) If the cable length passes through a fairlead, separate  
the two parts of fairlead in order to remove  
cable (lockwire, bolt and washers).
  - (4) If the cable length passes over a guide pulley,  
remove the cables guards mounted on the pulley support

EFFECTIVITY: ALL

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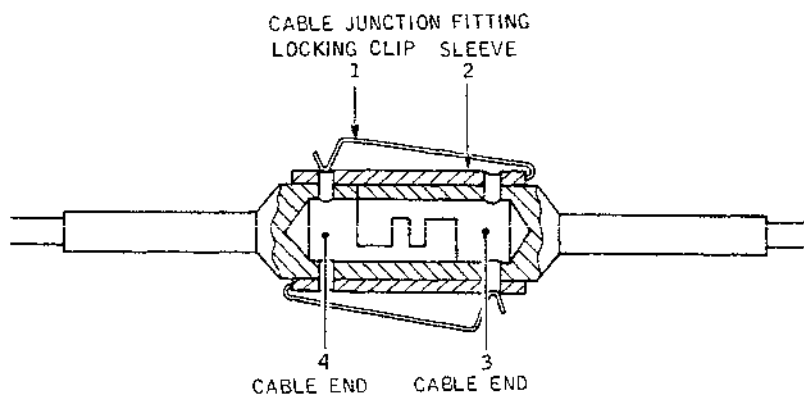
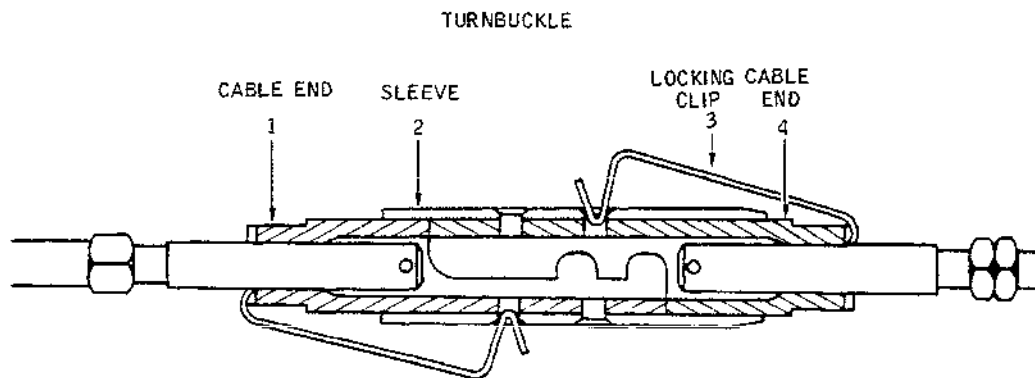
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## MAINTENANCE MANUAL



CMA 27 11 00 4 AEM0

Cable Junctions  
Figure 403

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EFFECTIVITY: ALL

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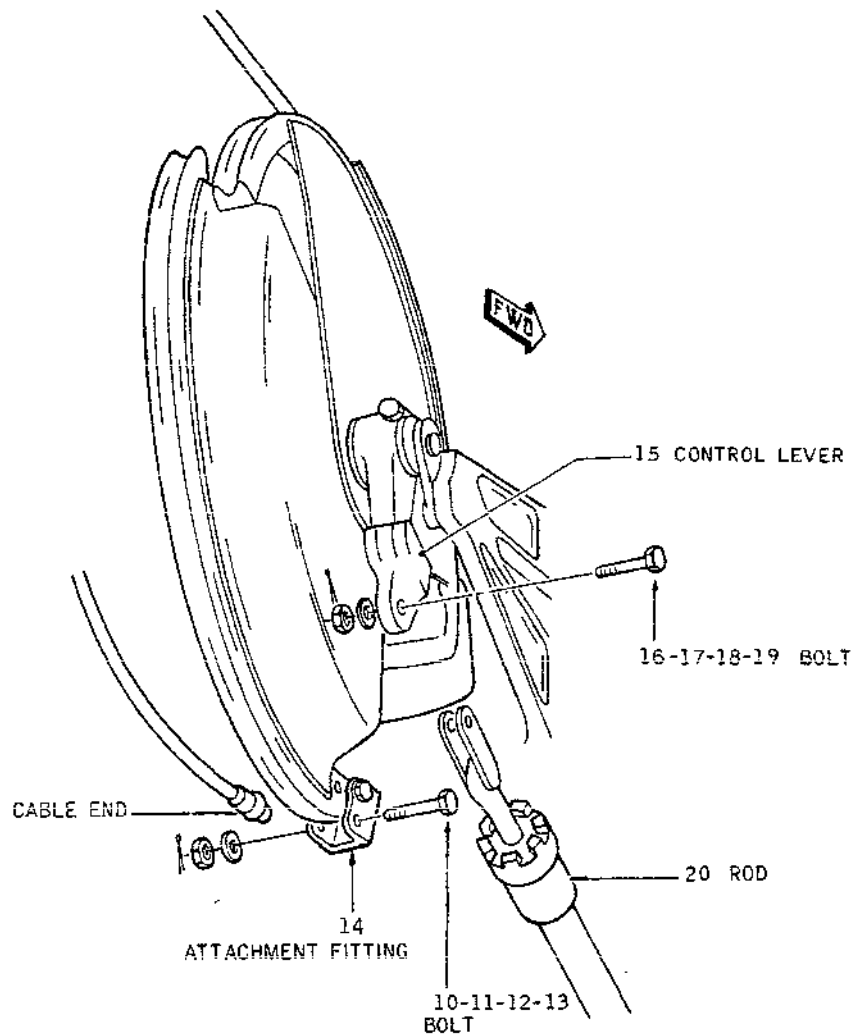
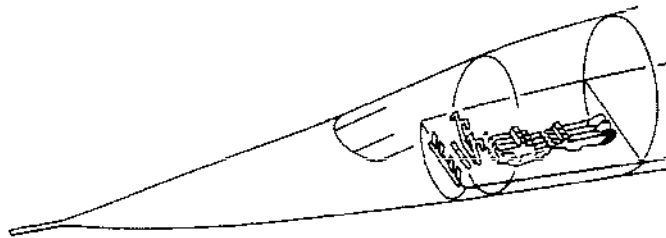
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## MAINTENANCE MANUAL



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Cables on Tension Regulator  
Figure 404

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## MAINTENANCE MANUAL

in order to disengage the cable.  
(Cotter, nut, washer, bolt, and remove spacers).

- (5) Cable length connected to a cable tension regulator (Ref. Fig. 404 )
- (a) Remove lower cable guard casing (Ref. 27-11-17, Removal/Installation).
  - (b) Remove cotter pin (16), remove nut (17), washer (18), and bolt (19).  
Disconnect rod (20) from control lever (15).
  - (c) Remove cotter pin (10), remove nut (11), washer (12), bolt (13).  
Tilt attachment fitting (14) on fixed pin and disengage lower cable.
  - (d) Rotate tension regulator so as to gain access to upper cable end attachment fitting.

NOTE : For removing or installing bolts (19) and (13), it is necessary to press plunger on head of bolt, to free retaining balls.

G. Install cables up to turnbuckles. Frame 65 before mixing unit.

- (1) On cable tension regulator (Ref. Fig. 404 )
- (a) Engage upper cable end in recess on tension regulator. Tilt cable attachment fitting on fixed pin, insert bolt, install washer, nut, and safety with cotter pin.
  - (b) Rotate tension regulator and engage lower cable end in recess on regulator. Tilt cable attachment fitting on fixed pin, insert bolt (13), install washer (12), nut (11) and safety with cotter pin (10).
  - (c) Connect rod (20) to control lever (15), engage bolt (19), install washer (18), nut (17).  
Torque to between 27 and 32 lbf.in.  
(0.30 and 0.36 m.daN).  
Safety with cotter pin.
  - (d) Install lower cable guard casing (Ref. 27-11-17, Removal/Installation).
- (2) At fairlead, engage cable in grooves on lower part

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## MAINTENANCE MANUAL

of fairlead ; position upper part and attach with screws. Torque to between 27 and 32 lbf.in. (0.30 and 0.36 m.daN). Safety with lockwire as per 20-21-13.

- (3) On guide pulleys, engage cable on pulley throat, install spacer, install bolt, washer, nut. Safety with cotter.

NOTE : Minimum clearance between spacers and pulleys must be between 0.022 and 0.060 in. (0.6 and 1.5 mm).

- (4) On turnbuckles and junction fittings, connect the cable ends and maintain them with sleeves. Remove equipment D921620000.
- (5) Tighten cable turnbuckles symmetrically until a sufficient and equal tension of both cables is obtained, enabling easy removal of tension regulator locking equipment.
- (6) Remove locking equipment D921606000 (Ref. Fig. 402 )
- (7) Note temperature in adjacent cable area, and adjust cable tension according to adjustment graph.
- (8) Cable tension adjustment is always symmetrical. The pointer on centre drum must coincide with chosen point on graph.  
Tension = 25 daN (56.2 lbf.).
- (9) Check that tension is equally distributed between both cables by removing rigging pins E925019105 from equipment E925019013 (easy removal of rigging pins).
- (10) Safety turnbuckles and junction fittings with locking clips.
- (11) Remove safety clip and tag and set circuit breaker M626, panel 15-216, Map Ref F22.
- (12) Remove warning notices.
- (13) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (14) Remove equipment E925019000, E925019013 and E925019010, and remove rigging pin D921310000 from mixing unit.

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- (15) Remove rigging pins D925252001 and D925252003 from pitch and roll resolvers.
  - (16) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
  - (17) Make certain that minimum clearance values are observed at the following points (Ref. Fig. 405 )
    - (a) Clearance A  
Between cables and edges of passages in floor support beams.  
Flight control cables and frame beams without fairleads from frame 11 to frame 38  
Nominal clearance : 10 mm (0.393 in.)  
Minimum clearance : 8 mm (0.315 in.)
    - (b) Clearance B  
Between cables and edges of passages in floor support beams.  
Flight control cables and beams with fairleads from frame 9 to frame 37  
Nominal clearance : 10 mm (0.393 in.)  
Minimum clearance : 4 mm (0.157 in.)
    - (c) Clearance C  
Between cables and edges of passage in floor support beam at frame 8  
Nominal clearance : 10 mm (0.393 in.)  
Minimum clearance : 5 mm (0.196 in.)
- H. Remove cables from mixing unit (Ref. Fig. 403, 404 and 406)
- (1) Remove warning notices
  - (2) Remove safety clip and tag and set circuit breaker M626, panel 15-216, Map Ref F22.
  - (3) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).
  - (4) Disconnect actuating rods from input levers on all elevon PFCU's.
    - (a) Remove the following fairings :
      - LH wing 551JB, 552JB, 553JB
      - RH wing 651JB, 652JB, 653JB

EFFECTIVITY: ALL

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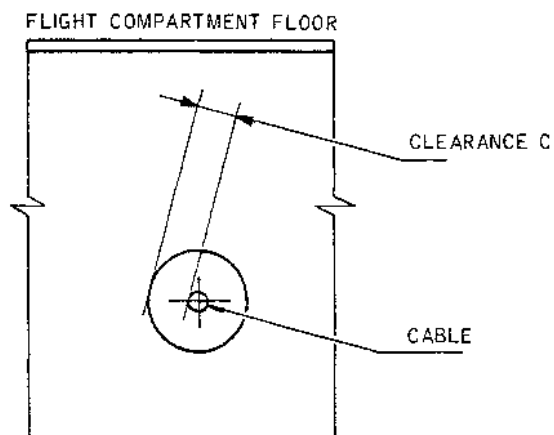
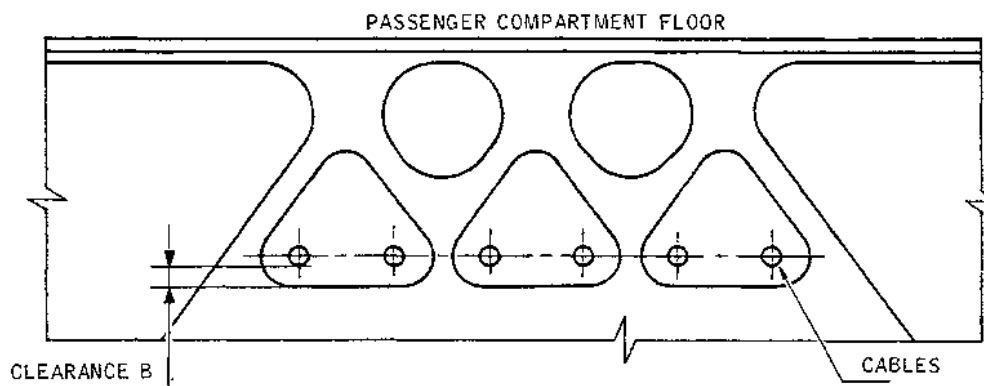
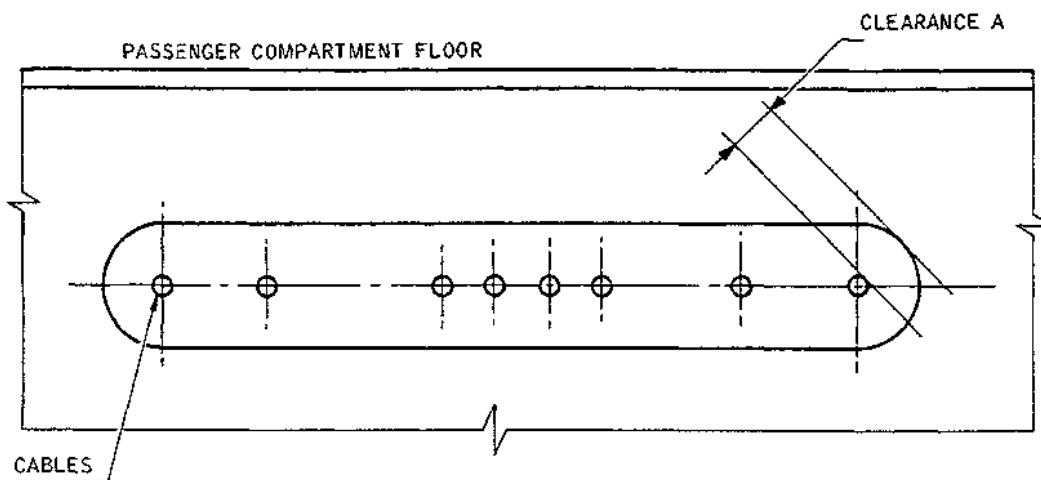
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CMA 27 11 00 4 AHMO

Clearances between cables and structure  
Figure 405

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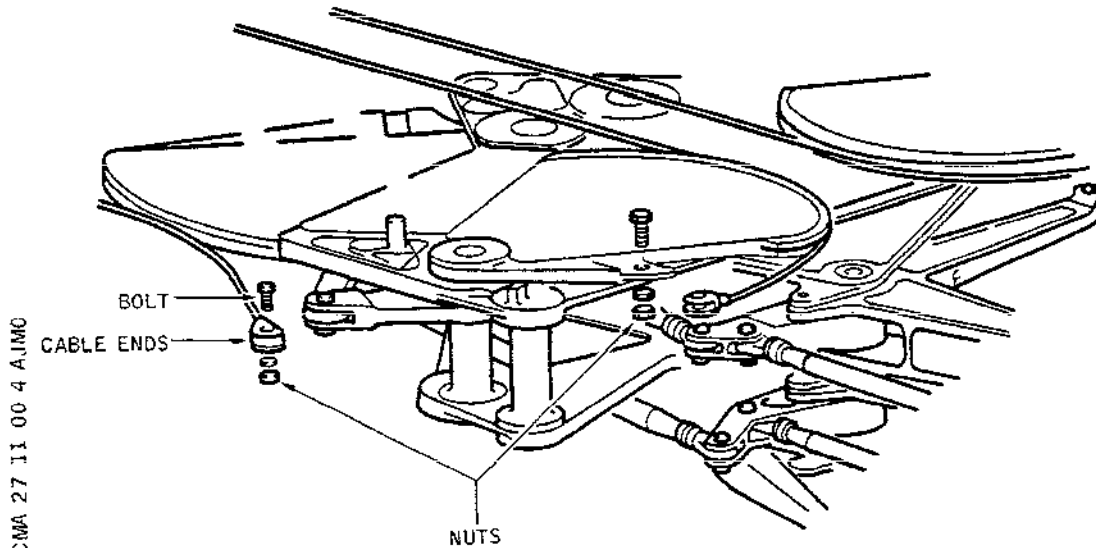
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## MAINTENANCE MANUAL



Cables on Mixing Unit  
Figure 406

- (b) Disconnect and separate actuating rods from PFCU input levers.
- (5) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in electrical mode).
- (6) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

WARNING : DISPLAY WARNING NOTICES, ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

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DISPLAY ALSO A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZATION SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

(Ref. Fig.403 and 406)

- (7) On turnbuckles (located between frames 65 and 66 for LH cable) and frames 64 and 65 for RH cable, disengage locking clips (3), turn turnbuckles symmetrically until a sufficient tension, enabling installation of locking equipment D921606000 on tension regulator is obtained.  
Install locking equipment.
- (8) Slacken cables symmetrically until they can be removed from turnbuckles.  
Slide sleeve assembly (2) disconnect cable ends from turnbuckles. Position equipment D9216020000.
- (9) Remove rigging pin D921310000 from mixing unit.
- (10) Remove cotter pins, remove nuts, washers, remove bolts attaching cable ends to cable quadrant of mixing unit, disengage cable ends.

### I. Install cables on mixing unit

- (1) Engage cable ends on cable quadrant, attach with bolt, washer and nut. Safety with cotter pin.
- (2) Immobilize mixing unit with rigging pin D921310000.
- (3) On turnbuckles, connect cable ends and maintain them with sleeves.  
Remove equipment D921620000.
- (4) Tighten turnbuckles symmetrically until a sufficient and equal tension of both cables, enabling easy removal of the regulator locking equipment, is obtained.
- (5) Remove equipment D921606000 from cable tension regulator.  
(Ref. Fig. 402 )
- (6) Note temperature in the adjacent cable area and adjust tension according to adjustment graph.

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- (7) Cable tension adjustment is always symmetrical. The pointer on regulator center drum must coincide with chosen point on graph.  
Tension : 25 daN (56.2 lbf.).
- (8) Check that tension is equally distributed between both cables, by removing rigging pins E925019105 from equipment E925019013 and rigging pin D921310000 from mixing unit (easy removal of rigging pins).
- (9) Safety turnbuckles with locking clips.
- (10) Connect actuating rods to PFCU input levers : bolt, washer, nut.  
PFCU at RIB24 torque to between 0.25 and 0.30 m.daN (23 and 26.541 lbf.in.).  
PFCU's at RIB3 and 9 torque to between 0.31 and 0.37 m.daN (27.425 and 32.733 lbf.in.).  
Safety with cotter pin.
- (11) Remove safety clip and tag and set circuit breaker M626, panel 15-216, Map Ref F22.
- (12) Remove warning notices.
- (13) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (14) Remove equipment E925019012, E925019013 and E925019010 and remove rigging pin D921310000 from mixing unit.
- (15) Remove rigging pins D925252001 and D925252003 from pitch and roll resolvers.
- (16) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Procedure to set Flight Controls in mechanical mode).
- (17) Install the following fairings :  
551JB, 552JB, 553JB  
651JB, 652JB, 653JB

### J. Test

- (1) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (2) Carry out an operational test (Ref. 27-11-00, Adjustment/Test).
- (3) Insert rigging pins D925252001 and D925252003 in

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Pitch and Roll resolvers.

Install equipment E925019010, E925019013 and E925019012.

Make certain that rigging pin D921310000 can be removed and inserted freely

Remove : - rigging pin D921310000

- equipment E925019012, E925019013 and E925019010

- rigging pins D925252001 and D925252003

- (4) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
- (5) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### K. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close doors and access panels.
- (3) Close floor panels.
- (4) Remove access platforms.

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### MECHANICAL CONTROL - ADJUSTMENT/TEST

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. Linkage Adjustment

##### A. General

For any important check after total removal of roll linkage, the adjustment procedure described below must be complied with.

After a partial removal or replacement of component, it is only necessary to immobilize linkage with rigging pins upstream and downstream of the replaced component.

WARNING : YAW MECHANICAL CONTROLS MUST BE CONNECTED TO SERVO CONTROL AND IN OPERATIONAL CONDITION.

##### B. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pin - Pitch/Roll Shaft	D925367000
Rigging pins - Set - Integral Trim Pitch/Roll/Yaw	D921277000
Rigging Pin - Mixing Unit Servo Control	D921310000

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DESCRIPTION	PART NO.
Rigging Pin - Torque Tube at RIBS 3 and 9	D921337000
Rigging Pin - Torque Tube at RIB24	D921311000
Rigging Pins - Synchro Pack	D925252000
Rigging Template - Integral Trim	D921250000
Zeroing Equipment - Elevons	D921354000
Protractor - Elevons and Rudder	TE2012000
Jig - Neutral Setting - Elevons at RIB3	D921303000
Jig - Neutral Setting - Elevons at RIB9	D921304000
Jig - Neutral Setting - Elevons at RIB24	E920001000
Zero Rigging Device Relay Chassis	E925019000
Test Set - Zero Setting - Resolvers	TE3016000
Ground Power Unit - Hydraulic Power and Preliminary Testing	EMH398E
Access Platforms 3.220 m (10 ft. 7 in.) 3.084 m (10 ft. 1 in.)	
Electrical Ground Power Unit	
Lockwire Dia 0.041 in. (1 mm) Corrosion Resistant Steel	

### C. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) On overhead panel, on Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position.
- (3) Depressurize Green, Blue and Yellow hydraulic systems (Ref. 29-11-00, Servicing - 29-12-00, Servicing and

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29-21-00, Servicing).

**WARNING :** DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (4) Open the following access doors and panels. They correspond to the Flight Control mechanical linkage components.  
(Ref. Fig.501 and 502)

ITEM	DESIGNATION	ACCESS
1	Torque tube	113DB
2	Torque tube	121AB
3	Integral Trim Assembly	121DB
4	AP Force Limiter	121FB
5	Synchro Pack	121FB
6	Load Limiting Mechanism	121GB
7	PFCU - R3	553JB
8	PFCU - R3	553KB
9	Control rod and Bellcrank at wing RIB3	544CB
10	Control rod and Bellcrank at wing RIB6	543BB
11	PFCU - R9	552JB
12	PFCU - R9	552KB
13	Control rod and Bellcrank at wing RIB9	543AB
14	Control rod and Bellcrank at wing RIB22	542AB
15	PFCU - R24	551JB
16	PFCU - R24	551KB
17	Control rod and Bellcrank at wing RIB26	541AB
18	Bulkhead pressure seal connection	151DB
19	Control rod and Bellcrank at wing RIB26	641AB
20	PFCU - R24	651JB
21	PFCU - R24	651KB
22	Control rod and Bellcrank at wing RIB22	642AB
23	Control rod and Bellcrank at wing RIB9	643AB
24	PFCU - R9	652JB
25	PFCU - R9	652KB
26	Control rod and Bellcrank at wing RIB6	643BB
27	Control rod and Bellcrank at wing RIB3	644BB

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ITEM	DESIGNATION	ACCESS
28	PFCU - R3	653JB
29	PFCU - R3	653KB
30	Control rod and Bellcrank at wing RIB15	536CT
31	Control rod and Bellcrank at wing RIB19	535DT
32	Cabin bulkhead pressure seal connection	241KF
33	Mixing unit	241JF
34	Mixing unit	241HF
35	Cabin bulkhead pressure seal connection	242KF
36	Control rod and Bellcrank at wing RIB19	635DT
37	Control rod and Bellcrank at wing RIB15	636CT

### D. Adjustment in Fuselage Front Section

**WARNING** : UNLESS OTHERWISE SPECIFIED IN THE TEXT ALL ADJUSTMENT OPERATIONS SHALL BE CARRIED OUT WITHOUT HYDRAULIC AND ELECTRICAL POWER.

**NOTE** : Scrupulously follow order of operations described below. All adjustable rods are removed.

- (1) Immobilize roll torque tube with rigging pin D925367000.
- (2) Immobilize integral trim assembly in zero position ; to do this, rotate control knob on centre console until rigging pin D921277000 can be easily inserted on input lever.
- (3) Install equipment D921250000. Check that spring rod is not compressed. Pin must be inserted without rod piston displacement.
- (4) Remove link rod, between torque tube and integral trim, assigned to Captain's side and install it on First Officer's side. Adjust its length and wirelock its adjustable ends (Ref. 20-21-13).

**NOTE** : To install or remove link rod attachment bolts, it is necessary to depress the plunger located on head of bolt in order to free the retaining balls.

- (5) Remove this rod and install it on Captain's side. Install bolts on its ends.  
On torque tube side, torque to between 27 and 32 lbf. in. (0.30 and 0.36 m.daN).

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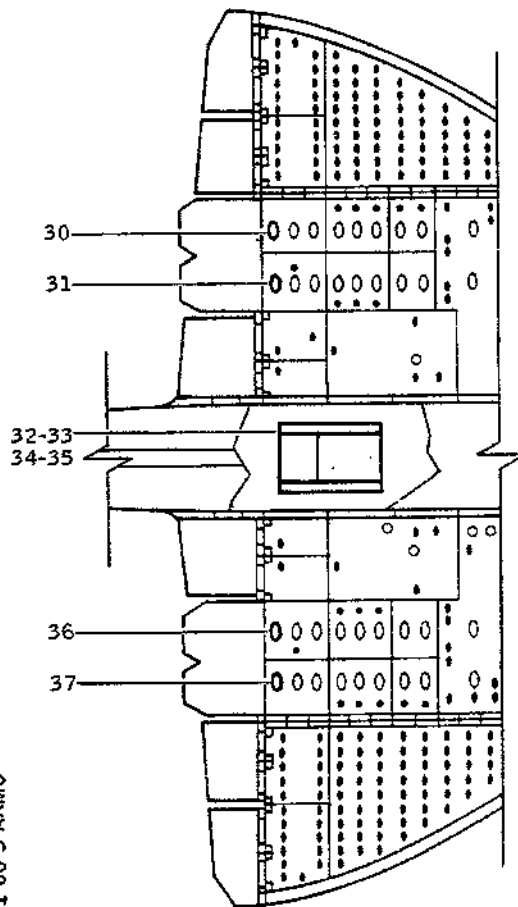
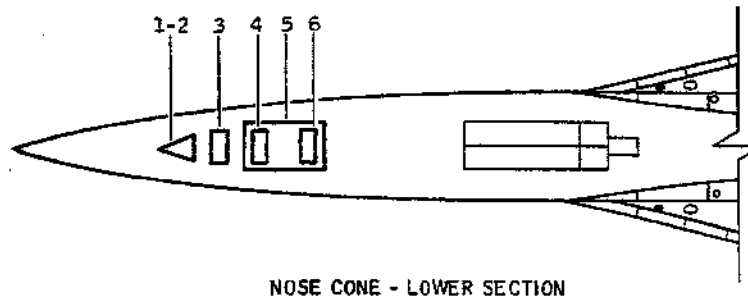
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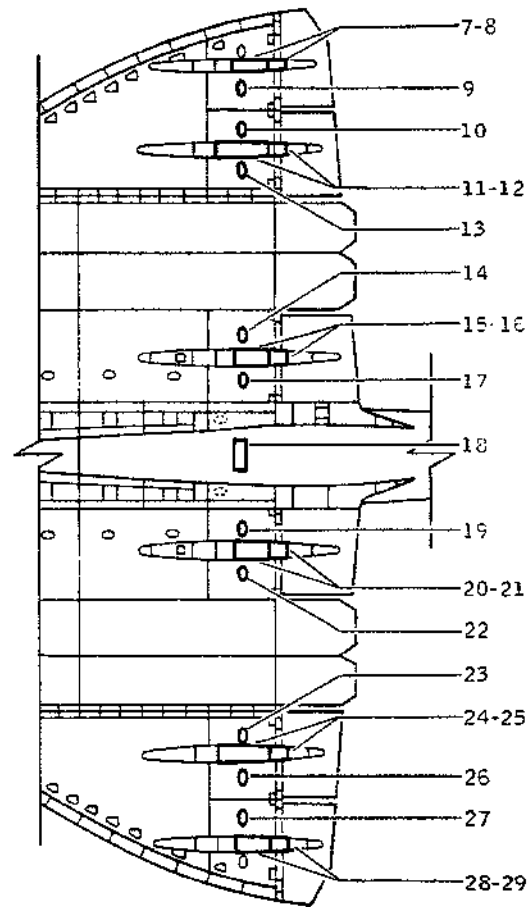
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WING - UPPER SURFACE



WING - LOWER SURFACE

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Access to Flight Controls  
Figure 501

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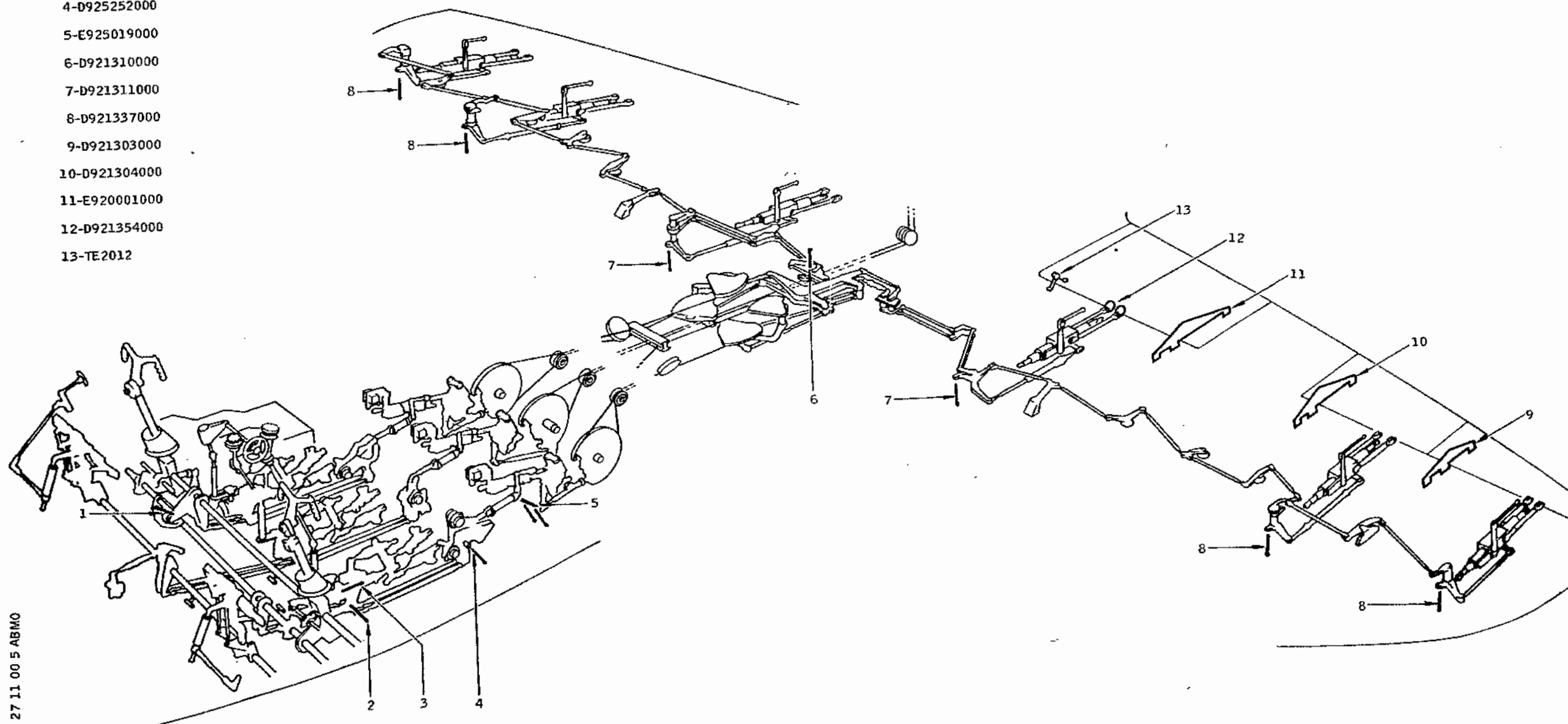
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- 1-D925367000
- 2-D921277000
- 3-D921250000
- 4-D925252000
- 5-E925019000
- 6-D921310000
- 7-D921311000
- 8-D921337000
- 9-D921303000
- 10-D921304000
- 11-E920001000
- 12-D921354000
- 13-TE2012



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Rigging Pins and Equipment for Mechanical  
Adjustment of Flight Controls  
Figure 502

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On integral trim side, torque to between 45 and 50 lbf.in. (0.52 and 0.60 m.daN). Safety with cotter pin.

- (6) Install rod assigned to First Officer's side.  
If necessary adjust rod length and wirelock its adjustable ends (Ref. 20-21-13).  
Install bolt on its attachment ends and torque to the same values as for Captain's side rod. Safety with cotter pin.  
Install safety attachments and coupling clamps.  
Torque coupling clamp attaching nuts to between 12 and 15 lbf.in. (0.15 and 0.18 m.daN).
- (7) Remove rigging pin D921277000 from input lever of integral trim assembly. Remove equipment D921250000.
- (8) Adjust cable tension on control column as follows :
  - (a) Tighten cables to a tension value of approximately 90 daN (202.7 lbf). Remove rigging pin D925367000. Operate control handwheel from stop to stop twenty times.
  - (b) Install rigging pin D925367000, release cable tension to approximately 60 daN (135 lbf). Remove rigging pin D925367000. Operate control handwheel from stop to stop twenty times.
  - (c) Install rigging pin D925367000. Finally adjust cable tension to a value of 33 plus or minus 3 daN (74.2 plus or minus 6.75 lbf). During this operation, check that marks engraved on handwheel line up with marks engraved on top of control column, plus or minus 1 mm (0.0394 in.). Remove rigging pin D925367000. Operate handwheel from stop to stop 10 times and check that cable tension remains within permissible limits.
- (9) Immobilize roll torque tube with rigging pin D925367000. Check that marks engraved on handwheel line up with marks on top of control column within plus or minus 1 mm (0.0394 in.). Safety turnbuckles.
- (10) Immobilize input lever on integral trim assembly with rigging pin D921277000 and synchro pack with rigging pin D925252001.
- (11) Install link rods, between integral trim and synchro pack input levers.  
Adjust rod length until attachment bolts can be ins-

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talled easily. Tighten and safety adjustable ends with lockwire (Ref. 20-21-13).

Install bolts on their attachment ends and torque to between 27 and 32 lbf.in (0.30 and 0.36 m.daN). Safety with cotter pin.

Install safety attachments and coupling clamps.

Torque coupling clamp attaching nuts to between 12 and 15 lbf.in (0.15 and 0.18 m.daN).

Safety with cotter pin.

- (12) Remove rigging pin D921277000 from integral trim input lever.
- (13) Install equipment E925019010 under relay chassis ; with rigging pins E925019105 immobilize rod E925019013 connecting equipment support to load limiting mechanism lever.
- (14) Install AP force limiter. Tighten attachment bolt nuts: on synchro pack side, torque to between 45 and 50 lbf.in (0.52 and 0.60 m.daN). On relay jack side, torque to between 27 and 32 lbf.in (0.30 and 0.36 m.daN). Safety with cotter pin.
- (15) Remove rigging pin E925019105 from load limiting mechanism lower lever.
- (16) Connect hydraulic ground power unit EMH398E to relay jack and pressurize the latter.
- (17) Make certain that rigging pin E925019105 on load limiting mechanism can be inserted and removed freely. If not, adjust length of AP force limiter as follows :
  - (a) Cut and remove lockwire and unscrew lock nut on adjustable end, disengage lock washers.
  - (b) Maintain special washer inserted in groove provided on outer sleeve and rod stem.
  - (c) Manually rotate rod stem and outer sleeve to lengthen or shorten AP force limiter until rigging pin E925019105 can be inserted or removed freely.
  - (d) Make certain that special washer is inserted in groove of rod stem and outer sleeve.
  - (e) Engage lock washer with tab in slot provided on front face of special washer.
  - (f) Engage second lock washer.

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- (g) Tighten lock nut of adjustable end.  
Torque to between 80 and 90 lbf.in (0.9 and 1 m.daN). Wirelock (Ref. 20-21-13).
- (18) Check adjustment of relay jack sensor (Ref. 22-13-61, Adjustment/Test).
- (19) Remove equipment E925019013, E925019010 and rigging pins D925367000 and D925252001.
- (20) Depressurize relay jack and disconnect hydraulic ground power unit from relay jack.
- (21) Connect the aircraft hydraulic lines to the Relay Jack as follows :
  - (a) Maintain adapters screwed in Relay Jack using appropriate wrench.
  - (b) Torque hydraulic line union nuts to between the following values :
    - Blue Pressure - 1.51 and 1.63 m.daN (11.1372 and 12.0223 lbf. ft.)
    - Blue Return - 1.92 and 2.15 m.daN (14.1612 and 15.8576 lbf. ft.)
    - Green Pressure - 1.51 and 1.63 m.daN (11.1372 and 12.0223 lbf. ft.)
    - Green Return - 1.92 and 2.15 m.daN (14.1612 and 15.8576 lbf. ft.)
    - Yell/Green Pressure - 2.43 and 2.76 m.daN (17.9228 and 20.3567 lbf. ft.)
    - Yellow Return 2.43 and 2.76 m.daN (17.9228 and 20.3567 lbf. ft.)
    - Yellow/Blue Pressure 2.43 and 2.76 m.daN (17.9228 and 20.3567 lbf. ft.)

### E. Adjustment in Fuselage

(Ref. 27-11-00, Removal/Installation).

### F. Linkage Adjustment in Wings (Ref. Fig. 503 )

**WARNING** : WHEN ELEVONS ARE NOT CONNECTED TO SERVO CONTROLS THEY MUST BE MAINTAINED WITHIN THE STRUCTURAL DEFLECTION LIMITS BY MEANS OF THE ZEROING EQUIPMENT D921354000 OR USING STANDS IF AIRCRAFT IS ON JACKS.

FEEDBACK LINKS MUST BE DISCONNECTED FROM STRUCTURE

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AS LONG AS POWER FLIGHT CONTROL UNIT (PFCU) ADJUSTMENT IS NOT CARRIED OUT.

- (1) In the event of a total linkage removal ; install fixed rods according to their previous position (Ref. Following paragraph).  
Install attachment bolts and nuts. Safety with cotter pin.

NOTE : On mixing unit bellcrank the attachment bolt of RH upper rod (13) is installed upside down.

- (2) Fixed rods location and length in wings :

- Rod (1), between RIB3 - RIB6 RH wing 1250.5 mm (49.2 in.)
- Rod (3), between RIB9 - RIB10 RH wing 675.2 mm (26.57 in.)
- Rod (4), between RIB10 - RIB14 RH wing 1376.6 mm (54.2 in.)
- Rod (6), between RIB18 - RIB22 RH wing 1417.5 mm (55.8 in.)
- Rod (7), between RIB22 - RIB24 RH wing 702.5 mm (27.61 in.)
- Lower rod (8) between RIB24 - RIB26 RH wing 1102.8 mm (43.4 in.)
- Lower rod (10) between RIB26 - RH pressure seal 944 mm (37.2 in.)
- Upper rod (11) between RIB26 - RH pressure seal 865.4 mm (34.07 in.)
- Lower rod (12) (spring rod) between RH pressure seal and Mixing unit 857.9 mm (33.77 in.)
- Upper rod (13) between RH pressure seal and Mixing unit 933.3 mm (36.74 in.)
- Lower rod (14) (spring rod) between mixing unit and LH pressure seal 761 mm (29.96 in.)
- Upper rod (15) between mixing unit and LH pressure seal 843 mm (33.19 in.)
- Lower rod (16) between pressure seal and LH RIB26 119.8 mm (4.09 in.)
- Upper rod (17) between pressure seal and LH RIB26 1039.5 mm (40.925 in.)
- Lower rod (18) between RIB26 - RIB24, LH wing, 777.2 mm (30.6 in.)
- Rod (20) between RIB24 - RIB22, LH wing, 796.2 mm (31.347 in.)
- Rod (21) between RIB22 - RIB19, LH wing, 1427.5 mm (56.2 in.)
- Rod (23) between RIB15 - RIB11, LH wing, 1366 mm (53.76 in.)
- Rod (24) between RIB11 - RIB9, LH wing, 570 mm

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- (22.45 in.)
- Rod (26) between RIB6 - RIB3, LH wing, 1263.4 mm (49.74 in.)
- (3) Adjustable rod location and theoretical length in wing :
- Rod (2), between RIB6 - RIB9 RH wing 1252.11 mm (49.3 in.)
  - Rod (5), between RIB15 - RIB19 RH wing 1417.5 mm (55.8 in.)
  - Upper rod (9), between RIB24 - RIB26 RH wing 1102.8 mm (43.4 in.)
  - Upper rod (19), between RIB26 - RIB24 LH wing 777.2 mm (30.6 in.)
  - Rod (22), between RIB19 - RIB15 LH wing 1428 mm (56.22 in.)
  - Rod (25), between RIB9 - RIB6 LH wing 1257.5 mm (49,5 in.)
- (4) Immobilize Roll and Pitch synchro packs with rigging pins D925252001 and D925252003.
- (5) Immobilize mixing unit with rigging pin D92131000.
- (6) Immobilize rod and bellcrank at RIB24 in RH and LH wings with rigging pin D921311000.
- (7) Install adjustable rods between rod and bellcrank assemblies at RIB26 and at RIB24. Adjust rod length until attachment bolts can be inserted freely. Install bolts and nuts and safety with cotter pin.
- (8) Remove pin D921311000 at RIB24. Immobilize rod and bellcrank at RIB9 in LH and RH wings with rigging pin D921337000.
- (9) Install adjustable rods between rod and bellcrank assemblies at RIB15 and at RIB19. Adjust rod length until attachment bolts can be inserted freely. Install bolts and nuts and safety with cotter pin.
- (10) Remove rigging pin D921310000 from mixing unit. Immobilize rod and bellcrank at RIB3 in LH and RH wing with rigging pin D921337000.
- (11) Install adjustable rod, between rod and bellcrank at RIB6 and at RIB9. Adjust rod length until attachment bolts can be inserted freely. Install bolts and nuts and safety with cotter pin.

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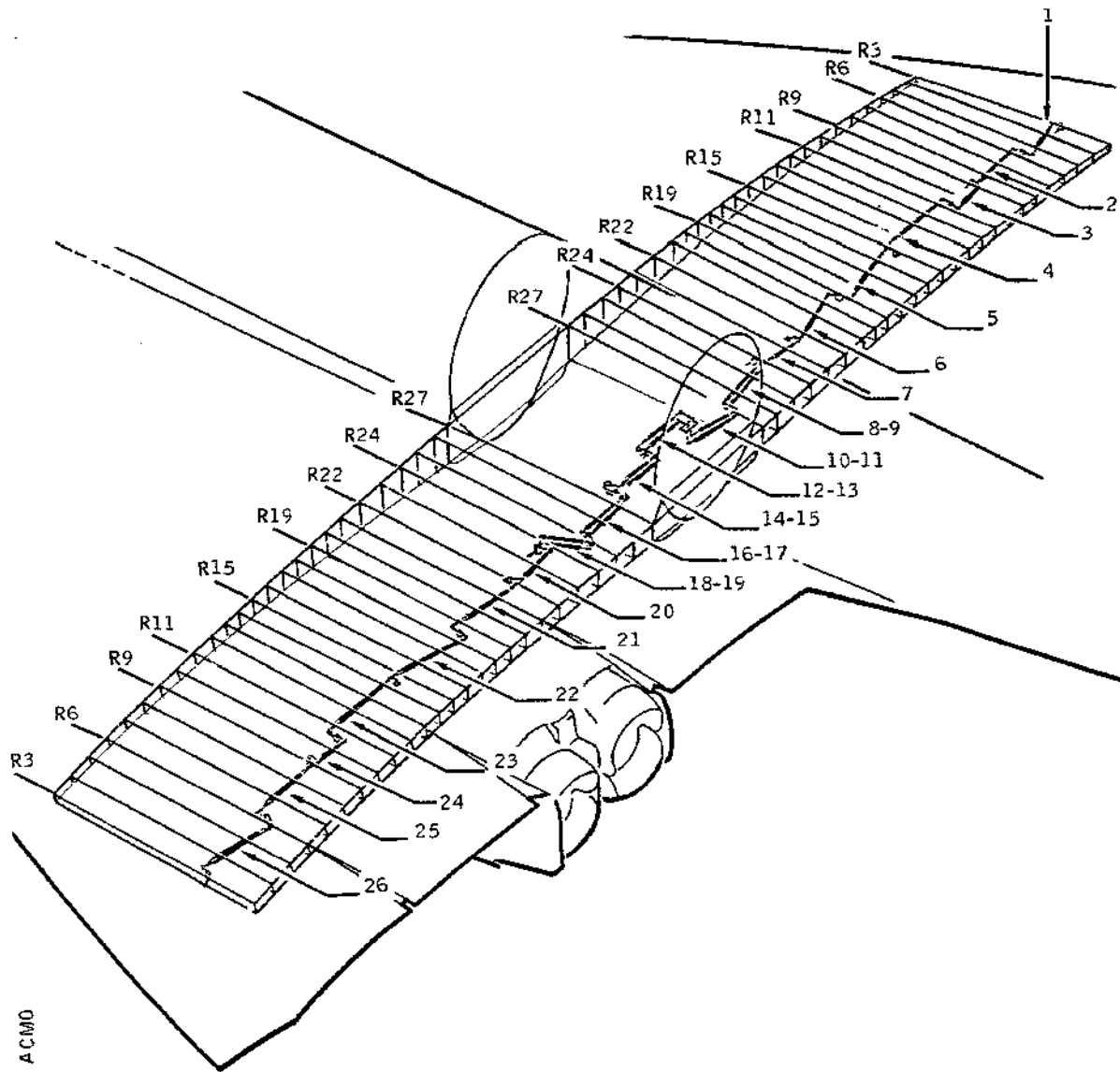
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Linkage Location in Wings  
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- (12) Remove rigging pins D921337000 from rod and bellcrank assemblies at RIB9 and RIB3.
- (13) Install equipment E92000100 - D921303000 - D921304000, on wings. Position elevons so that they touch the neutral setting elevon jig. Install elevon zeroing equipment D921354000.
- (14) Install protractors TE2012000 and set them to zero.
- (15) Remove equipment E920001000 - D921303000 - D921304000 and elevon zeroing equipment D921354000.
- (16) Manually or by means of any appropriate equipment fully deflect elevons in both directions so that they reach an angular value (read on protractor) of at least :
  - 22° 16 minutes, nose up and nose down, for inner elevons
  - 27° 30 minutes, nose up and nose down, for outer and middle elevons.

NOTE : During this operation, do not exceed required angles in order not to damage upper protective strip when in nose up configuration and so that elevon does not rest on structural stop when in nose down configuration.

- (17) Support elevon approximately to zero.
- (18) Set eccentric bush, PFCU LH side, to zero. Marks engraved on bush and on body. Install back-up washers, LH rods connecting PFCUs to elevons. Tighten attachment nuts. Torque to between 9.2 and 16.6 m.daN (68 and 118 lbf.ft.). Safety with cotter pin.

NOTE : Correct thickness of shim washers to obtain required torque value.

- (19) Install back-up washers, and RH rods. On PFCU RH trunnion, adjust eccentric bush so that rod can be installed freely. In the event that eccentricity of RH bush is insufficient adjust LH bush so as to obtain required rod end fitting centre-to-centre distance. Tighten attachment nuts. Torque to between 9.2 and 16.6 m.daN (68 and 118 lbf.ft.). Safety with cotter pin.

NOTE : Correct thickness of shim washers to obtain required torque value.

- (20) Manually or by means of any appropriate equipment de-

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flect elevons from one PFCU stop to the other.  
Check on protractors that deflection angles are not greater than :  
20° 46 minutes plus or minus 30 minutes in nose up and nose down direction for inner elevons  
25° 45 minutes plus or minus 30 minutes in nose up or nose down direction for outer and middle elevons.

- (21) Return elevon to neutral, install zeroing equipment D921354000.
- (22) Adjust PFCU input lever actuating rods to their theoretical length :  
789.2 mm (31.07 in.) RIB24  
853.1 mm (33.59 in.) RIB9  
690.7 mm (27.2 in.) RIB3
- (23) Install these rods.  
Tighten and safety attachment bolts.  
At RIBS9 and 3 torque to between 0.31 and 0.37 m.daN (27.31 and 32.733 lbf.in.). Safety with cotter pin.  
At RIB24, torque to between 0.26 and 0.30 m.daN (23 and 26.541 lbf.in.). Safety with cotter pin.  
  
NOTE : On control rod and bellcrank side at RIBS24 and 9, PFCU lever actuating rod attachment bolts are installed upside down.
- (24) Install rigging pin D921310000 and remove zeroing equipment D921354000. Position elevons at PFCU lower stop.
- (25) Make certain that elevon travel range is clear.
- (26) Remove warning notices.
- (27) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing)
- (28) Remove rigging pin D921310000 and adjust, if necessary, length of PFCU input lever actuating rods to set protractor to zero plus or minus 2 minutes.
- (29) Remove rigging pins D925252001 and D925252003 from synchro packs.
- (30) Turn control handwheel in both directions up to stop and check elevons for deflection angles :  
14° plus or minus 25 minutes for inner elevons  
20° plus or minus 30 minutes for outer and middle elevons.

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Carry out these operations and note readings at least three times.

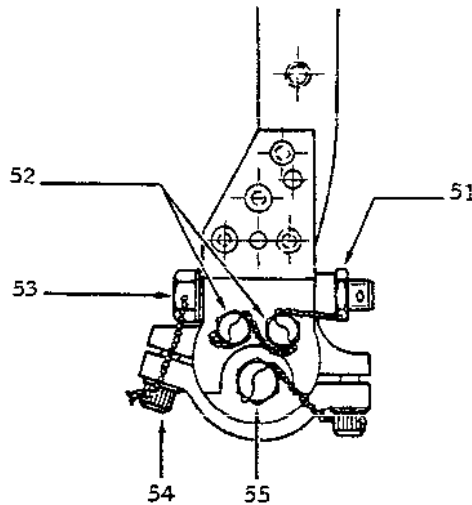
**NOTE :** In the event that these deflections could not be obtained, adjust length of lever arm on cable tension regulator located in zone 121.

(31) Immobilize roll and pitch synchro packs with rigging pins D925252001 and D925252003 and mixing unit with rigging pin D921310000.

(32) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).

(33) Do not remove protractors (TE2012000) and carry out PFCU resolver electrical zero adjustment.

G. Adjustment of PFCU resolver electrical zero  
(Ref. Fig. 504 )



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Resolver Electrical Zero Adjustment  
Figure 504

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- (1) Make certain that Pitch and Roll resolvers and mixing unit are immobilized with rigging pins. If not ;
  - (a) Set Flight Controls in mechanical mode, (Ref. 27-00-00, Servicing) and immobilize Pitch and Roll resolvers with rigging pins D925252991 and D925252003 and mixing unit with rigging pin D921310000.
  - (b) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight controls in mechanical mode).
- (2) Disconnect electrical connectors from PFCUs and connect electrical connectors of Test set TE3016000 to PFCUs.
- (3) Position elevons to neutral, and maintain them in this position by means of zeroing equipment D921354000. In the event that protractors have been removed or are out of adjustment, proceed as follows :
  - (a) Install neutral setting jigs E920001000, D921303000 and D921304000.
  - (b) Lock each elevon in zero position by means of zeroing equipment D921354000. When locked, check that elevon is in contact with neutral setting jig pick up.
  - (c) Install protractors TE2012000 and set to zero
  - (d) Remove neutral setting jigs E920001000, D921303000 and D921304000.
- (4) Connect to structure PFCU resolver feedback link bolt attachment plates. Do not safety.
- (5) Proceed with resolver zero electrical adjustment of each PFCU as follows :
  - (a) Unsafety nuts and bolts (51), (52), (54), (55).
  - (b) Slightly loosen bolts (52), (54) and (55).
  - (c) Loosen nut (51) in order to be able to turn bolt (53) with slight resistance.
  - (d) Turn bolt (53) in appropriate direction until test set TE3016000 indicator pointer indicates 0° plus or minus 2 minutes. At the same time gradually increase test set sensitivity to maximum.

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- (e) Tighten nut (51).  
Torque to between 13 and 15 lbf.in. (0.15 and 0.17 m.daN).
  - (f) Make certain that electrical zero has not varied.
  - (g) Tighten bolts (52) and (54).  
Torque to between 6 and 8 lbf.in. (0.07 and 0.09 m.daN).
  - (h) Tighten bolt (55).  
Torque to between 23 and 25 lbf. in. (0.259 and 0.282 m.daN).
  - (i) Wirelock bolts (52), (54) and (55) and nut (51)  
(Ref. 20-21-13).
- (6) Disconnect resolver feedback link bolt attachment plates from structure.
  - (7) Disconnect test set from PFCU.
  - (8) Connect aircraft electrical connectors to PFCU.
  - (9) Remove zeroing equipment D921354000.
  - (10) Fully deflect elevon and check that, in both PFCU stop positions, feedback link can be connected easily to structure.

**WARNING** : IN PFCU STOP POSITIONS, MAKE CERTAIN BEFORE CONNECTING FEEDBACK LINK TO STRUCTURE THAT A CLEARANCE OF AT LEAST 1 mm (0.039 in.) IS OBTAINED BEFORE RESOLVERS REACH THEIR INTERNAL STOPS.

- (11) Attach to structure link bolt attachment plates.
- (12) Check that elevon travel range is clear.
- (13) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).
- (14) Remove rigging pins D925252001 and D925252003 from synchro packs and D921310000 from mixing unit.
- (15) Operate control handwheel at least three times in both directions up to stop. Slowly release handwheel to neutral. Immobilize synchro packs with rigging pins D925252001 and D925252003. On protractors TE2012000 check elevon position : 0° plus or minus 2 minutes. If

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this value is outside tolerance, re-adjust PFCU resolver electrical zero.

- (16) Remove rigging pins D925252001 and D925252003 from synchro packs. Remove protractors TE2012000.
- (17) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing - Procedure to set Flight Controls in electrical mode).

### H. Close-Up

- (1) Clean relay jack, PFCUs and adjacent areas. Make certain that no trace of hydraulic fluid remains.
- (2) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (3) Close access doors and panels corresponding to the linkage components Ref. list C. (4).
- (4) Remove access platforms.

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### 2. Operational Test

#### A. General

The purpose of the test is to make certain that the linkage from controls to control surfaces operates correctly.

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph (Ref. page 501).
- (2) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (3) Check that roll and pitch trim controls are in zero position.

#### C. Test

- (1) Fully turn control handwheel to the left.  
Check on ICOVOL indicator (Flight Control Surface Position Indicator) :
  - that LH elevons deflect upwards and RH elevons downwards.
  - the deflections at maximum travel :
    - 14° plus or minus 25 minutes for inner elevons
    - 20° plus or minus 30 minutes for outer and middle elevons.
- (2) Fully turn control handwheel to the right.  
Check on ICOVOL indicator :
  - that RH elevons deflect upwards and LH elevons downwards
  - the deflections at maximum travel :
    - 14° plus or minus 25 minutes for inner elevons
    - 20° plus or minus 30 minutes for outer and middle elevons.
- (3) Release control handwheel to neutral position.
  - Check on ICOVOL indicator that elevons are in neutral position.

#### D. Close-Up

- (1) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing - Procedure to Set Flight Controls in Mechanical Mode).

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### 3. System Test

#### A. General

The purpose of the test is :

- (1) To check that control surface deflection values correspond to flight control displacement values.
- (2) To check that the load applied to components does not exceed the authorized values.

#### B. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins - Synchro Pack	D925252000
Protractor - Elevon and Rudder	TE2012000
Hand Equipment - Effort Measuring - Flight Control Linkages	TE3019000
Access Platforms : 3.220 m (10 ft. 7 in.) 4.337 m (14 ft. 7 in.)	

#### C. Prepare

- (1) Take the precautions described in the previous WARNING paragraph (Ref. page 501).
- (2) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (3) Check that roll and pitch trim controls are set to zero.
- (4) Open access panel 121FB and immobilize pitch and roll resolvers with rigging pins D925252003 and D925252001.
- (5) Install the following equipment :  
TE 2012000 on elevons  
TE 3019101 on Captain's control handwheel  
TE 3019213, TE 3019214 and TE 3019220 on First Officer's control handwheel

NOTE : Equip spring scale with a 50 daN blade

- (6) Set measuring equipment to zero.

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- (7) Remove rigging pins from synchro packs.

### D. Mechanical Mode Test

- (1) By means of equipment, installed on First Officer's control handwheel, fully turn control handwheel to the left.
- (2) Load applied to spring scale must be progressive and at a tangent to circumference described :  
Load must not exceed 16 daN (36lbf)
- (3) Note :
  - (a) Control handwheel deflection : 48° plus or minus 1° 30 minutes.
  - (b) Inner elevons deflection : 14° plus or minus 25 minutes.
  - (c) Outer and middle elevon deflection : 20° plus or minus 30 minutes.
- (4) Gradually release load on control handwheel which returns to neutral position.
- (5) Carry out the same operations and measurements in right turn direction.

### E. BLUE Electrical Mode Test

- (1) Set Flight Controls in BLUE electrical mode (Ref. 27-00-00, Servicing).
- (2) Repeat procedure described in paragraph "Mechanical mode Test".

### F. GREEN Electrical Mode Test

- (1) Set Flight Controls in GREEN electrical mode (Ref. 27-00-00, Servicing).
- (2) Repeat procedure described in paragraph "Mechanical mode Test".

### G. Close-Up

- (1) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing - Procedure to set Flight Controls in electrical mode).

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- (2) Remove equipment TE2012000 and TE3019000.
- (3) Close access panel 121FB.
- (4) Remove access platforms.

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### 4. Neutral Tolerance (Dead Play) Test

#### A. General

The purpose of this test is to check the elevon neutral tolerance ranges.

Before carrying out measurements, it is advised to operate Roll and Pitch controls several times.

#### B. Equipment and Materials

DESCRIPTION	PART NO.
Protractor - Elevon and Rudder	TE2012000
Rigging pins - Synchro Pack	D925252000
Access Platform 3.22 m (10 ft. 7 in.) 4.33 m (14 ft. 7 in.)	
Circuit Breaker Safety Clip	

#### C. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Set Flight Controls in Mechanical mode (Ref. 27-00-00, Servicing).
- (3) Check that Roll and Pitch trim controls are set to zero.
- (4) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
STICK SHAKER SUP	1-213	W 513	P15

- (5) Check that the following circuit breakers are set :

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW A SYS SUP	1-213	G 292	M17
ADC 1 28 V SUP		1F 74	P12
ADC 1 26 V SUP	2-213	1F 78	A 2
1ST PLT ADC INST SUP	2-213	1F 75	B 3
RH UC WEIGHT SW	2-213	G 294	B 9
ROLL ART FEEL COMP 1 SUP		1C 243	E 3
PITCH ART FEEL COMP 1 SUP		1C 244	E 4
ADC 1 115 V SUP		1F 73	F 3

(6) On ADC control panel (centre console).

(a) Place ADC 1 switch in ON position.

(b) Place ADC 1 TEST switches in position 1.

(b1) ADC 1 amber warning light must illuminate.

(b2) After 30 seconds approximately Blue TEST indicator light must illuminate.

(b3) Press then release ADC 1 amber warning light ; it must go off.

(7) On overhead panel, on ARTIFICIAL FEEL No.1 engage switch unit, engage ROLL and PITCH switches, they must remain engaged.

(8) Open panel 121FB, immobilize Pitch and Roll resolvers with rigging pins D925252001 and D925252003.

(9) Install protractors TE2012000, set them to zero.

(10) Remove rigging pins D925252001 and D925252003 from resolvers.

### D. Mechanical mode test.

(1) Turn control handwheel in left turn configuration, for an elevon deflection of 12° approximately.

(2) Slowly release control handwheel to neutral : Note on protractor positions of elevons.

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- (3) Repeat these operations in right turn configuration. Note on protractor position of elevons.
- (4) Carry out operations (1) to (3) at least three times. Average the readings of stop positions taken on protractor for each direction of operation. Check that the average stop values of elevons are in a range of plus or minus 30 minutes maximum.
- (5) In the event that the neutral tolerance ranges are greater than the value indicated above (plus or minus 30 minutes), inspect for chafing along linkage.

### E. BLUE electrical mode test.

- (1) Set Flight Controls in BLUE electrical mode (Ref. 27-00-00, Servicing).
- (2) Repeat procedure described in paragraph :  
"Mechanical Mode Test."  
Neutral tolerance range : plus or minus 15 minutes maximum.

### F. GREEN electrical mode test.

- (1) Set Flight Controls in GREEN electrical mode (Ref. 27-00-00, Servicing).
- (2) Repeat procedure described in paragraph :  
"Mechanical Mode Test."  
Neutral tolerance range : plus or minus 15 minutes maximum.

### G. BLUE electrical mode with trim operation.

- (1) Set Flight Controls in BLUE electrical mode (Ref. 27-00-00, Servicing).
- (2) Place ADC 1 switch in OFF position.
- (3) Operate roll trim knob in left turn configuration.
- (4) Turn control handwheel in left turn direction.
- (5) Slowly release control handwheel to neutral position. Note on protractor stop position of LH middle elevon.
- (6) Repeat these operations in right turn direction and note protractor stop position of LH middle elevon.
- (7) Carry out these operations and measurements at least

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three times. Average the readings of stop positions taken on protractor for each direction of operation. Check that the average stop values of elevons are in a range of plus or minus 15 minutes maximum.

- (8) Repeat these operations with a trim operation in right turn configuration.

### H. GREEN electrical mode test with trim operation.

- (1) Set Flight Controls in GREEN electrical mode (Ref. 27-00-00, Servicing).
- (2) Repeat procedure of previous paragraph (BLUE electrical mode test with trim operation).

### I. Close-Up.

- (1) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing - Procedure to set Flight Controls in electrical mode).
- (2) Remove equipment TE2012000.
- (3) Remove safety clips and tag and set circuit breaker.
- (4) Remove access platform.

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### MECHANICAL CONTROL - INSPECTION/CHECK

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

General check of roll mechanical control cables and pulleys.

#### 2. Cables and Pulleys

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Zero Rigging Device - Relay Chassis	E925019000
Rigging Pin - Mixing Unit Servo Control	D921310000
Rigging Pins - Synchro Pack	D925252000
Access Platform - 3.672 m (12 ft.)	
Special Material (Ref. 20-30-00, No.124)	
Cleaning (Ref. 20-30-00, No.469)	
Circuit Breaker Safety Clips	

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### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Remove access panels 121GB and 121FB, to gain access to cable tension regulators and to resolvers.
- (3) Open door 151DB, depressurize Blue, Green and Yellow hydraulic systems.
- (4) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (5) Open floor panels : 215AF, 215BF, 221AF, 221DF, 221HF, 221LF, 221QF, 221UF, 221XF, 223AF, 223DF, 223LF, 223SF, 231AF, 231DF, 231GF, 231HF, 231JF, 233AF, 233BF, 233CF, 233FF, 233JF, 241AF, 241BF, 241EF, 241HF.

### C. Check

- (1) Two cables assembly  
(Ref. Fig.601 and 602)

#### (a) Cable wear

On cable lengths moving over pulleys and through fairleads.

(a1) Check cables for traces of wear. Wear must

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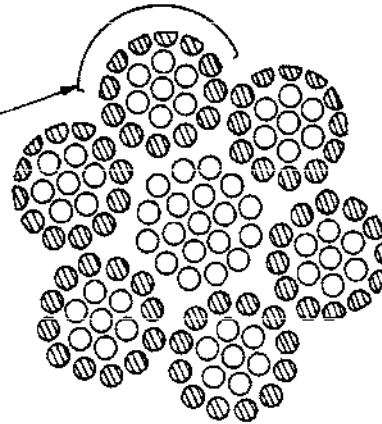
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TYPICAL OUTER WIRE WEAR AREA  
ON CABLE STRAND. HAIRLINE  
CRACKS BETWEEN WIRES OR  
FULLY BLENDED SURFACE APPEARANCE  
OF APPROXIMATELY SIX WIRES PER  
OUTER CABLE STRAND INDICATES  
50 PERCENT WIRE WEAR.



Cable Wear  
Figure 601

not exceed 50 % of the cross section of the wires in an outer strand.

(a2) Cables must not show excess of protective material ; abrasive particles could adhere to this surplus lubricant and cause damage to the cables.

(b) Broken wires

Cables must not show any broken wire.

(c) Corrosion

The cable lengths showing internal corrosion traces must be replaced (Ref. Removal/Installation).

In case of external corrosion traces, proceed as follows :

- Clean the cable with product No.469
- Coat the cable with a protective film of product No.124.

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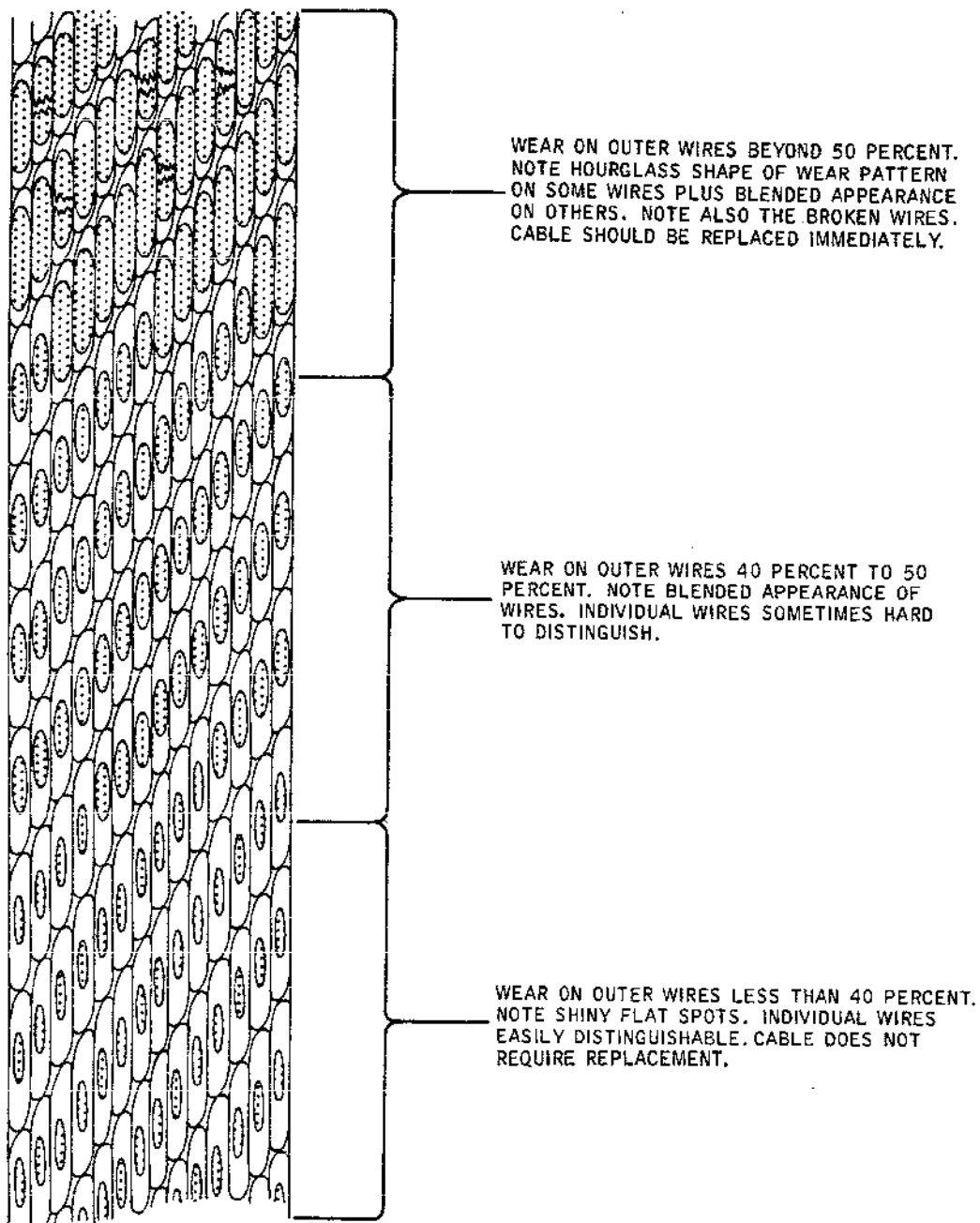
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Cable Check  
Figure 602

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### (2) RH Cable

- (a) Check the cable attachment to the tension regulator drum.
- (b) On the sleeves, make certain there is no sign of pulling out of cable by reference to painted mark.
  - Sleeve located between frames 15 and 16
  - Sleeve located between frames 20 and 21
  - Sleeve located between frames 50 and 51
  - Sleeve located between frames 54 and 55
- (c) On the cable junction fittings, make certain there is no sign of pulling out of cable by reference to painted mark and check the correct position of the lock pins.
  - Cable junction fitting located between frames 10 and 11
  - Cable junction fitting located between frames 42 and 43
- (d) On the turnbuckles, make certain there is no sign of pulling out of cable by reference to painted mark and check the correct position of locking clips.
  - Turnbuckle located between frames 52 and 53
  - Turnbuckle located between frames 64 and 65
- (e) Check the cable attachment to the mechanical mixing unit quadrant.

### (3) LH Cable

Carry out the same operations ; only the locations are different

- Sleeve between frames 17 and 18  
between frames 21 and 22  
between frames 51 and 52  
between frames 56 and 57
- Cable junction fittings  
between frames 12 and 13  
between frames 42 and 43
- Turnbuckles  
between frames 53 and 54  
between frames 65 and 66

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- (4) Guide pulleys between frames 9 and 10 and frames 67 and 68.
  - (a) Check that there are no wear traces on the pulley.
  - (b) Check that there is no play between the pulley and its shaft.
  - (c) Check the attachment and the correct position of the pulley cable guard.  
Clearance between pulley and cable guard must be between 0.022 and 0.06 in. (0.55 and 1.5 mm).
  - (d) Check that clearance between pulley and support flanges is 0.04 in. (1 mm) minimum.
- (5) Place a thermometer in the regulator adjacent area and note temperature. Indication read on regulator scale must be the same as that of graph, in relation with temperature noted.  
If not, adjust cable tension (Ref. 27-11-00, Removal/Installation).  
(Ref. Fig.603 and 604)
- (6) Set circuit breaker M626 on panel 15-216, Map Ref. F22
- (7) Remove warning notices.
- (8) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (9) Immobilize roll resolvers with rigging pin D925252001. Install tools E925019010 and 925019013 and immobilize roll control.
- (10) With rigging pin D921310000, make certain that mixing unit can be easily rigged. If rigging pin cannot be inserted, adjust cable tension (Ref. 27-11-00, Removal/Installation). Remove rigging pin D921310000.

**WARNING** : WHEN INSERTING AND REMOVING PINS TAKE ALL NECESSARY PRECAUTIONS IN ORDER TO AVOID INTRODUCING INADVERTENTLY TOOLS OR MISCELLANEOUS ITEMS IN MIXING UNIT.

- (11) Remove tools E925019013, E925019010 and rigging pin D925252001.
- (12) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).

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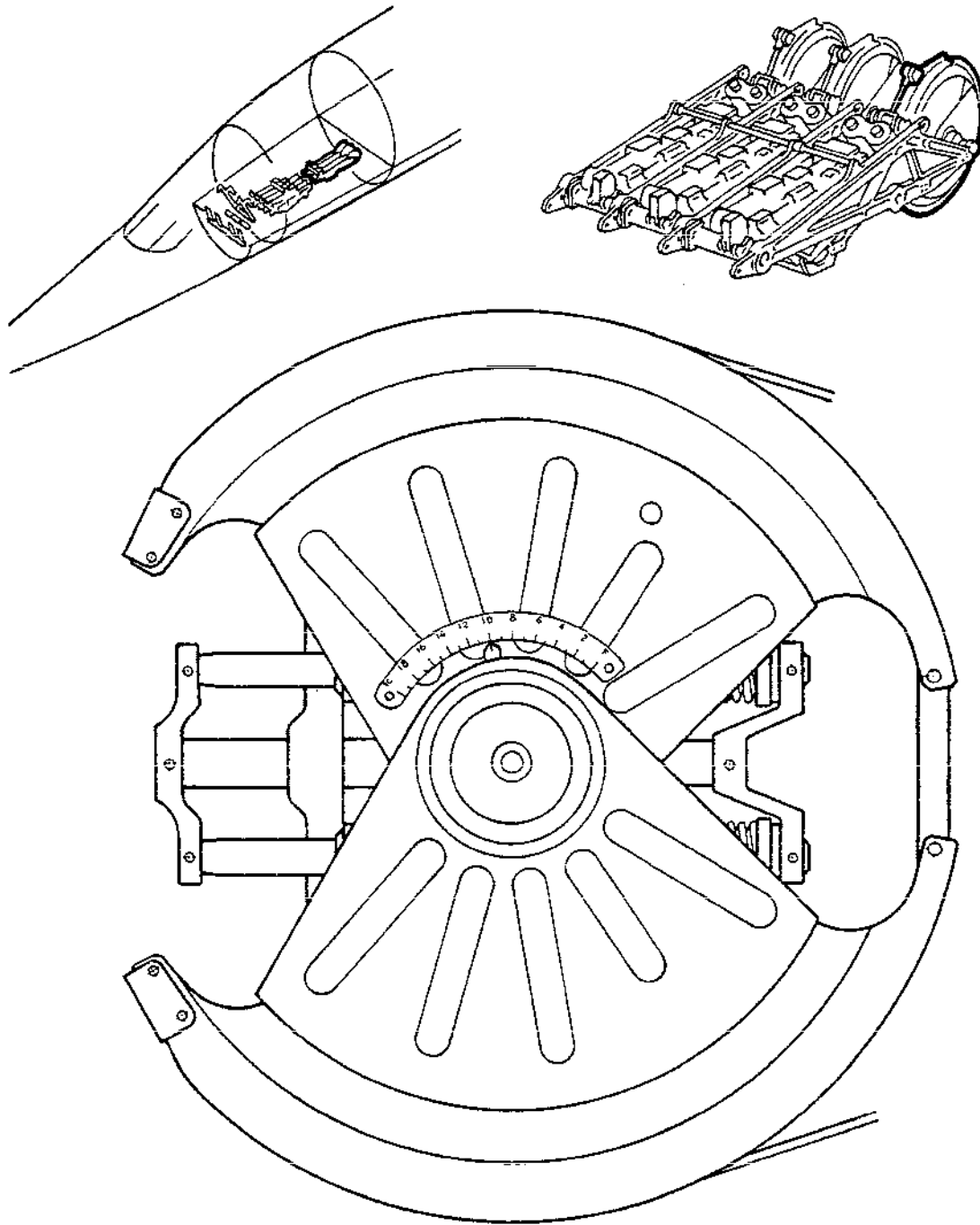
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Cable Tension Regulator  
Figure 603

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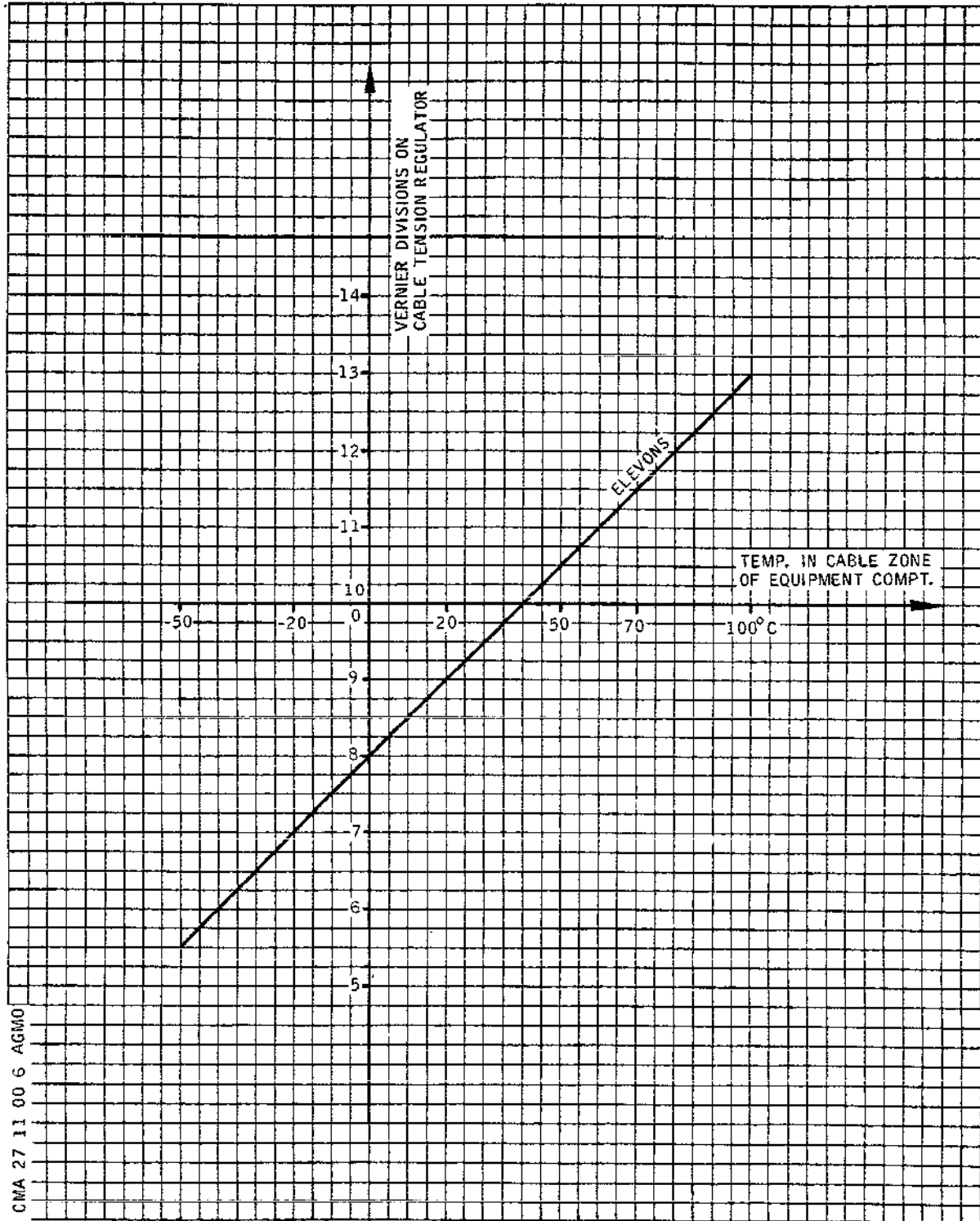
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Cable Tension Graph  
Figure 604

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### D. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close floor panels 215AF, 215BF, 221AF, 221DF, 221HF, 221LF, 221QF, 221UF, 221XF, 223AF, 223DF, 223LF, 223SF, 231AF, 231DF, 231GF, 231HF, 231JF, 233AF, 233BF, 233CF, 233FF, 233JF, 241AF, 241BF, 241EF, 241HF.
- (3) Close access doors and panels 121GB and 151DB.
- (4) Remove access platform.

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### HANDWHEEL - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The Captain's and First Officer's handwheels being similar, the removal/installation of the Captain's handwheel only will be described.

#### 2. Handwheel

##### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Access Platform 3.672 m (12 ft.)	
----------------------------------	--

Circuit Breaker Safety Clips	
------------------------------	--

##### B. Prepare

(1) Take the precautions described in the previous WARNING paragraph.

(2) Trip safety and tag the following circuit breakers :

EFFECTIVITY: ALL

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
No.1 INPH SUP	1-213	R 89	K19
**ON A/C ALL			
STICK SHAKER SUP	1-213	W 513	P15
SAFETY FLT CONT No.1 SUP		1C 651	S20
INS COMPTN SUP 3	2-213	F 3	A 6
ADI 1ST PLT INS 1 SUP & IND		1F 15	B 7
HSI TRUE 1ST PLT INS 1 SUP & IND		1F 21	B 6
No.2 INPH SUP	3-213	R 90	H 2
**ON A/C ALL			
SAFETY FLT CONT No.2 SUP	5-213	2C 651	D17
AP/FD COMP 1 SUP	13-215	1C 18	A 5
TRIM COM 1 SUP		1C 162	C 5
SAFETY FLT CONT COMP No.1		1C 652	E 6
115 V SUP			
SAFETY FLT CONT COMP No.1		1C 653	F 6
26 V SUP			
INS COMPTN SUP 2	13-216	F 2	B15
AP/FD COMP 1 SUP		2C 18	F18
TRIM COMP 2 SUP		2C 162	E16
SAFETY FLT CONT COMP No.2		2C 652	C17
115 V SUP			
SAFETY FLT CONT COMP No.2		2C 653	C16
26 V SUP			

- (3) Open access door 151DB : depressurize Green, Blue and Yellow hydraulic systems.

### C. Remove

- (1) Remove protective cover (1).
- (2) Remove cotter pins and unscrew nuts (2). Retain washers (3).
- (3) Loosen screws (4) and disconnect electrical connectors (5) and (6).

EFFECTIVITY: ALL

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(4) Remove handwheel carefully.

### D. Preparation of Replacement Component

### E. Install

(1) Make certain that the contact surfaces of electrical connectors (5) and (6) are clean and in good condition.

(2) Position the handwheel to the attachment studs. Connect up electrical connectors (5) and (6).

(3) Push the handwheel home on the studs.

(4) Install washers (3) and tighten nuts (2) : Torque to between 50 and 60 lbf.in. (0.58 and 0.7 m.daN). Safety with cotter pin.

(5) Tighten screws (4).

(6) Install protective cover (1).

### F. Tests

(1) Carry out tests (Ref. 27-11-11, Adjustment/Test).

(2) Check that circular clearance between protective casing and handwheel is not less than 0.05 in. (1.2 mm).

(3) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

(1) Close access door 151DB.

(2) Remove safety clips and tags and reset circuit breakers

(3) Remove access platform.

EFFECTIVITY: ALL

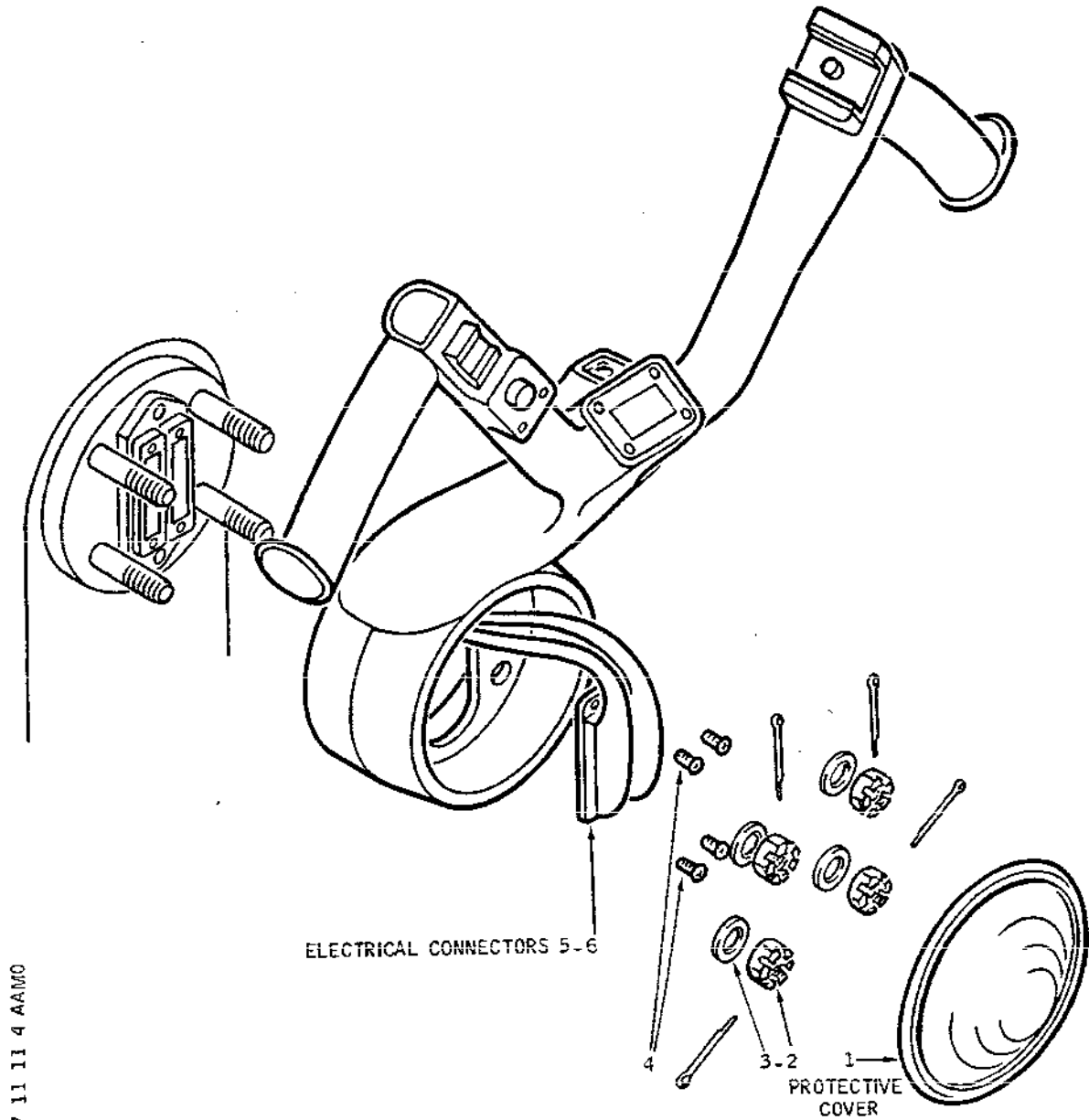
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## MAINTENANCE MANUAL



CMA 27 11 11 4 AAM0

Handwheel  
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EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### HANDWHEEL - ADJUSTMENT/TEST

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The tests described hereafter must be carried out after removal/installation of Captain's and First Officer's control column handwheels.

##### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Electrical Ground Power Unit	
------------------------------	--

Ground Power Unit - Hydraulic - Power and Preliminary Testing	
--	--

\*\*ON A/C ALL

2 Boom Headsets

##### B. Prepare

(1) Take the precautions described in the previous WARNING paragraph.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (2) The aircraft must be placed in ground configuration with shock absorbers compressed.
- (3) At centre console :
  - (a) On ADC control panel, make certain that :
    - ADC1 and ADC2 switches are in OFF position.
    - The TEST selector switches for ADC1 and ADC2 systems are in NORM position.
- (4) At overhead panel :
  - (a) On SERVO CONTROLS unit, make certain that the two selector switches are in NORMAL position.
  - (b) On RELAY JACK unit, make certain that switch is in NORM position.
  - (c) On Flight Control Unit, make certain that :
    - BLUE INVERTER and GREEN INVERTER switches are in PWR OFF position
    - OUTER AND MIDDLE ELEVONS and INNER ELEVONS switches are in MECH position
    - The two ANTI STALL SYSTEM switches are in OFF position.
- (5) On Captain's and First Officer's control handwheels, make certain that RAD-INT push-to-talk switches are in the intermediate position.
- (6) On Captain's and First Officer's audio selector panels (console 7-211) make certain that :
  - (a) All keys on keyboard are disengaged.
  - (b) All reception selection push-buttons are disengaged.
  - (c) The R/T-INT switch is in the intermediate position
  - (d) The BOOM-MASK selector switch is in BOOM position.
  - (e) The VOICE filter push-button is disengaged.
- (7) On Captain's side console (1-211) and First Officer's side console (2-212) make certain that :
  - (a) The LOUDSPEAKER ON-OFF switch is in OFF position..

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## MAINTENANCE MANUAL

(8) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
NAV-INS 1ST PLT SW SUP	1-213	1F 34	E15
ATT-INS 1ST PLT SW SUP		1F 13	G16
COMPASS COUPLER SYS1 SW SUP		1F 134	F14
RAD/INS 1ST PLT SW SUP		1F 26	G17
ATT/INS 1ST PLT SW SUP		R 89	K19
**ON A/C ALL			
INNER ELVN CONT & MON GRN SUP1		1C 53	M11
MID & OUTER ELVN CONT & MON GRN SUP		1C 55	M12
OUTER ELEVON NEUTRLN GRN SUP		1C 58	M13
INNER ELEVON CONT & MON GRN SUP2		1C 59	M14
P.F.C.S. INV GRN FAIL IND		1C 73	M15
LH UC WEIGHT SW "A" SYS SUP		G 292	M17
RH UC WEIGHT SW "A" SYS SUP		G 295	M18
AUDIO WARN SYS SUP1		W 371	M21
RUDDER CONT & MON GRN SUP		1C 62	N11
RUDDER MON LOGIC GRN SUP		1C 63	N12
P.F.C.S. ALL SURFACES MON GRN SUP		1C 54	N13
P.F.C.S. INV BLUE FAIL SUP		1C 67	N14
P.F.C.S. INV GRN PROTN CONT		1C 68	N15
RELAY JACK HYD SEL IND & SUP		C 281	N17
P.F.C. IND		C 287	N18
N.W.S. SUP1		W 252	N21
P.F.C.S. INV GRN SUP		1C 66	P11
ADC1 28 V SUP		1F 74	P12
WARN 8 LDG DISPLAY SUP1		1C 192	P13
WARN 8 LDG DISPLAY SUP2		1C 193	P14
YELL/GRN - GRN FAIL - PFC & RELAY JACK "A" SYST CONT		C 285	P16
YELL/BLUE BLUE FAIL - PFC & RELAY JACK "A" SYST CONT		C 286	P17
YELL LL PFC & RELAY JACK "A" SYST CONT		C 288	P18
TRIM 1 CONT		1C 161	Q11
AP/FD SYS1 CONT		1C 17	Q13
FD1/FD2 1ST PLT SW SUP		1C 27	Q15
FLT CONT POSN IND CONT		C 83	R11
SAFETY FLT CONT No.1 SUP		1C 651	S20

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## MAINTENANCE MANUAL

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
1ST PLT ADC INST SUP	2-213	1F 75	B 3
ADC1 26 V SUP		1F 78	A 2
FLT CONT POSN IND 26 V		C 84	B 4
400 Hz SUP			
INS COMPTN SUP2		F 3	A 6
AD1 1ST PLT INS1 SUP & IND		1F 15	B 7
LAT ACCELMTR1 26 V SUP		1C 42	A 4
HSI TRUE 1ST PLT INS1 SUP & IND		1F 21	B 6
OUTER ELEVON AMP BLUE SUP		2C 44	C 1
INNER ELEVON BLUE CONT SUP		2C 94	C 2
MID ELEVON AMP BLUE SUP		2C 93	C 3
MID & OUTER ELEVON BLUE CONT SUP		2C 92	C 4
AP/FD SYS1 SUP		1C 20	C 5
INNER ELEVON MON BLUE SUP		2C 47	D 1
MID & OUTER ELEVON MON BLUE SUP		2C 46	D 2
RUDDER MON BLUE SUP		2C 49	D 3
RUDDER BLUE 26 V 1800 Hz CONT SUP		2C 76	D 4
P.F.C.S. INV BLUE PROTN SUP		2C 71	D 5
AUTO STAB1 COMP SUP		1C 37	E 5
INS1 HTR SUP		1F 14	E 6
ADC1 115 V SUP		1F 73	F 3
LDG DISPLAY SYS1 SUP		1C 191	F 4
INS1 SUP		1F 20	F 6
COMPASS COUPLER 1 SUP		1F 130	F 8
INNER ELEVON MON GRN SUP		1C 47	G 1
MID & OUTER ELEVON MON GRN SUP		1C 46	G 2
RUDDER MON GRN SUP		1C 49	G 3
RUDDER GRN 26 V 1800 Hz CONT SUP		1C 76	H 6
P.F.C.S. INV GRN PROTN SUP		1C 71	G 5
OUTER ELEVON AMP GRN SUP		1C 44	E 1
INNER ELEVON GRN CONT SUP		1C 94	F 1
MID ELEVON AMP GRN SUP		1C 93	F 2
MID & OUTER ELEVON GRN CONT SUP		1C 92	H 5
YELL L/LEVEL PFC & RELAY	3-213	C 282	A 8
JACK "B" SYST CONT			
YELL/GRN GRN FAIL PFC &		C 283	A 9

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## MAINTENANCE MANUAL

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RELAY JACK "B" SYST CONT YELL/BLUE BLUE FAIL PFC & RELAY JACK "B" SYST CONT LH UC WEIGHT SW "B" SYS SUP RH UC WEIGHT SW "B" SYS SUP No.2 INPH SUP		C 284 G 293 G 294 R 90	A10 B 8 B 9 H 2

\*\*ON A/C ALL

AP/FD SYS2 CONT	5-213	2C 17	A11
FD1/FD2 2ND PLT SW SUP		2C 27	A13
WARN & LDG DISPLAY 2 SUP1		2C 192	B11
WARN & LDG DISPLAY 2 SUP2		2C 193	B12
TRIM 2 CONT		2C 161	B13
P.F.C.S. INV BLUE SUP		2C 66	B14
RUDDER CONT & MON BLUE SUP		2C 62	C11
RUDDER MON LOGIC BLUE SUP		2C 63	C12
P.F.C.S. IN GRN FAIL SUP		1C 67	C13
P.F.C.S. INV BLUE PROTN CONT		2C 68	C14
AUDIO WARN SYS SUP2		W 372	C17
INNER ELEVON CONT & MON BLUE SUP1		2C 53	D11
MID & OUTER ELEVON CONT & MON BLUE SUP		2C 55	D12
OUTER ELEVON NEUTRLN BLUE SUP		2C 58	D13
INNER ELEVON CONT & MON BLUE SUP2		2C 59	D14
M.W.S. SUP2		W 251	D15
SAFETY FLT CONT No.2 SUP		2C 651	D17
P.F.C.S. INV BLUE FAIL IND		2C 73	E11
P.F.C.S. ALL SURFACES MON BLUE SUP		2C 54	E11
ADC2 28 V SUP		2F 74	F12
AP/FD COMP1 SUP	13-215	1C 18	A 5
P.F.C.S. TEST UNIT AC SUP		C 113	A 6
AFCS MODE SYS1 LTS SUP		1C 273	B 5
COMPASS COUPLER 2 ST BY SUP		2F 131	B 7
TRIM COMP 1 SUP		1C 162	C 5
AT SYNCHRO SYS1 SUP		1C 181	D 5
TRIM SYNCHRO SYS1 SUP		1C 163	E 5
SAFETY FLT CONT COMP No.1 115 V SUP		1C 652	E 6

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SAFETY FLT CONT COMP No.1 26 V SUP		1C 653	F 6
2ND PLT ADC INST SUP	13-216	2F 75	A14
ADC2 26 V SUP		2F 78	F14
TRIM SYNCHRO SYS2 SUP		2C 163	A16
AP/FD SYS2 SUP		2C 20	A17
INS COMPTR SUP3		F 2	B15
LAT ACCELMTR2 26 V SUP		2C 42	B16
AT SYNCHRO SYS2 SUP		2C 181	B17
ADI 2ND PLT INS2 SUP & IND		2F 15	C13
HSI TRUE 2ND PLT INS2 SUP & IND		2F 21	C15
SAFETY FLT CONT COMP No.2 26 V SUP		2C 653	C16
SAFETY FLT CONT COMP No.2 115 V SUP		2C 652	C17
**ON A/C ALL			
INS2 SUP		2F 20	G15
INS2 HTR SUP		2F 14	D14
**ON A/C ALL			
COMPASS COUPLER 2 NORM SUP		2F 130	D15
AUTOSTAB 2 COMP SUP		2C 37	D17
ATT/INS 2ND PLT SW SUP		2F 13	D21
TRIM COMP2 SUP		2C 162	E16
AFCS MODE SYS2 LTS SUP		2C 273	E17
ADC2 115 V SUP		2F 73	F15
LDG DISPLAY SYS2 SUP		2C 191	F16
AP/FD COMP2 SUP		2C 18	F18
P.F.C.S. TEST UNIT DC SUP	15-215	C 114	A 5
COMPASS COUPLER SYS2 SW SUP	15-216	2F 134	A21
NAV-INS 1ST PLT SW SUP		2F 34	C21
ROOF PNL LT TEST SUP		L1002	D13
ATT-INS 1ST PLT SW SUP		2F 13	D21
RAD/INS 1ST PLT SW SUP		2F 26	E21

(9) On Captain's and First Officer's jack panels located respectively on console 1-211 and 1-212 :

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- (a) Connect a boom headset to both the HEADSET and MIC sockets of the BOOM SET panel section.
- (10) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).
- (11) Pressurize Blue and Green hydraulic systems (Ref. 29-11-00 and 29-12-00, Servicing).
- (12) Make certain that Pitch, Roll and Yaw trim controls are set to zero.
- (13) At Flight Engineer's panel, on EQUIPMENT BAY COOLING unit, make certain that electronics rack ventilation operates (Ref. 21-25-00, Servicing).

CAUTION : IF DURING A TEST, THE "FLOW" LIGHTS ON EQUIPMENT BAY COOLING UNIT (AT FLIGHT ENGINEER'S PANEL) ILLUMINATE, INDICATING A FAILURE IN COOLING SYSTEM, IMMEDIATELY STOP INERTIAL NAVIGATION SYSTEMS BY PLACING MODE SELECTOR SWITCHES ON MSU UNITS IN OFF POSITION (FLIGHT ENGINEER'S STATION).

- (14) At overhead panel, on Flight Control Unit :
  - (a) Place BLUE INVERTER and GREEN INVERTER switches in ON position.
  - (b) Place OUTER AND MIDDLE ELEVONS, INNER ELEVONS and RUDDER switches in BLUE position.
  - (c) Press, then release the three RESET push-buttons.
- (15) On ICOVOL indicator (Flight Control Surface Position Indicator) on First Officer's instrument panel :
  - (a) The eight magnetic indicators must display "B".
  - (b) If required, press ALARM RESET button to cancel out the red lights on the ICOVOL indicator.
- (16) At Flight Engineer's station, make certain that the switches on mode selection units (MSU) are in OFF position.  
On compass-coupler unit, place DG-MAG switch in MAG position.
- (17) At Captain's station, on AFCS control unit, place RAD/INS switches in INS position.

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- (18) On Captain's instrument panel, place :
- ATT INS1/INS3 switch in INS1 position
  - COMP1/COMP2 switch in COMP1 position
  - DEV1/DEV2 switch in DEV1 position
  - NAV INS1/INS2 switch in INS1 position.
- (19) On First Officer's instrument panel, place :
- ATT INS2/INS3 switch in INS2 position
  - COMP1/COMP2 switch in COMP2 position
  - DEV1/DEV2 switch in DEV2 position
  - NAV INS1/INS2 switch in INS2 position.
- (20) At Captain's station, on AFCS control unit, press TRK/HDG knobs 1 and 2 in TRK position.
- (21) On Captain's console, turn DIGITS potentiometer in BRIGHT direction.
- (22) At Flight Engineer's station, place switches on MSU INS1 and MSU INS2 units in STBY position.
- (23) At Flight Engineer's station, on COMPASS unit, place both DG-MAG switches in MAG position.
- (24) At centre console :
- (a) On ADC1 and ADC2 control panel :
    - Make certain that the two TEST selector switches are in NORM position
    - Place both switches in ON position
    - If required, press then release the amber ADC1 and ADC2 warning lights to cancel them out.
  - (b) On AFCS datum adjust unit, make certain that TURN switch is in middle position.
- (25) At overhead panel :
- (a) On ANTI STALL SYSTEM unit, place both ON-OFF switches in ON position.
  - (b) On ELECTRIC TRIM unit, engage switches 1 and 2.
  - (c) On AUTO STAB units No.1 and No.2, engage the three PITCH, ROLL and YAW switches.
- (26) On instrument panels, place :

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## MAINTENANCE MANUAL

- Captain's FD1/FD2 switch in FD1 position
- First Officer's FD1/FD2 switch in FD2 position.

### C. Test of AP DISC (Auto-Pilot Instinctive Disconnection) Switch

#### (1) Captain's control handwheel.

NOTE : Make certain that the G flag on the ADI's does not appear.

- (a) On AFCS control unit, engage AP1 switch.
- (b) On Captain's handwheel, press AP/DISC switch, the AP1 switch must disengage.
- (c) Press again AP/DISC switch. The red AP warning lights must go off.
- (d) On AFCS control unit, engage AP2 switch.
- (e) On Captain's control handwheel, press AP/DISC switch. The AP2 switch must disengage.
- (f) Press again AP/DISC switch. The red AP warning lights must go off.

#### (2) First Officer's control handwheel.

Same procedure as for Captain's control handwheel.

### D. Test of Automatic Display of Pitch Attitude on the ADI's

- (1) On Captain's and First Officer's control handwheels, set attitude presetting knobs F27-F136 to zero.
  - On Captain's and First Officer's ADI's the pitch attitude indicating pointer is in neutral position.
- (2) On Captain's control handwheel.
  - (a) Turn knob F27 clockwise to reach 15° graduation.
    - The pointer on Captain's ADI moves and displays the angle set by the knob.
  - (b) Return knob to zero.
    - The pointer on ADI returns to zero.
- (3) Check control smoothness during rotation.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

(4) On First Officer's control handwheel.

(a) Same procedure as for Captain's control handwheel.

### E. Test of Control Column Push-to-Talk Switches

(1) Captain's push-to-talk switch

(a) On Captain's audio selector panel :

- Place R/T INT switch in INT position.
- Engage INT reception selection push-button and set the integral potentiometer to an intermediate position.

(b) On First Officer's audio selector panel :

- Engage INT reception selection push-button and set the integral potentiometer to an intermediate position.

(c) Place and hold RAD-INT push-to-talk switch on Captain's control column in RAD position. Speak into Captain's boom headset microphone and check that :

- The voice is received in First Officer's boom headset earphones.

(d) Release Captain's RAD-INT push-to-talk switch.

(e) Place RAD-INT push-to-talk switch on Captain's control column in INT position. Speak into Captain's boom headset microphone and check that :

- The voice is received in First Officer's boom headset earphones.

(f) Place Captain's RAD-INT push-to-talk switch in the intermediate position.

(2) First Officer's push-to-talk switch

(a) Repeat procedure carried out for Captain's push-to-talk switch. Read First Officer's in place of Captain's and vice-versa.

### F. Test of Emergency Flight Control System Engagement

NOTE : The emergency flight control system engage switch is located on Captain's handwheel only.

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## MAINTENANCE MANUAL

- (1) On Captain's control column, at the junction of hand-wheel yoke, press the emergency flight control test button and hold it.

- The EMERG CONT caption light on Captain's control handwheel must come on.

### G. Test of Pitch Trim Control

#### (1) Captain's handwheel

- (a) Press PITCH TRIM switch in UP, then in DOWN direction.

- (b) Disengage ET1, press PITCH TRIM switch in UP then in DOWN direction.

- Check that the trim control moves in the selected direction.

#### (2) First Officer's handwheel

Same procedure as for Captain's handwheel.

### H. Close-Up

#### (1) At overhead panel, on Flight Control Unit :

- (a) Place OUTER AND MIDDLE ELEVONS, INNER ELEVONS and RUDDER switches in MECH position.

- (b) Place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position.

#### (2) Shut down pressurization of Blue and Green hydraulic systems (Ref. 29-12-00 and 29-11-00, Servicing).

#### (3) On Captain's and First Officer's audio selector panels :

- (a) Place R/T INT switch in the intermediate position.

- (b) Disengage INT reception selection push-button and turn the integral potentiometer to counter clockwise limit position.

#### (4) On Captain's and First Officer's jack panels :

- (a) Disconnect boom headset from HEADSET and MIC sockets.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (5) Place ADC1 and ADC2 switches in OFF position.
- (6) At Flight Engineer's station, place switches on INS1 MSU and INS2 MSU units in OFF position.
- (7) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### CHAINS AND CABLES IN CONTROL COLUMN - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

Removal/Installation procedures for Captain's and First Officer's control column chains and cables are identical ; therefore only one Removal/Installation procedure is dealt with.

#### 2. Chains and Cables in Control Column

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins-Synchro Pack	D925252000
Rigging Pin - Pitch/Roll Shaft	D925367000
Tensiometer	
Zero Rigging Device - Relay Chassis	E925019000
Warning Notices	
Lockwire Dia. 1 mm (0.041 in.)	
Corrosion Resistant Steel	

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

DESCRIPTION	PART NO.
-------------	----------

Access Platform 3.672 m (12 ft)

### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (3) Check that pitch, roll and yaw trim controls are set to zero.
- (4) Open panel 121FB and immobilize roll resolvers (rigging pin D925252001) and pitch resolvers (rigging pin D925252003).
- (5) Open access panel 121GB and install items of equipment E925019010, E925019012 and E925019013.
- (6) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in mechanical mode).
- (7) Open door 151DB and depressurize Green Blue and Yellow hydraulic systems (Ref. 29-11-00, 29-12-00 and 29-21-00, Servicing).
- (8) Trip, safety and tag the following circuit breaker

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2, AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.  
DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

EFFECTIVITY: ALL

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# *Concorde*

## MAINTENANCE MANUAL

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

(9) Open access doors 113DB and 121AB.

(10) Remove the following components around control column.

(a) Captain's control column :

(a1) Remove panel 211CS

(a2) Remove pedal base foot rests 211DF, 211FF, 211EF.

(a3) Remove pedal gaiters.

(a4) Remove attach plate attaching gaiter (211DS) to three-piece base housing, lift gaiter (211DS) on column and recover gaskets.

(a5) Remove three-piece base housing : 211RF, 211PF, 211QF.

(a6) Remove floor panels 211CF and 211BF.

(b) First Officer's control column :

(b1) Remove panel 212CS

(b2) Remove pedal base foot rests 212DF and 212FF

(b3) Remove pedal gaiter

(b4) Remove attach plate attaching gaiter 212DS to three-piece base housing, lift gaiter 212DS on column and recover gaskets.

(b5) Remove three-piece base housing : 212RF, 212PF, 212QF.

(b6) Remove floor panels 212CF, 212NF, 212MF.

C. Remove

(1) Strip Control Column

(a) Remove clamp (12) securing gaiter and upper protective casing on control column.

EFFECTIVITY: ALL

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# *Concorde*

## MAINTENANCE MANUAL

- (b) Open zip fastener on gaiter and remove gaiter.
- (c) Remove screws (2) and remove upper casing (1).
- (2) Remove cables and Chains
  - (a) Remove locking clips from turnbuckles (7) and fully slacken cables.
  - (b) Below the floor, remove bolts (9) from cable stops (8) mounted on the pulleys.
  - (c) Remove cotters and disconnect cable ends from recesses on roll tube quadrants (11).
  - (d) Cut and remove lockwire and remove lock-nut (3).
  - (e) Remove washer (4) and bolts (5) which attach chains (6) to hand wheel shaft.
  - (f) The associated cables and chains can then be removed.

### D. Preparation of Replacement Component

Not applicable.

### E. Install

- (1) Install chains (6) on hand wheel shaft. Install bolts (5).
- (2) Install washer (4) and lock-nut (3). Torque to 270 plus or minus 15 lbf.in.(3.05 plus or minus 0.19 m.daN). Wirelock. (Ref. 20-21-13).
- (3) Engage the cables in pulleys (10) with intermediate nipples in their recesses on the pulleys.
- (4) Install cable ends in recesses on roll tube quadrant (11).
- (5) Install cable stops (8) on pulleys (10). Fully tighten bolt (9). Torque to between 25 and 30 lbf. in. (0.29 and 0.32 m.daN).
- (6) Tighten cables as follows :
  - (a) Install rigging pin D925367000 connecting pitch and roll torque tubes on mixing cam.

EFFECTIVITY: ALL

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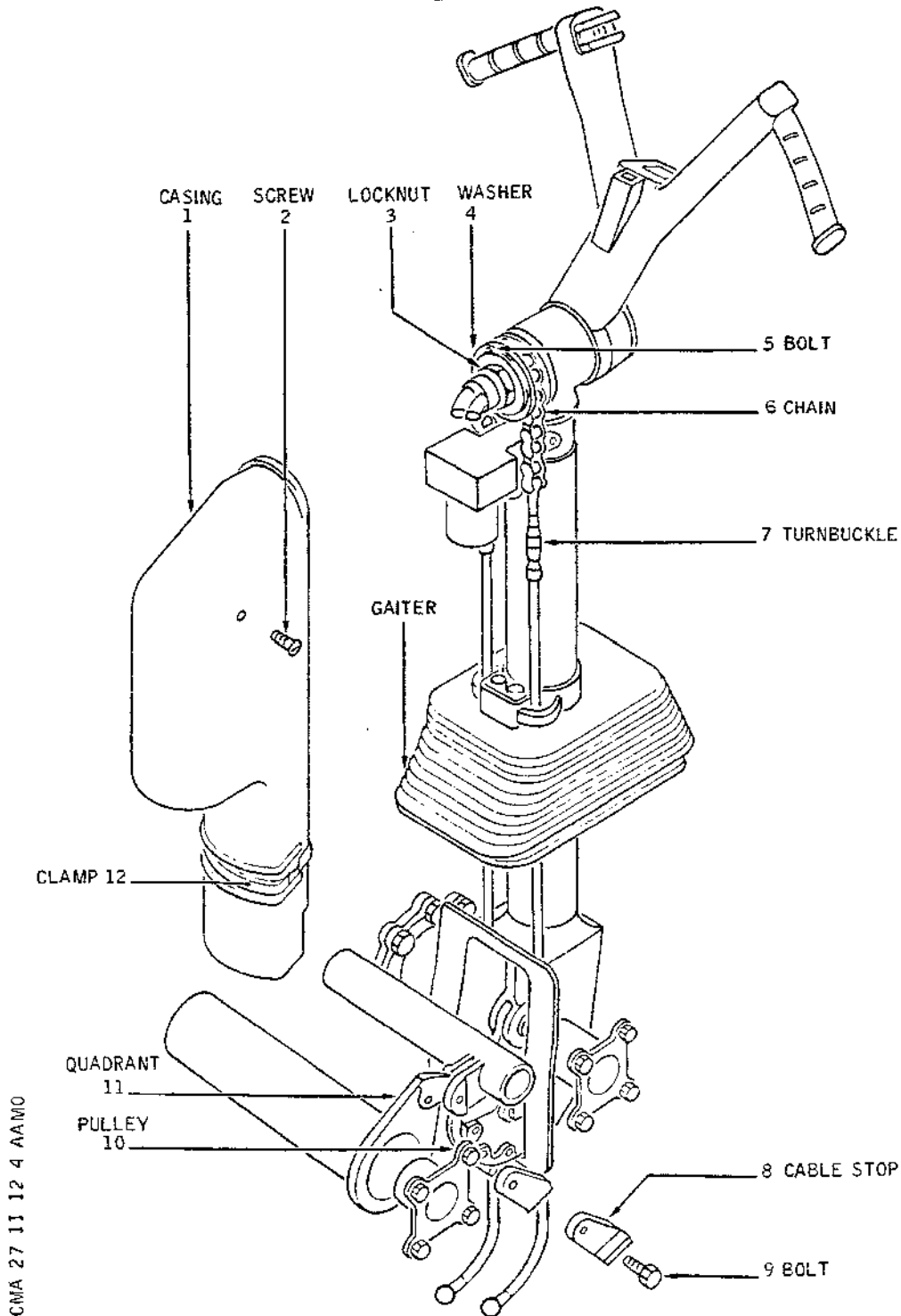
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## MAINTENANCE MANUAL



Removal of Cables and Chains in Control Column  
Figure 401

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (b) On integral trim assembly disconnect rods between integral trim and synchro pack.

NOTE : For installing or removing attachment bolts it is necessary to press plunger on head of bolt to free locking system balls.

- (c) Pre tighten cables - tension = 90 daN (102.7 lb).

- (d) Remove rigging pin D925367000 ; rotate handwheel from stop to stop 20 times.

- (e) Install rigging pin D925367000 and reduce cable tension to 60 daN (135 lb).

- (f) Remove rigging pin D925367000 and rotate handwheel from stop to stop 20 times.

- (g) Install rigging pin D925367000 and finally adjust cable tension to 33 plus or minus 3 daN (74.2 plus or minus 6.75 lb). Once the desired tension has been obtained no threads should remain visible on the turnbuckles.

NOTE : During step (c) (e) and (g) check that reference marks engraved on handwheel line up within plus or minus 1 min with marks on head of control column.

- (h) Safety turnbuckles (7) with locking clips.

- (i) On integral trim assembly connect rods between integral trim assembly and synchro pack, (bolt, special washer, flat washer, nut). Torque to between 27 and 32 lbf.in (0.30 and 0.36 m.daN). Safety with cotter pin .

- (j) Remove rigging pin D925367000.

- (7) Install upper protective casing (1) on control column. Make certain that it is correctly installed. Secure with screws (2).

NOTE : Circular clearance between upper casing and handwheel must not be less than 0.05 in. (1.2 mm).

- (8) Remove warning notices and set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).

- (9) Remove items of equipment E925019013, E925012012 and

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E925019010.

- (10) Remove rigging pins D925252001 and D925252003 from roll and pitch resolvers.
- (11) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).

### F. Test

- (1) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (2) Perform an operational test (Ref. 27-11-00, Adjustment/ Test).
- (3) Rotate handwheel fully to the left and release slowly. Check that handwheel returns smoothly to neutral. Carry out the same manoeuvre to the right.
- (4) With hydraulic power applied to Flight Controls, immobilize pitch and roll resolvers with rigging pins D925252001 and D925252003 and check that rigging pin D925367000 on pitch and roll mixing cam can be easily inserted and removed. Remove rigging pin.
- (5) Remove rigging pins D925252001 and D925252003 from resolvers.
- (6) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
- (7) Make certain that clearance between upper protective casing (1) and instrument panel is within the following limits :  
Theoretical clearance : 10 mm (0.394 in.)  
Minimum clearance : 6 mm (0.236 in.)
- (8) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Remove safety clips and tags and set circuit breaker M626, panel 15-216, Map Ref. F22.

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## MAINTENANCE MANUAL

- (3) Install the following components around control column concerned.
  - (a) Captain's side
    - (a1) Install floor panels 211CF and 211BF
    - (a2) Install pedal gaiters
    - (a3) Install three-piece base housing : 211RF, 211PF and 211QF.
    - (a4) Install pedal-base foot rests 211DF, 211FF, 211EF.
    - (a5) Install panel 211CS.
  - (b) First Officer's side.
    - (b1) Install floor panels 212CF, 212NF, 212MF
    - (b2) Install pedal gaiter
    - (b3) Install three-piece base housing : 212RF, 212PF and 212QF.
    - (b4) Install pedal-base foot rests 212DF, 212FF
    - (b5) Install panel 212CS.
- (4) Install gaiter 211DS or 212DS
  - (a) Install gaiter on control column and close zip fastener.
  - (b) Install gaskets and gaiter on three-piece base housing.  
Install and secure attach plate.
  - (c) Install and secure clamp attaching gaiter 211DS or 212DS and casing 211ES or 212ES to control column.
- (5) Close access doors and panels 212FB, 121GB, 151DB, 121AB and 113DB.
- (6) Remove access platforms.

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# Concorde

## MAINTENANCE MANUAL

### CHAINS AND CABLES IN CONTROL COLUMN - INSPECTION/CHECK

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The object of the following operations is to check the condition of the chains and cables in the control column.

#### 2. Chains and Cables in Control Column

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Ground Power Unit - Hydraulic - Power and Preliminary Testing	EMH398E
Rigging Pins - Synchro Pack	D925252000
Rigging Pin - Pitch/Roll Shaft	D925367000
Tensiometer	
Access Platform 3.672 m (12 ft.)	
Feeler Gauges	
Special Products (Ref. 20-30-00,	

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## MAINTENANCE MANUAL

DESCRIPTION

PART NO.

No.124)

Cleaning Products (Ref. 20-30-00,  
No.469)

B. Prepare (Ref. Fig. 601 )

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) On Flight Control Unit, on overhead panel, make certain that BLUE INVERTER and GREEN INVERTER switches are in PWR OFF position.  
  
On SERVO CONTROLS unit, make certain that the control switches are in NORMAL position.
- (3) Open access door 113DB, then 121AB allowing access to pitch and roll torque tubes.
- (4) Remove protective gaiter on Captain's and First Officer's control column.
  - (a) Remove clamp (4) attaching gaiter on column.
  - (b) Remove attach plate securing gaiter on three-piece base housing.
  - (c) Open zip fastener, remove gaiter and retain gaskets.
- (5) Remove screws (6) attaching casing (5). Remove casing.
- (6) Remove the following components in control column adjacent area :
  - (a) Captain's side :
    - (a1) Remove panel 211CS (centre console).
    - (a2) Remove pedal-base foot rest 211DF, 211FF, 211EF.
    - (a3) Remove pedal gaiter.
    - (a4) Remove three-piece base housing 211RF, 211PF

EFFECTIVITY: ALL

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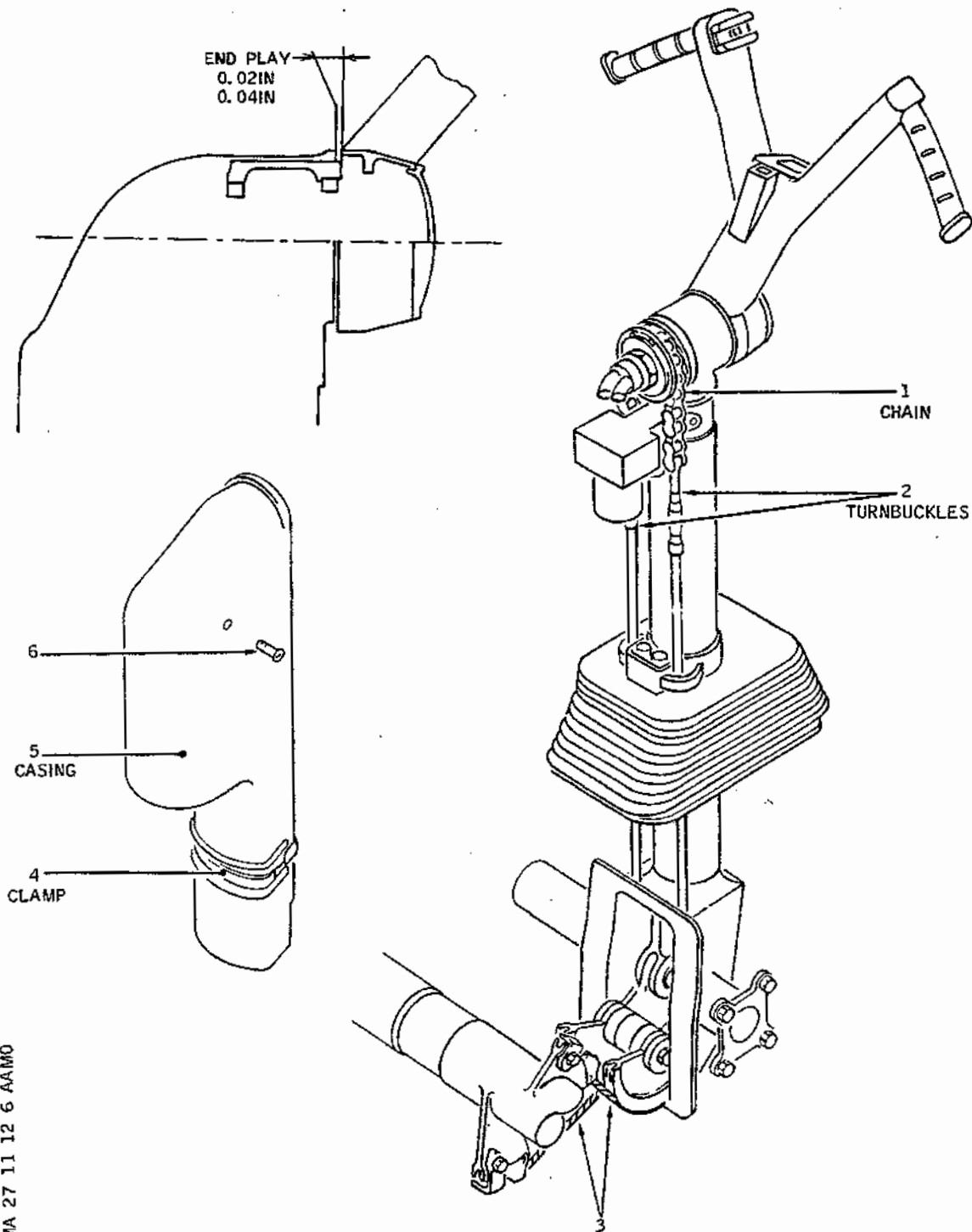
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CMA 27 11 12 6 AAMO

Cables and Chains in Control Column -  
Inspection/Check  
Figure 601

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

and 211QF.

- (a5) Remove floor panels 211CF, 211BF.
- (b) First Officer's side :
  - (b1) Remove panel 212CS (centre console)
  - (b2) Remove pedal-base foot rests 212DF, 212FF.
  - (b3) Remove pedal gaiter.
  - (b4) Remove three-piece base housing, 212RF, 212PF and 212QF.
  - (b5) Remove floor panels 212CF, 212NF and 212MF.

### C. Check

- (1) Check chain (1) for good condition and absence of corrosion and wear.
- (2) Check the two cable turnbuckles (2) making certain that :
  - (a) Locking clips are in good condition.
  - (b) No threads show.
  - (c) There are no signs of cable pulling out of end fitting. (Check condition of varnish).
- (3) Cable Check  
(Ref. Fig. 602 )
  - (a) Broken wires

Cables must show no broken wires.

- (b) Cable wear must not exceed 50 % of wire section in an outer strand.

- (c) Corrosion

Any cables showing signs of internal corrosion must be replaced (Ref. Removal/Installation).

In the case of cables showing signs of surface corrosion, proceed as follows :

- Remove all traces of corrosion using Product

EFFECTIVITY: ALL

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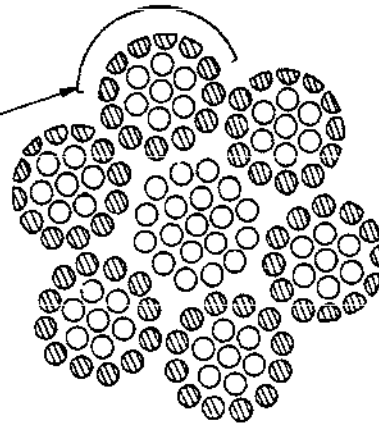
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## MAINTENANCE MANUAL

TYPICAL OUTER WIRE WEAR AREA  
ON CABLE STRAND. HAIRLINE  
CRACKS BETWEEN WIRES OR  
FULLY BLENDED SURFACE APPEARANCE  
OF APPROXIMATELY SIX WIRES PER  
OUTER CABLE STRAND INDICATES  
50 PERCENT WIRE WEAR.



CMA 27 11 12 6 ACMO

Cable Wear  
Figure 602

No.469.

- Give the cable a coat of protective Product No.124.

- (4) Make certain that the cable ends (3) at the control column pivot show no signs of pulling off. (Check condition of varnish).
- (5) Using a set of feeler gauges, check the end play in the hand wheel relative to the head of the control column. The play must be between 0.02 in. and 0.04 in. (0.5 - 1.0 mm).
- (6) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).
- (7) Open door 121FB and immobilize roll resolvers with rigging pin D925252001.
- (8) Check that roll trim controls are set to zero.
- (9) Immobilize pitch/roll torque tube with rigging pin

EFFECTIVITY: ALL

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D925367000.

- (10) Check cable tension with tensiometer : tension must be 33 plus or minus 3 daN (74.3 plus or minus 6 lbf.).
- (11) Check that reference mark on handwheel lines up with mark on control column. (A tolerance of plus or minus 1 mm (0.04 in.) is permitted).
- (12) Remove rigging pin D925367000 from torque tube and rigging pin D925252001 from roll resolvers.
- (13) Operate roll controls to full travel in each direction and make certain there are no signs of binding in the movement of the cables and chains.
- (14) Check that torque tube reaches stops in each direction.
- (15) Shut-down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, procedure to set Flight Controls in electrical mode).

### D. Tests

### E. Close-Up

- (1) Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
- (2) Install the following components in control column adjacent area :
  - (a) Captain's side :
    - (a1) Install floor panels 211CF and 211BF.
    - (a2) Install pedal gaiter.
    - (a3) Install three-piece base housings 211RF, 211PF, 211QF.
    - (a4) Install pedal-base foot rests 211DF, 211FF, 211EF.
    - (a5) Install panel 211CS (centre console).
  - (b) First Officer's side :
    - (b1) Install floor panels 212CF, 212NF, 212MF.

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- (b2) Install pedal gaiter.
  - (b3) Install three-piece base housings 212RF, 212PF, 212QF.
  - (b4) Install gaiter.
  - (b5) Install pedal-base footrests 212DF, 212FF.
  - (b6) Install panel 212CS (centre console).
- (3) On Captain's and First Officer's control columns.  
Install casing (5) and attach it by means of screws (6)
  - (4) Attach gaiter to column with clamp (4).
  - (5) Install gaskets and gaiter on three-piece base housing.  
Install and secure attach plate on three-piece base housing.
  - (6) Close access panels : 121AB then 113DB, 121FB.
  - (7) Remove access platform.
  - (8) Remove hydraulic ground power unit.

EFFECTIVITY: ALL

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# *Concorde*

## MAINTENANCE MANUAL

### FAIRLEAD PULLEY FR2A - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The fairlead pulleys at FRAME 2A route control column cables to torque tubes.

#### 2. Fairlead Pulleys at FR2A

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pin - Pitch Roll Shaft	D925367000
Zero Rigging Device - Relay Chassis	E925019000
Rigging Pin - Synchro Pack	D925252000
Access Platforms 3.672 m (12 ft)	
Circuit Breaker Safety Clips	
Lockwire - Dia. 1 mm (0.041 in.) Corrosion Resistant Steel	

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## MAINTENANCE MANUAL

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DESCRIPTION

PART NO.

---

Tensiometer

B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Set Flight Controls in mechanical mode. (Ref. 27-00-00, Servicing).
- (3) Make certain that pitch, roll and yaw trim controls are set to zero.
- (4) Open panel 121FB and immobilize pitch, roll resolvers with rigging pins D925252001 and D925252003.
- (5) Open panel 121GB and install items of equipment E925019010, E 925019012 and E925019013.
- (6) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing; Procedure to set Flight Controls in mechanical mode).

**WARNING :** DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF HYDRAULIC GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (7) Trip, safety and tag the following circuit breaker :

---

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

---

EFFECTIVITY: ALL

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- (8) Open access door 151DB and depressurize the Green, Blue and Yellow hydraulic systems (Ref. 29-11-00, 29-12-00, 29-21-00, Servicing).
- (9) Open access doors 113DB, 121AB.
- (10) Remove the following components around Captain's or First Officer's control column depending on pulleys to be removed.
  - (a) Captain's control column
    - (a1) Remove panel 211 CS
    - (a2) Remove pedal-base foot rests 211 DF, 211 FF, 211 EF.
    - (a3) Remove pedal gaiter.
    - (a4) Remove attach plate securing gaiter 211 DS on three-piece base housing, lift gaiter 211 DS on control column and recover gaskets.
    - (a5) Remove three-piece base housing ; 211 RF, 211 PF, 211 QF.
    - (a6) Remove floor panels 211 CF and 211 BF.
  - (b) First Officer's control column.
    - (b1) Remove panel 212 CS.
    - (b2) Remove pedal-base foot rests 212 DF and 212 FF.
    - (b3) Remove pedal gaiter.
    - (b4) Remove attach plate securing gaiter 212 DS on three-piece base housing, lift gaiter 212 DS on control column and recover gaskets.
    - (b5) Remove three-piece base housing 212 RF, 212 PF, 212 QF.
    - (b6) Remove floor panels 212 CF, 212 NF, 212 MF.

### C. Remove

- (1) In flight compartment
  - (a) Loosen clamps (1) attaching gaiter 211 DS or 212 DS and upper casing 211 ES or 212 ES on con-

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## MAINTENANCE MANUAL

trol column.

- (b) Open zip fastener on gaiter and remove gaiter.
- (c) Remove upper casing 211 ES or 212 ES.
- (d) Remove the clips locking cable turnbuckles (2) and slacken the cables so as to be able to disengage cable ends from recesses in quadrants.

### (2) Beneath flight compartment floor

- (a) Remove the lock pins and disengage cable ends (11) from their recesses in quadrants (14).
- (b) Remove cable stops (8) which are attached to pulleys (6) (10) by means of bolt (9) disengage cables.
- (c) Remove cotter and unscrew nut (3). Remove washer and pivot pin (13), pulleys (6) and (10), and link (5).
- (d) Remove the pulleys and retain spacers (4).

### D. Preparation of Replacement Component

Not applicable.

### E. Install

#### (1) Beneath flight compartment floor

- (a) Carefully insert pivot pin (13) and install pulley (10), link (5), one spacer (4), pulley (6) the second spacer (4) and the washer. Tighten nut (3). Torque to 80 plus or minus 8 lbf.in. (0.9 plus or minus 0.1 m.daN). Safety with cotter pin.
- (b) Engage the cables in pulleys (6) and (10). Install the cable ends (11) in their recesses in quadrants (14). Install lock pins.
- (c) Install the cables in pulleys (10) and (6) with the intermediate nipples (12) in their recesses in the pulleys.
- (d) Install cable stops (8) using bolt (7). Torque to between 25 and 30 lbf.in. (0.28 and 0.34 m.daN).

EFFECTIVITY: ALL

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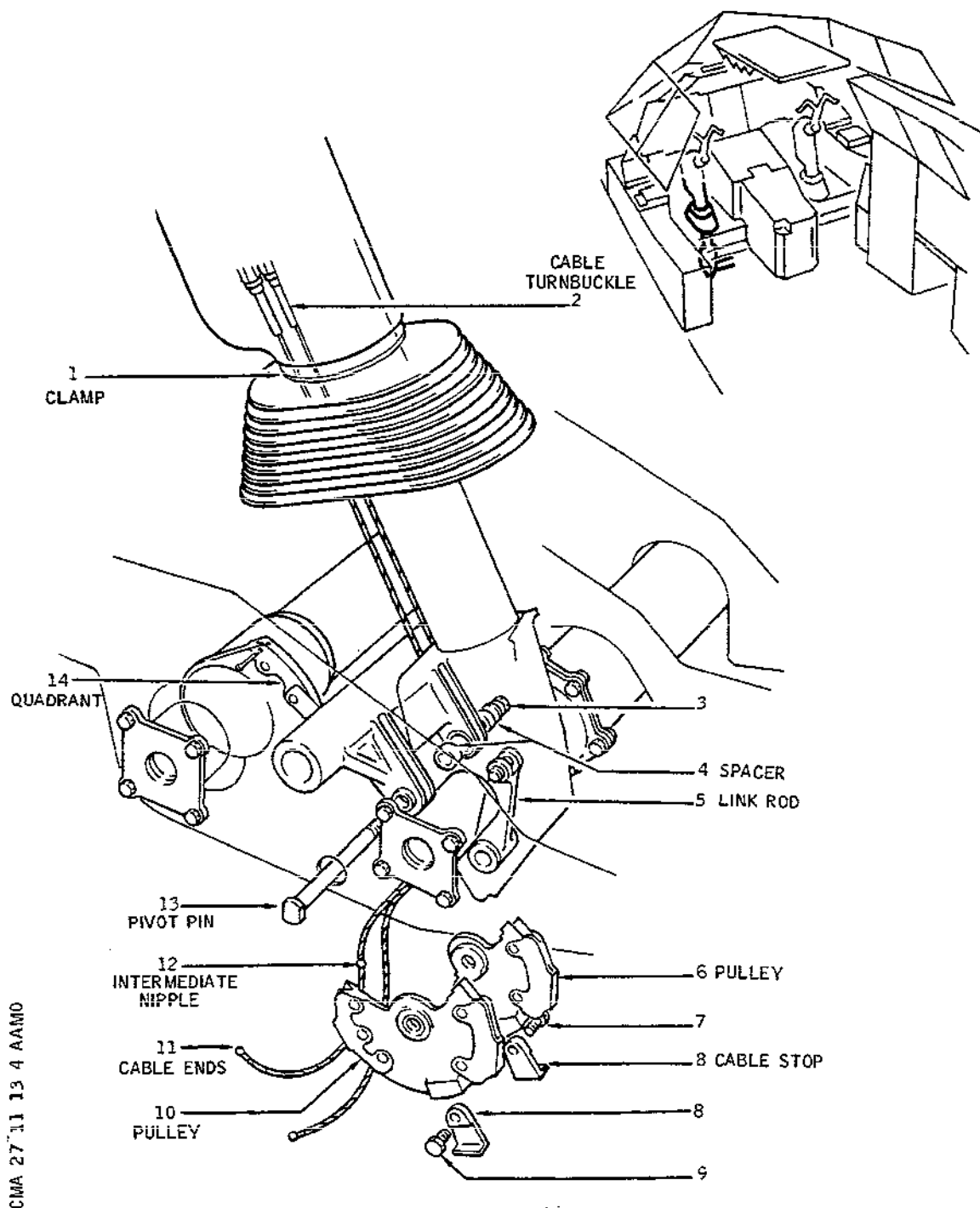
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## MAINTENANCE MANUAL



CMA 27 11 13 4 AAM0

Fairlead Pulley  
Figure 401

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# **Concorde**

## **MAINTENANCE MANUAL**

Safety with lockwire.

(2) Tighten cables as follows :

- (a) Install rigging pin D925367000 connecting pitch and roll torque tubes on mixing cam.
- (b) On integral trim assembly disconnect rods between integral trim and synchro pack.

**NOTE** : For installing or removing attachment bolts it is necessary to press plunger on head of bolt to free locking system balls.

- (c) Pre tighten cables. Tension = 90 daN (202 lb)
- (d) Remove rigging pin D925367000, rotate handwheel from stop to stop 20 times.
- (e) Install rigging pin D925367000 and reduce cable tension to 60 daN (135 lb)
- (f) Remove rigging pin D925367000 and rotate handwheel from stop to stop 20 times.
- (g) Install rigging pin D925367000 and finally adjust cable tension to 33 plus or minus 3 daN (74.2 plus or minus 6.75 lb).  
Once the desired tension has been obtained no threads should remain visible on the turnbuckles.

**NOTE** : During steps (c) (e) and (g) check that reference marks engraved on handwheel line up within plus or minus 1 mm with marks on head of control column.

- (f) Safety turnbuckles (2) with locking clips.
- (i) Remove rigging pin D925367000. Rotate handwheel slowly from stop to stop. During this manoeuvre check that clearance between fairlead pulleys (10) and (6) and lower fittings on control column are within the following limits :  
Theoretical clearance : 0.118 in. (3 mm)  
Minimum required clearance : 0.085 in. (2.16 mm)  
If clearance is out of tolerance adjust thickness of washers at each end of pulley mounting so that clearance falls within limits.
- (j) On integral trim assembly, connect rods between integral trim assembly and synchro pack (bolt,

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special washer, flat washer, nut) Torque to between 27 and 32 lbf. in. (0.30 and 0.36 m.daN). Safety with cotter pin.

- (3) Install upper protective casing 211 ES or 212 ES on control column. Make certain that it is correctly positioned. Secure with screws.

NOTE : Circular clearance between upper casing and handwheel must not be less than 0.05 in. (1.2 mm).

- (4) Remove warning notices and set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (5) Remove items of equipment E925019013, E925019012 and E925019010.
- (6) Remove rigging pins D925252001 and D925252003 from Roll and pitch resolvers.
- (7) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in mechanical mode).

### F. Test.

- (1) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (2) Proceed with an operational test (Ref. 22-11-00, Adjustment/Test).
- (3) Fully rotate handwheel to the left and release slowly. Check that handwheel returns smoothly to neutral. Carry out the same manoeuvre to the right.
- (4) With hydraulic power applied to Flight Controls, immobilize pitch and roll resolvers with rigging pins D925252001 and D925252003 and check that rigging pin D925367000 on pitch and roll mixing cam can be easily inserted and removed.
- (5) Remove rigging pins D925367000, D925252001 and D925252003.
- (6) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing: Procedure to set Flight Controls in mechanical mode).
- (7) Make certain that clearance between upper protective

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casing 211 ES or 212 ES and instrument panel is within the following limits.

Theoretical clearance : 10 mm (0.394 in.)

Minimum clearance : 6 mm (0.236 in.)

- (8) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-up.

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Remove safety clips and tags and set circuit breaker M 626, panel 15-216, Map Ref. 22.
- (3) Install the following components around concerned control column.
- (a) Captain's Side :
- (a1) Install floor panels 211 CF and 211 BF.
- (a2) Install pedal gaiter.
- (a3) Install three-piece base housing : 211 RF, 211 PF and 211 QF.
- (a4) Install pedal-base foot rests 211 DF, 211 FF, 211 EF.
- (a5) Install panel 211 CS.
- (b) First Officer's side :
- (b1) Install floor panels 212 CF, 212 NF, 212 MF.
- (b2) Install pedal gaiter.
- (b3) Install three piece base housing : 212 RF, 212 PF and 212 QF.
- (b4) Install pedal base foot rests 212 DF, 212 FF.
- (b5) Install panel 212 CS.
- (4) Install gaiter 211 DS or 212 DS.
- (a) Install gaiter 211 DS or 212 DS on control column and close zip fastener.

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- (b) Install gaskets and gaiter on three-piece base housing.  
Install and secure attach plate.
- (c) Install and secure clamp (1) attaching gaiter 211 DS or 212 DS and upper casing 211 ES or 212 ES to control column.
- (5) Close access doors and panels 121 FB, 121 GB, 151 DB, 121 AB and 113 DB.
- (6) Remove access platforms.

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### FAIRLEAD PULLEY FR2A - INSPECTION/CHECK

#### 1. General

The following operations constitute an inspection/check of the fairlead pulleys at FR2A.

#### 2. Fairlead Pulley

##### A. Equipment and Materials

##### B. Prepare

- (1) Remove the floor panels from around the control column.
- (2) Open access doors 113DB and 121AB.

##### C. Check

- (1) Make certain that there are no signs of wear on the pulleys.
- (2) Make certain that there is no play at pulley centre shafts.
- (3) Make certain that cable stops are correctly positioned and safetied.

##### D. Tests

Not applicable.

##### E. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Install floor panels.
- (3) Close access doors 113DB and 121AB.

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**END OF THIS  
SECTION**

**NEXT**

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## MAINTENANCE MANUAL

### TORQUE TUBES - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The Captain's and First Officer's torque tubes transmit mechanical movement between the control handwheels and the rods.

#### 2. Torque Tubes

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pin - Pitch/Roll Shaft	D925367000
Rigging Pins - Synchro Pack	D925252000
Zero Rigging Device - Relay Chassis	E925019000
Extractors - Roll, Pitch and Yaw Shafts	D925371000
Tensiometer	
Standard Grease (Ref. 20-30-00, No.51)	

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### DESCRIPTION

### PART NO.

---

Lockwire Dia 1 mm (0.041 in.)  
Corrosion Resistant Steel

Access Platform 3.672 (12 ft.)

Circuit Breaker Safety Clips

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Set flight controls in mechanical mode (Ref. 27-00-00, Servicing).
- (3) Check that pitch, roll and yaw trim controls are in neutral.
- (4) Open panel 121FB under fuselage and install rigging pins D925252001 and D925252003 in roll and pitch resolvers.
- (5) Open door 121GB under fuselage and install items of equipment E925019010, E925019012 and E925019013.
- (6) Trip safety and tag the following circuit breaker :

---

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE OUT	15-216	M 626	F22

---

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT, PROHIBITING PRESSURIZATION OF AIRCRAFT

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### HYDRAULIC SYSTEMS.

- (7) Open door 151DB and depressurize BLUE, GREEN and YELLOW hydraulic systems (Ref. 29-11-00, Servicing ; 29-12-00, Servicing ; 29-21-00, Servicing).
- (8) Open panels 113DB and 121AB giving access to torque tubes.
- (9) Remove the following components around control columns :
  - (a) Captain's control column
    - (a1) Remove panel 211CS.
    - (a2) Remove pedal-base foot rests 211DF, 211FF, 211EF.
    - (a3) Remove pedal gaiter.
    - (a4) Remove attach plate securing gaiter 211DS on three-piece base housing, lift gaiter 211DS on column and retain gaskets.
    - (a5) Remove three-piece base housing 211RF, 211PF, 211QF.
    - (a6) Remove floor panels 211CF and 211BF.
  - (b) First Officer's control column
    - (b1) Remove panel 212CS.
    - (b2) Remove pedal-base foot rests 212DF, 212FF, 212EF.
    - (b3) Remove pedal gaiter.
    - (b4) Remove attach plate securing gaiter 212DS on three-piece base housing, lift gaiter 212DS on column and retain gaskets.
    - (b5) Remove three-piece base housing 212RF, 212PF, 212QF.
    - (b6) Remove floor panels 212CF, 212NF, 212MF.
- (10) Remove clamps attaching gaiter 211DS and upper protective casing 211ES to Captain's control column, and gaiter 212DS and upper protective casing 212ES to

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First Officer's control column.

- (11) Open zip fasteners on gaiters 211DS and 212DS and remove gaiters.
- (12) Remove upper casing 211ES from Captain's control column and upper casing 212ES from First Officer's control column.

### C. Remove Captain's Torque Tube

- (1) Remove cotter pin and nuts (28), remove washers (27), (26) and pivot bolts (25) attaching rods (29) and (30) to torque tubes.

NOTE : For removing or installing attachment bolts it is necessary to press plunger on head of bolt to free the locking balls.

- (2) Remove cable turnbuckle lock pins and fully slacken cables.
- (3) On each cable quadrant (34), remove cotter pin and nut (5), remove washer (6) and bolt (7). Remove cable attach fitting (3). Remove cotter pin (20) and disengage cable end fitting from its recess on the quadrant.
- (4) Remove cotter pin and nut (11), remove washers (10) and bolt (9). Tilt control wheel position potentiometer rod (8).
- (5) Cut and remove lockwire and remove bolts (1). Support torque tube. Using equipment D925371000 extract LH bearing support fitting (19).
- (6) Cut and remove lockwire and remove bolts (12) securing bearings (14) and (15) to support beam. Retain the washers (13).
- (7) Disengage the shoulder of bearing (14) from its housing in the beam and lower the torque tube to remove.

### D. Preparation of Replacement Component

### E. Install Captain's Torque Tube

- (1) Position torque tube and engage shoulder of bearing (14) in housing in support beam, with grease nipple (33) down. Hold tube in position.

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- (2) Fit LH bearing support fitting (19) on floor beam as follows :
  - Position support fitting with grease nipple (18) up.
  - Press-fit LH bearing support fitting (19) in torque tube ball race and in the housing on beam.
  - Install bolts (1) equipped with washers (2). Tighten bolts and wirelock.
- (3) Secure bearing (14) on support beam with bolts (12) fitted with washers (13). Torque to between 60 and 70 lbf.in. (0.68 and 0.79 m.daN). Wirelock bolts.
- (4) Lubricate ball bearings with Product No.51 through grease nipples (18) and (33).
- (5) Connect the artificial feel actuating rods. For each rod : bolt (25), washers (27 and 26) and nut (28) Torque to between 27 and 32 lbf.in. (0.30 and 0.36 m.daN). Safety the nuts with cotter pins.
- (6) Check that pitch/roll mixing cam rigging pin D925367000 can be freely inserted. Remove pin.
- (7) Install rod (8) in fork end. Insert bolt (9) and install washer (10) and nut (11). Tighten nut and safety with a cotter pin.
- (8) On each cable quadrant (34)
  - Engage cable end fitting in recess, position cable attach fitting (3) and secure with bolt (7), washer (6) and nut (5). Safety nut with a cotter pin.
  - Install cotter pin (20).
- (9) In Flight Compartment, tighten roll cables in control columns as follows :
  - (a) Install rigging pin D925367000 connecting pitch and roll torque tubes on mixing cam.
  - (b) On integral trim assembly, disconnect rods between integral trim assembly and synchro pack.
  - (c) Pre-tighten cables : tension 90 daN (202.7 lb)
  - (d) Remove rigging pin D925367000, rotate handwheel, from stop to stop 20 times.
  - (e) Install rigging pin D925367000 and reduce cable

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tension to 60 daN (135 lb).

- (f) Remove rigging pin D925367000 and rotate hand-wheel from stop to stop 20 times.
- (g) Install rigging pin D925367000 and finally adjust cable tension to 33 plus or minus 3 daN (74.2 plus or minus 6.75 lb).  
Once the desired tension has been obtained no threads should remain visible on the turnbuckles.

NOTE : During steps (c) (e) (g) check that reference marks engraved on handwheel line up within plus or minus 1 mm with marks on head of control column.

- (h) Safety turnbuckles with lockpins.
- (i) On integral trim assembly, connect rods between integral trim assembly and synchro pack (bolt, special washer, flat washer, nut).  
Torque to between 27 and 32 lbf.in. (0.30 and 0.36 m.daN).
- (j) Remove rigging pin D925367000.
- (k) Install upper protective casing 211ES or 212ES on control column. Make certain that it is correctly positioned. Secure with screws.

NOTE : Circular clearance between upper casing and handwheel must not be less than 0.05 in. (1.2 mm).

- (10) Remove warning notices and set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (11) Remove items of equipment E925019013, E925019012 and E925019010.
- (12) Remove rigging pins D925252001 and D925252003 from roll and pitch resolvers.
- (13) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in mechanical mode).

F. Remove First Officer's Torque Tube  
(Ref. Fig. 401 )

- (1) Disconnect rods (29) (30) from torque tube. Remove

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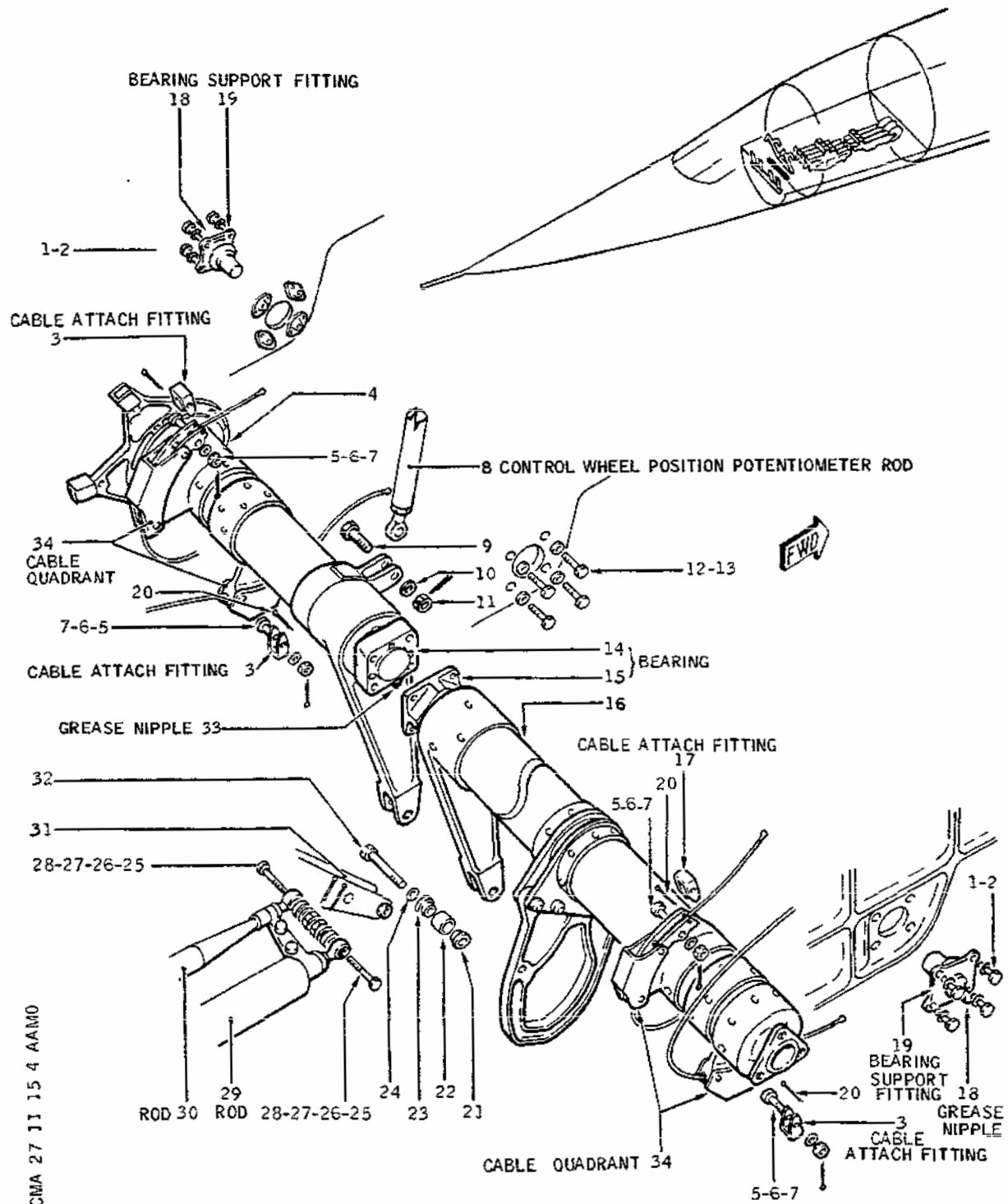
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Captain's First Officer's Torque Tubes  
Figure 401

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cotter pins, nuts (28), washers (27) (26) and bolts (25).

NOTE : For removing or installing attachment bolts it is necessary to press plunger on head of bolt to free the locking balls.

- (2) Remove cable turnbuckle lock pins and fully slacken cables.
- (3) On each cable quadrant (34), remove cotter pin and nut (5), remove washer (6) and bolt (7). Remove cable attach fitting (3). Remove cotter pin (20) and disengage cable end from its recess on the quadrant.
- (4) Remove cotter pin from nut on bolt (32). Remove bolt equipped with washer (24). Remove roller (22) and spacers (23) and (21). Tilt and remove fork end (31).
- (5) Cut and remove lockwire and remove bolt (1). Support torque tube. Extract RH bearing support fitting (19), using equipment D925371000.
- (6) Cut and remove lockwire and remove bolts (12) securing bearings (14) and (15) to support beam.
- (7) Disengage the shoulder of bearing (15) from its housing in the beam and lower the torque tube to remove.

### G. Install First Officer's Torque Tube

- (1) Position torque tube and engage shoulder of bearing (15) in housing in support beam, with grease nipple (33) down. Hold tube in position.
- (2) Fit RH bearing support fitting (19) on floor beam as follows :
  - Position support fitting with grease nipple (18) up.
  - Press-fit RH bearing support fitting (19) in torque tube ball race and in the housing on beam.
  - Install bolts (1) equipped with washers (2). Tighten bolts and wirelock.
- (3) Secure bearing (15) on support beam with bolts (12) fitted with washers (13). Torque to between 60 and 70 lbf.in. (0.68 and 0.69 m.daN). Wirelock bolts.

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- (4) Lubricate ball bearings with Standard Grease No.51 through grease nipples (18) and (33).
- (5) Connect the artificial feel actuating rods. For each rod :  
bolt (25), washers (27) and (26) and nut (28). Torque to between 27 and 32 lbf/in (0.30 and 0.36 m.daN).  
Safety nut with cotter pin.
- (6) Install fork end (31) : position roller (22) equipped with spacers (21) and (23), insert bolt (32) and associated nut. Safety nut with cotter pin.
- (7) Check that rigging pin D925367000 can be easily inserted or removed on mixing cam. Remove pin.
- (8) On each cable quadrant (34) :
  - Engage cable end in recess, position cable attach fitting (3) and secure with bolt (7), washer (6) and nut (5). Safety the nut with a cotter pin.
  - Install cotter pin (20).
- (9) In flight compartment, tighten roll cables on First Officer's control column as per procedure described in paragraph 2.E (9).
- (10) Remove warning notices and set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (11) Remove items of equipment E925019013, E925019012 and E925019010.
- (12) Remove rigging pins D925252001 and D925252003 from pitch and roll resolvers.
- (13) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in mechanical mode).

### H. Tests

- (1) Set flight controls in mechanical mode (Ref. 27-00-00, Servicing).
- (2) Carry out an operational test (Ref. 27-11-00, Adjustment/Test).
- (3) Fully rotate handwheel to the left and release slowly. Check that handwheel returns smoothly to neutral. Carry out the same manoeuvre to the right.

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- (4) Install rigging pins D925252001 and D925252003 on roll and pitch resolvers.
- (5) Check that rigging pin D925367000 can be easily inserted or removed. Remove pin.
- (6) Remove rigging pins D925252001 and D925252003 from resolvers.
- (7) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing - Procedure to set Flight Controls in Mechanical Mode).
- (8) Make certain that clearance between upper protective casing 211ES or 212ES and instrument panel is within the following limits :
  - theoretical clearance : 0.394 in. (10 mm)
  - minimum clearance : 0.236 in. (6 mm)
- (9) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### I. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Remove safety clip and tag and set circuit breaker M626 panel 15-216, Map ref. F22.
- (3) Install the following components around control columns.
  - (a) Captain's side
    - (a1) Install floor panels 211CF and 211BF.
    - (a2) Install pedal gaiter.
    - (a3) Install three-piece base housing : 211RF, 211PF and 211QF.
    - (a4) Install pedal-base footrests 211DF, 211FF, 211EF.
    - (a5) Install panel 211CS.
  - (b) First Officer's side

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- (b1) Install floor panels 212CF, 212NF, 212MF.
- (b2) Install pedal gaiter.
- (b3) Install three-piece base housing 212RF, 212PF and 212QF.
- (b4) Install pedal-base footrests 212DF, 212FF, 212EF.
- (b5) Install panel 212CS.
- (4) Install gaiter 211DS or 212DS.
  - (a) Install gaiter on column and close zip fastener.
  - (b) Install gaskets and gaiter on three-piece base housing.  
Install and secure attach plate.
  - (c) Install clamp attaching gaiter 211DS or 212DS and upper casing 211ES or 212ES on column.
- (5) Close access doors and panels 121FB, 121GB, 151DB, 121AB and 113DB.
- (6) Remove access platforms.

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## MAINTENANCE MANUAL

### TORQUE TUBES - INSPECTION/CHECK

#### 1. General

The following operations constitute an inspection/check of the roll control torque tubes.

#### 2. Torque Tube

##### A. Equipment and Materials

##### B. Prepare

- (1) Remove the floor panels around the control column.
- (2) Open access doors 113DB and 121AB.

##### C. Check of Torque Tube, Captain's Side (Ref. Fig. 601 )

- (1) Make certain that there is no play between the torque tube and bearings (2) and (3).
- (2) Make certain that rod (1) of accident recorder is attached to the crank on the torque tube.
- (3) Check cable ends for correct attachment to their respective quadrants. Check stirrups (11) and (12) for correct positioning.
- (4) Make certain that artificial feel input rod (9) is correctly attached to the crank.

##### D. Check of Torque Tube, First Officer's Side

- (1) Make certain that there is no play between the torque tube and bearings (3) and (5).
- (2) Check roller condition. Check attachment of roll/pitch deflection limiting rod (10) in cam (7) of torque tube.
- (3) Check cable ends for correct attachment to their respective quadrants. Check stirrups (4) and (6) for correct positioning.
- (4) Make certain that artificial input rod (8) is correctly attached to the crank.

##### E. Tests

Not applicable.

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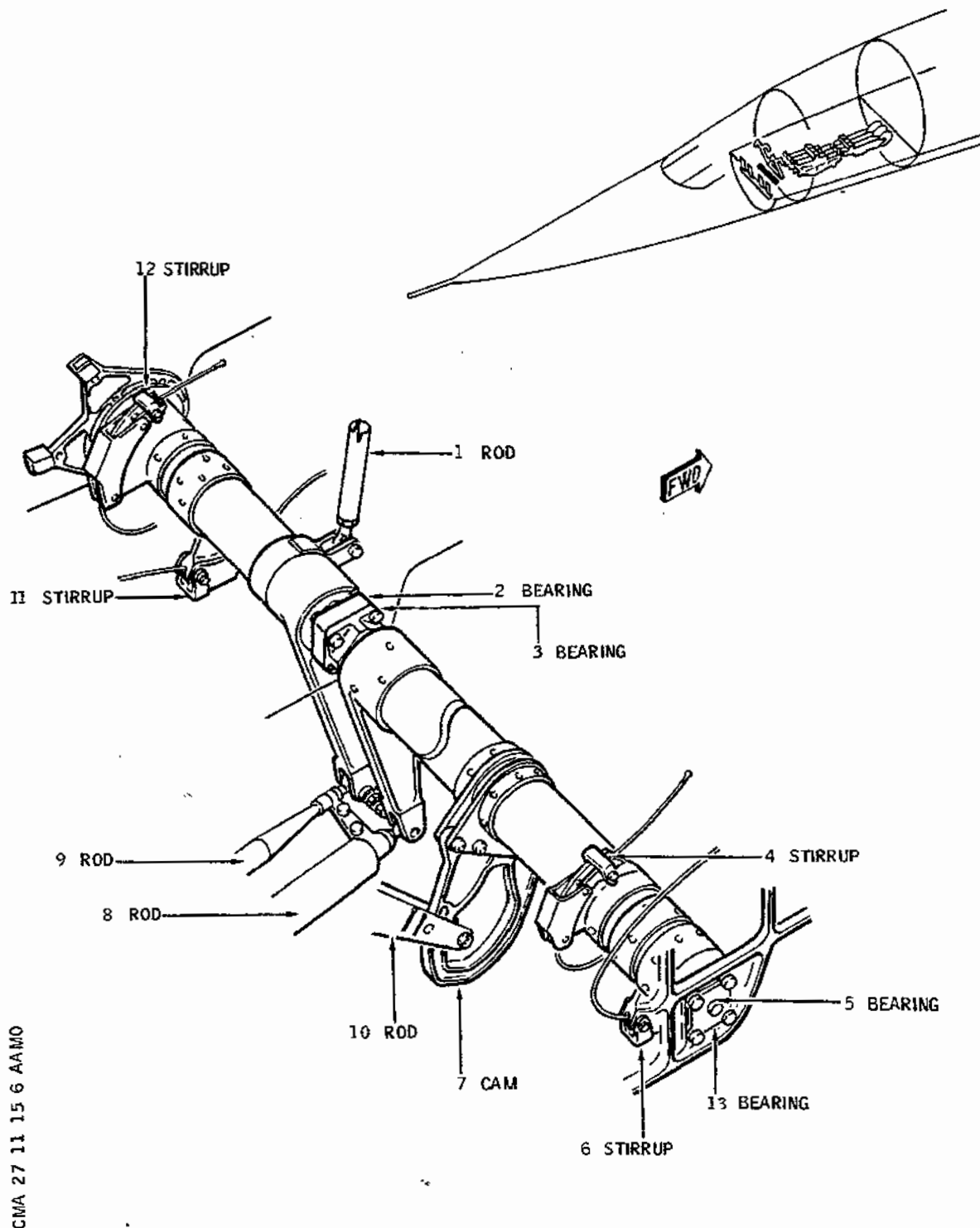
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Roll Control Torque Tube  
Figure 601

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### F. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Install floor panels around the control columns.
- (3) Close access doors 113DB and 121AB.

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## MAINTENANCE MANUAL

### LOAD LIMITING MECHANISM - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The load limiting mechanism protects the control linkage.

#### 2. Load Limiting Mechanism

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Zero Rigging Device - Relay Chassis	E925019000
Rigging Pins - Synchro Pack	D925252000
Acces Platform 3.672 m (12 ft)	
Circuit Breaker Safety Clip	
Lockwire Dia. 1 mm (0.041 in.)	
Corrosion Resistant Steel	

##### B. Prepare

(1) Take the precautions described in the previous

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WARNING paragraph.

- (2) Check that pitch, roll and yaw trim controls are in zero position.
- (3) Open panel 121FB, immobilize roll resolvers with rigging pin D925252001.
- (4) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE OUT	15-216	M 626	F22

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

ALSO DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING OPERATION OF HYDRAULIC GROUND PRESSURIZATION SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (5) Open door 151DB and depressurize Green, Blue and Yellow hydraulic systems.
- (6) Open panel 121GB, to gain access to load limiting mechanisms.

C. Remove  
(Ref. Fig. 401 )

- (1) Remove cotter pin, loosen nut (14), remove washers (13, 12), disengage bolt (11), disconnect jam detection strut (10) from load limiting mechanism.
- (2) Remove cotter pin, loosen nut (4), remove washers (5, 6), disengage bolt (7), disconnect relay jack (18) from load limiting mechanism.
- (3) Remove cotter pin, unscrew nuts (1), remove washers

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

(2), remove bonding strip (17).

(4) Identify orientation and location of bolts (3). Maintain load limiting mechanism, remove bolts (3), remove load limiting mechanism.

(5) Remove supports (8) and (16) from load limiting mechanism pivot and remove washers (9, 15).

### D. Preparation of Replacement Component

### E. Installation

(1) Install washers (9, 15), supports (8) and (16) on load limiting mechanism pivot.

(2) Position load limiting mechanism, insert support attachment bolts (3) in chassis beams, according to their initial locations.

(3) Connect bonding strip (17).

(4) Install washers (2), tighten nuts (1). Safety with cotter pins.

(5) With the assembly installed, sideways play shall be between 0.05 mm and 0.13 mm (.002 in to .005 in).

(a) If play is above limits, replace washer (15).

(b) If play is below limits, adjust washer (15).

(6) Connect jam detection strut (10) insert bolt (11), washer (12, 13), tighten nut (14). Torque to between : 45 and 50 lbf.in. (0.5 and 0.6 m.daN). Safety with cotter pin.

(7) Connect relay jack (18) to load limiting mechanism body, insert bolt (7), washers (6, 5), tighten nut (4). Safety with cotter pin.

(8) Remove warning notices.

(9) Set circuit breaker M 626, panel 15-216, Map ref. F22.

(10) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).

(11) Install equipment E925019010.  
Install equipment E925019013 on equipment E92501910 and on load limiting mechanism output

EFFECTIVITY: ALL

R

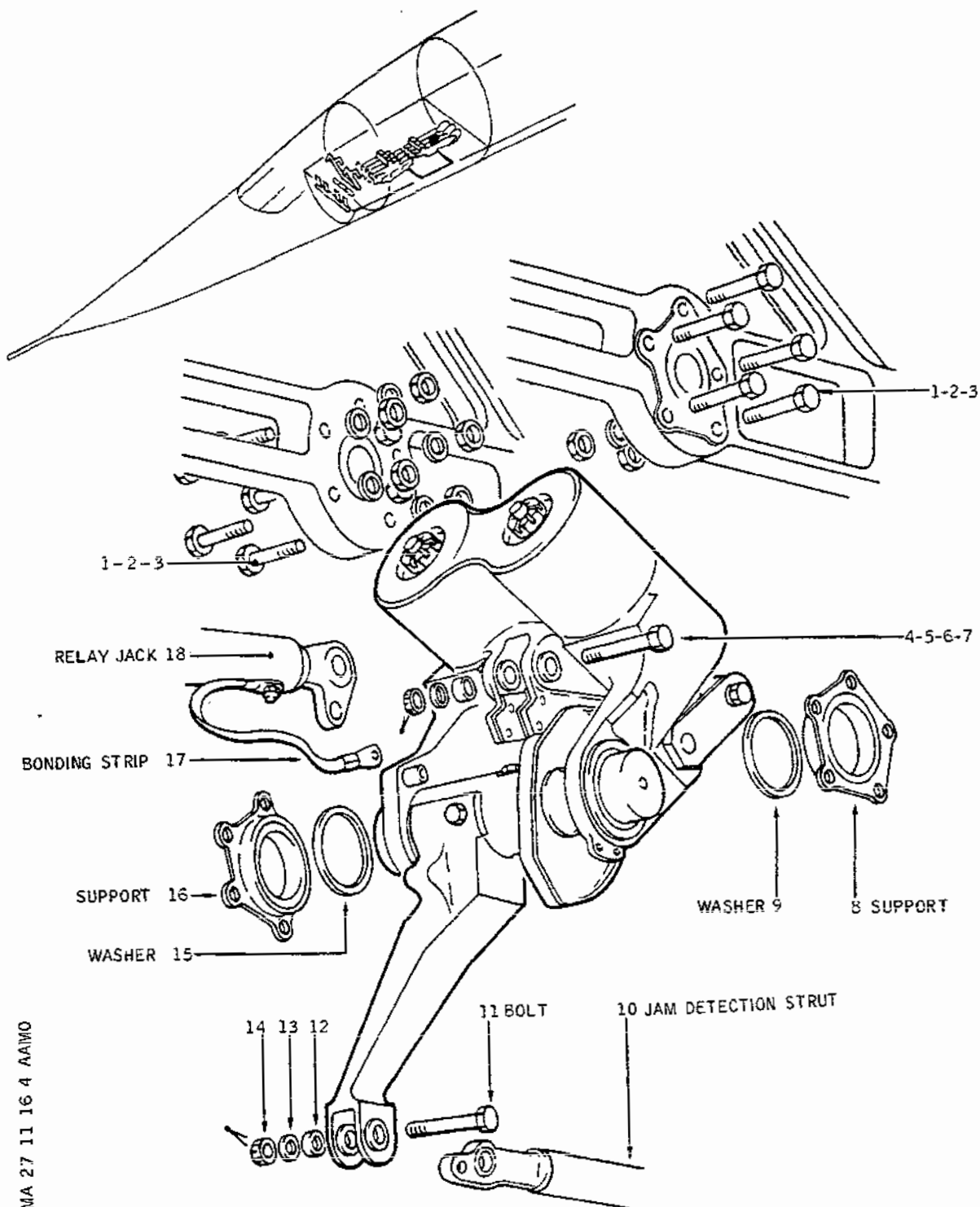
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## MAINTENANCE MANUAL



Load Limiting Mechanism  
Figure 401

R

EFFECTIVITY: ALL

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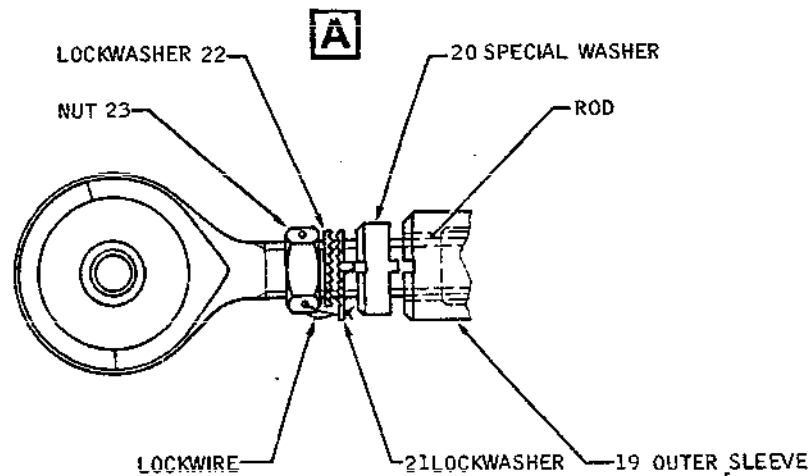
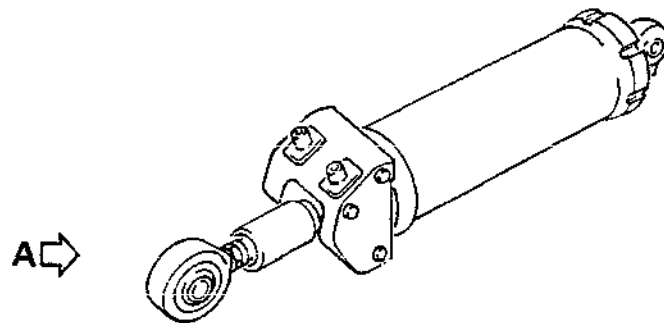
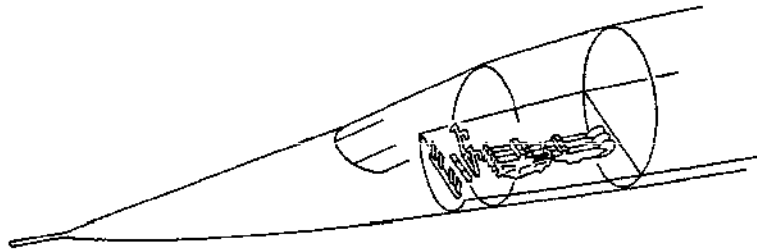
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CMA 27 11 16 4 ACM0

Adjustment of AP Force Limiter  
Figure 402

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

lever by means of rigging pins E925019105. Rigging pins must be inserted easily. If not, adjust the AP force limiter as follows :  
(Ref. Fig. 402 )

- (a) Cut lockwire, loosen nut (23), disengage washers (21) and (22).
  - (b) Hold special washer (20) inserted in recess in outer sleeve (19) and rod.
  - (c) Turn by hand the rod and outer sleeve assembly in order to lengthen or shorten, the AP force limiter until rigging pin E925019105 can be inserted and removed freely.
  - (d) Make certain that special washer (20) is inserted in recess in rod and outer sleeve (19).
  - (e) Engage lockwasher (21), tab in slot located on the front face of special washer (20).
  - (f) Engage the second lockwasher (22).
  - (g) Tighten nut (23).  
Torque to between 80 and 90 lbf.in. (0.9 and 1 m.daN).  
Safety with Lockwire (Ref. 20-21-13).
- (12) Check adjustment of relay jack sensor (Ref. 22-13-61, Adjustment/Test).
- (13) Remove items of equipment E925019013 and E925019010. Remove resolver rigging pins D925252001.
- (14) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in mechanical mode).

### F. Test

- (1) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (2) Carry out an operational test (27-11-00, Adjustment/Test).
- (3) Install rigging pin D925252001 on resolvers.
- (4) Install items of equipment E925019010 and E925019013. Make certain that rigging pins can be inserted freely

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

on roll linkage. If necessary adjust length of AP force limiter.

- (5) Remove items of equipment E925019013 and E925019010 rigging pin D925252001 from resolvers.
- (6) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in mechanical mode).
- (7) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access doors and panels 121FB, 151DB, 121GB.
- (3) Remove access platform.

EFFECTIVITY: ALL

R

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## MAINTENANCE MANUAL

### LOAD LIMITING MECHANISM - INSPECTION/CHECK

#### 1. General

The purpose of the following procedure is to check the roll channel load limiting mechanism.

#### 2. Load Limiting Mechanism

##### A. Equipment and Materials

DESCRIPTION	PART NO.
-------------	----------

Access Platform 3.672 m (12 ft)

##### B. Prepare

- (1) Remove access panel 121GB, giving access to load limiting mechanism.

##### C. Check

- (1) Check relay jack rod attachment to load limiting mechanism corresponding yoke for correct lockwiring of nut and for absence of end play.  
Check bonding strip for correct condition.
- (2) Check jam detection strut attachment to load limiting mechanism lower bellcrank for correct lockwiring of nut and for absence of end play.
- (3) Check that roller is correctly positioned in cam track. Make certain that there are no wear marks, due to roller displacement, on cam roller track.

##### D. Tests

##### E. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access door 121GB.
- (3) Remove access platform.

EFFECTIVITY: ALL

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# *Concorde*

## MAINTENANCE MANUAL

### CABLE TENSION REGULATOR - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The cable tension regulator is mounted on the relay chassis located between Frames 7 and 8. Access is obtained through door 121GB. The cable tension regulator maintains a constant cable tension at all temperatures.

#### 2. Cable Tension Regulator

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Cable grip	D921620000
Rigging Pins - Synchro Pack	D925252000
Rigging Pin - Mixing Unit Servo Control	D921310000
Locking Equipment - Cable Tension Regulator	D921606000
Zero Rigging Device - Relay Chassis	E925019000

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

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### DESCRIPTION

### PART NO.

---

Tensiometer

Access Platform 3.672 m (12 ft.)

Circuit Breaker Safety Clips

Warning Notices

Lockwire Dia. 1 mm (0.041 in.)

Corrosion Resistant Steel

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (3) Check that pitch and roll trim controls are set to zero.
- (4) Open panel 121FB, immobilize roll resolvers with rigging pin D925252001.
- (5) Open floor panel 241HF, immobilize mixing unit with rigging pin D921310000.

**WARNING** : WHEN INSERTING AND REMOVING PINS TAKE ALL NECESSARY PRECAUTIONS IN ORDER TO AVOID INTRODUCING INADVERTENTLY TOOLS OR MISCELLANEOUS ITEMS IN MIXING UNIT.

- (6) Shut down pressurization of hydraulic systems.  
(Ref. 27-00-00, Servicing; Procedure to set Flight Controls in mechanical mode).
- (7) Trip, safety and tag the following circuit breaker :

---

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15/216	M626	F22

---

EFFECTIVITY: ALL

R

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## MAINTENANCE MANUAL

**WARNING :** DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS USED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

MAKE CERTAIN THAT PERSONNEL DO NOT WORK ON MECHANICAL LINKAGE BETWEEN MIXING UNIT AND ELEVONS.

- (8) Open door 151DB and depressurize Green, Blue and Yellow hydraulic systems. (Ref. 29-11-00, Servicing; 29-12-00, Servicing; 29-21-00, Servicing).
- (9) Open floor panel 231JF, giving access to cable turnbuckles.
- (10) Open floor panel 215AF, giving access to cable tension regulators.  
Open access panel 121GB, giving access to cable tension regulators.

### C. Remove (Ref. Fig. 401 )

- (1) Remove cotter pin, loosen nuts (33), remove washers (34), bolts (31), spacers (32).
- (2) Remove cotter pin, loosen nuts (37), remove washers (38), bolts (36).  
Remove guard struts (35) between hydraulic lines and control rods.
- (3) Remove cotter pin, loosen nuts (5), remove washers (6), bolts (7).
- (4) Remove cotter pin, loosen nuts (1), remove washers (2), bolts (3), spacers (4), remove cable guard (8).
- (5) Unsafety locknuts and adjusting screw (39).  
Loosen locknuts and draw back cable guard (40) from regulator pulley by means of adjusting screw.
- (6) Remove locking clips from turnbuckles corresponding to the roll regulator.  
Turn turnbuckles symmetrically in order to obtain a tension allowing installation of the locking equip-

EFFECTIVITY: ALL

R

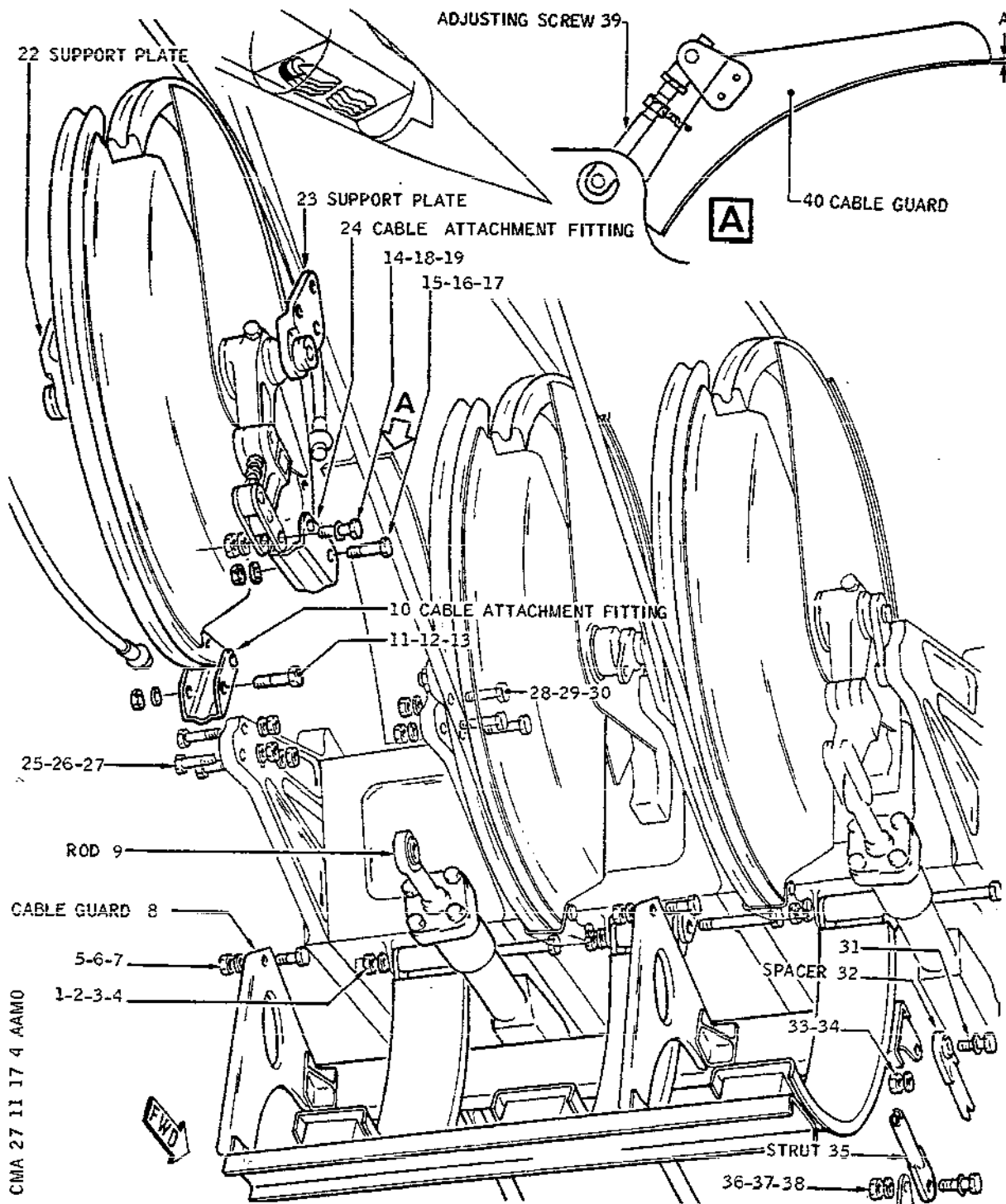
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## MAINTENANCE MANUAL



Cable Tension Regulator  
Figure 401

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## MAINTENANCE MANUAL

ment D921606000 on the regulator.

Install locking equipment.

Slacken cables so that they can be removed from regulator cable quadrants.

- (7) Remove cotter pin, nut (18), remove washers (19), bolt (14), disconnect rod (9) from control lever without changing rod length.
- (8) Install cable grip D921620000 to immobilize cables.
- (9) Remove cotter pin, nut (11), remove washer (12), bolt (13). Tilt cable attachment fitting (10) on fixed pin and disengage lower cable.
- (10) Remove cotter pin, nut (15), remove washer (16), bolt (17). Tilt cable attachment fitting (24) on fixed pin and disengage upper cable.

NOTE : For removing bolts (13) and (17), it is necessary to press plunger on head of bolt to free the locking system balls.

- (11) Remove cotter pin, loosen nuts (25 and 28), remove washers (26 and 29). Maintain cable tension regulator to remove bolts (27 and 30), remove cable tension regulator.

### D. Preparation of Replacement Component (Ref. Fig. 402 )

- (1) Check presence of cable tension regulator locking equipment D921606000 on regulator. This equipment maintains the two flanges at adjustment point 10.
- (2) On new regulator, make certain that distance A is the same as that of the removed regulator. Adjust if necessary.

### E. Install

- (1) Remove equipment D921620000.
- (2) Position tension regulator and attach support plates (22) and (23) to chassis using bolts (27) and (30), washers (26) and (29) and nuts (25) and (28).
- (3) Engage end fitting of upper cable in its recess on the quadrant. Tilt cable attachment fitting (24) on fixed pin and engage bolt (17). Install washer (16), nut (15). Tighten nut (15) and safety with

EFFECTIVITY: ALL

R

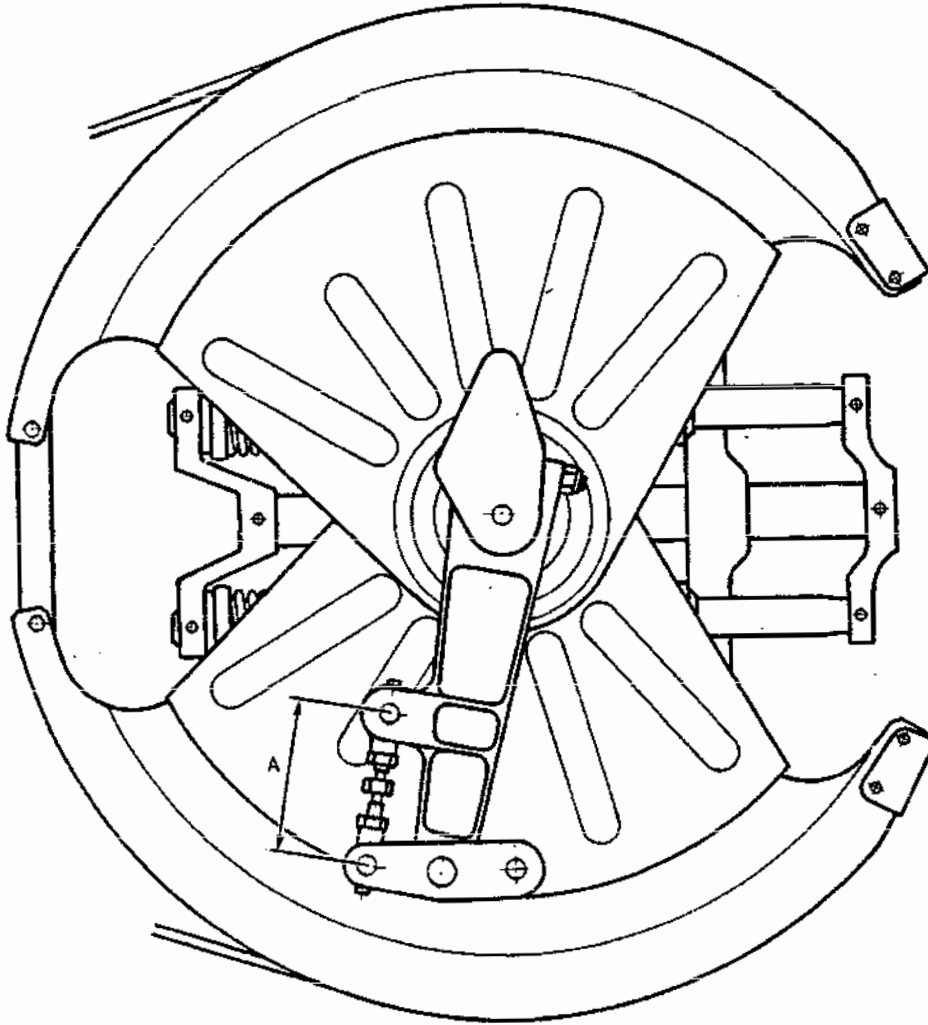
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CMA 27 11 17 4 ABMO

Adjustment of Control Lever  
Figure 402

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cotter pin.

- (4) Rotate tension regulator and engage end fitting of lower cable in its recess on the quadrant. Tilt cable attachment fitting (10) on fixed pin and engage bolt (13). Install washer (12) nut (11). Tighten nut (11) and safety with cotter pin.
- (5) Connect rod (9) to control lever, insert bolt (14), washers (19), tighten nut (18).  
Torque to between : 27 and 32 lbf.in. (0.30 and 0.36 m.daN).
- (6) Cable tension adjustment (Ref. Fig. 403 )
  - (a) Install equipment E925019010 and immobilize roll control with equipment E925019013.
  - (b) Tighten turnbuckles symmetrically until sufficient and balanced tension of the 2 cables is obtained to allow easy removal of cable tension regulator locking equipment D921606000 rigging pins.
  - (c) Remove cable tension regulator locking equipment.
  - (d) Adjust cable tension according to compartment temperature as per adjustment graph.  
TENSION = 25 daN (56.2 lbf).
  - (e) Check that tension is equally distributed between both cables by removing rigging pins (equipment E925019013) (easy removal of rigging pins).
  - (f) Safety turnbuckles with locking clips.
- (7) Install lower cable guard (8). Install spacers (4), bolts (3), washers (2), tighten nuts (1).  
Torque to between : 12 and 15 lbf.in. (0.14 and 0.17 m.daN). Insert bolts (7) washers (6), tighten nuts (5), safety with cotter pin.  
  
Make certain that clearance between cable guard and cable tension regulator is between : 0.03 and 0.08 in. (0.762 and 2.03 mm).
- (8) Turn adjusting screw (39) so that clearance between cable guard (40) and regulator pulley is between 0.03 and 0.08 in. (0.762 and 2.03 mm).  
Tighten locknuts.  
Safety adjusting screw and locknuts with lockwire as

EFFECTIVITY: ALL

R

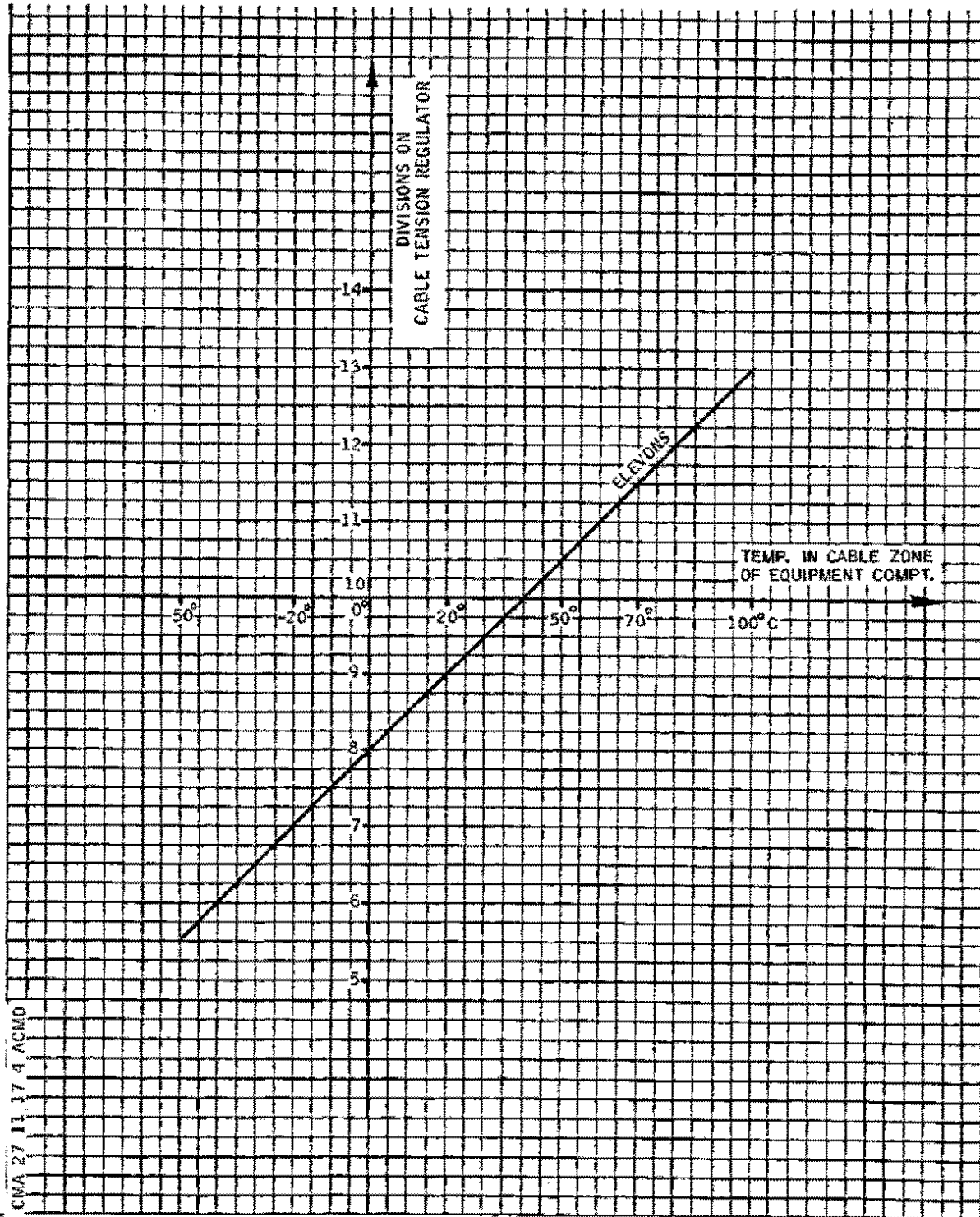
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## MAINTENANCE MANUAL



Cable Tension Adjustment Graph  
Figure 403

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per 20-21-13.

Torque to between 27 and 32 lbf.in. (0.305 and 0.361 m.daN).

- (9) Connect guard struts (35) between hydraulic lines and control rods.
- (10) Insert bolts (31), washers (34), spacers (32), tighten nuts (33) and safety with cotter pin.
- (11) Insert bolts (36), washers (38), tighten nuts (37), safety with cotter pin.
- (12) Remove warning notices.
- (13) Remove safety clips and tags and set circuit breaker M626, Panel 15-216, Map Ref. F22.
- (14) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).
- (15) Remove pin (D921310000) from mixing unit.
- (16) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing; Procedure to set Flight Controls in electrical mode).
- (16) Remove pin D925252001 from resolvers and items of equipment E925019010 and E925019013 from roll mechanical linkage.

### F. Test

- (1) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).
- (2) Carry out an operational test (Ref. 27-11-00, Adjustment/Test).
- (3) Immobilize roll resolvers with rigging pin D925252001.
- (4) Install equipment E925019010 and immobilize roll control linkage with equipment E925019013.
- (5) Check that pin D921310000 can be inserted easily on mixing unit.  
Remove rigging pin.
- (6) Remove items of equipment E925019010 and E925019013 from roll linkage and rigging pin D925252001 from resolvers.

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- (7) Shut down pressurization of hydraulic systems  
(Ref. 27-00-00, Servicing; Procedure to set Flight Controls in electrical mode).
- (8) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close floor panels : 241 HF, 215 AF, 231 JF.
- (3) Close access panel 121 FB and access doors 151 DB, 121 GB.
- (4) Remove safety clips and tags and set circuit breakers
- (5) Remove access platform.

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## MAINTENANCE MANUAL

### CABLE TENSION REGULATOR - INSPECTION/CHECK

#### 1. General

The purpose of the following procedure is to check the cable tension regulator of the roll channel.

#### 2. Cable Tension Regulator

##### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

R Access Platform 3.672 m (12 ft.)

##### B. Prepare

(1) Open door 121GB and floor panel 215AF giving access to the cable tension regulators.

##### C. Check (Ref. Fig. 601 )

(1) On cable quadrants

R - Check attachment of cable ends and cable attachment fittings.  
- Check that there are no wear and damage marks on the cable quadrant grooves.

(2) Check lockwiring of rod adjusting screw.

R (3) Make certain there is no play at the adjustable control lever fulcrums.  
R

(4) On the regulator

(a) Note value indicated by the regulator marker.

(b) Near the regulator, bring the two cables together manually and check the balance arm displacement on locking shaft.

(c) Release the two cables.

R (d) Make certain that the value indicated by the marker is identical with that noted previously.

EFFECTIVITY: ALL

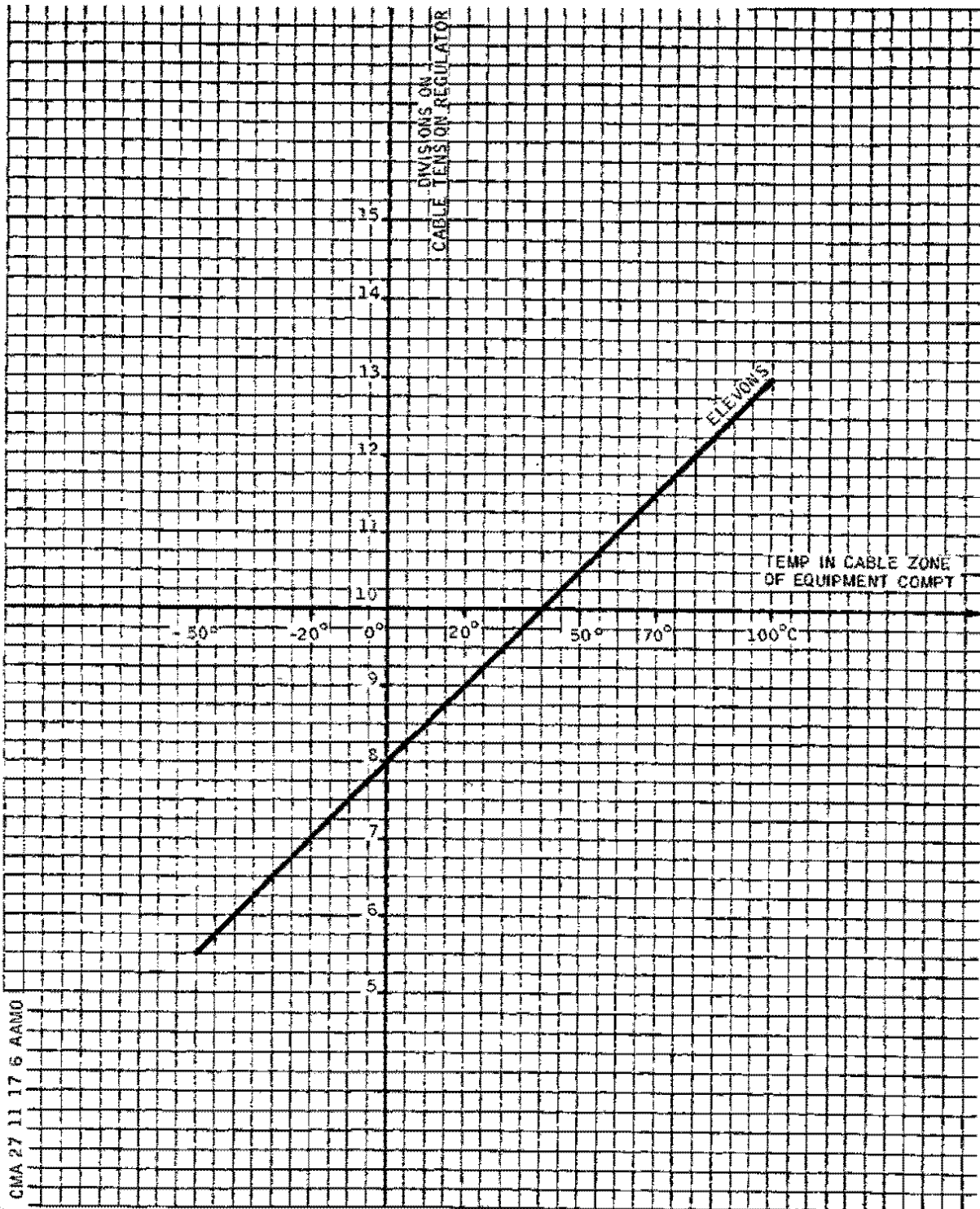
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## MAINTENANCE MANUAL



- Cable Tension Adjustment Graph  
Figure 601

EFFECTIVITY: ALL

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- (5) Place a thermometer near the regulator and note temperature.

R By means of the cable tension adjustment graph, make  
R certain that the value indicated by the marker corresponds to the value shown on the graph (determined by noted temperature).

- R (6) Check that clearance between lower and upper cable  
R guard and tension regulator pulley is between 0.03  
R and 0.08 in. (0.762 and 2.03 mm).

### D. Tests

### E. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close door 121GB and floor panel 215AF.
- (3) Remove access platform.

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## MAINTENANCE MANUAL

### AUTO PILOT FORCE LIMITER - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The auto pilot force limiter ensures the automatic disengagement of the AP when loads applied to linkage reach its threshold value. It is located level with frame 6 in zone 121.

#### 2. Auto Pilot Force Limiter

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Zero Rigging Device - Relay Chassis	E925019000
Rigging Pins - Synchro Pack	D925252000
Lockwire (Dia. 0.041 in. (1 mm)) Corrosion Resistant Steel	
Access Platform 3.67 m (12 ft.)	
Circuit Breaker Safety Clips	

##### B. Prepare

EFFECTIVITY: ALL

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- (1) Take the precautions described in the previous "WARNING" paragraph.
- (2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER		MAP REF.
AP/FD SYS1 CONT	1-213	1C	17	Q13
AP/FD SYS1 SUP	2-213	1C	20	C 5
AP/FD SYS2 CONT	5-213	2C	17	A11
AP/FD COMP1 SUP	13-215	1C	18	A 5
AP/FD COMP2 SUP	13-216	2C	18	F18
AP/FD SYS2 SUP		2C	20	A17

- (3) Place roll flight control at neutral position.
- (4) Place roll trim control in zero position.
- (5) Remove access panel 121FB and insert rigging pin D925252001 in the roll synchro pack.
- (6) Remove access panel 121GB and install items of equipment E925019010 and E925019013 on roll control.
- (7) Open access door 151DB and depressurize the Blue, Green and Yellow hydraulic systems.

**WARNING :** DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.  
DISPLAY ALSO A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZATION SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

C. Remove (Ref. Fig. 401 )

**NOTE :** For removing or installing attachment bolts it is necessary to press the plunger located on

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head of bolt to free the locking system balls.

- (1) Remove screws attaching housings (7) and (8) to resolver chassis. Lift housing (8) and lower housing (7).
- (2) Disconnect electrical connectors (9).
- (3) Remove cotter and unscrew nut (3) : recover washer (2).
- (4) Remove cotter and unscrew nut (6) : recover washer (5).
- (5) Support force limiter (10) and remove bolt (1).
- (6) Remove rigging pin D925252001 and rotate roll trim knob until bolt (4) can be removed easily. Remove bolt (4), force limiter (10); handle with care.

### D. Preparation of Replacement Component

- (1) Adjust the replacement force limiter to the same length as that of the removed component. The adjustment end fitting locknut (19) must be tightened. Torque to between 80 and 90 lbf.in. (0.9 and 1 m.daN). Safety with lockwire (Ref. 20-21-13).

### E. Install

- (1) Carefully install force limiter (10); install bolt (4) attaching forward end of force limiter (10) to synchro pack lever.  
Rotate trim knob to neutral and install bolt (1) attaching force limiter (10) to relay jack.  
Insert rigging pin D925252001 in resolvers.
- (2) Install washer (2) and tighten nut (3). Torque to between 0.30 and 0.35 m.daN (27 and 32 lbf.in.). Safety with cotter.
- (3) Install washer (5) and tighten nut (6). Torque to between 0.50 and 0.56 m.daN (45 and 50 lbf.in.). Safety with cotter.
- (4) Remove and disconnect equipment E925019013.
- (5) Remove warning notices
- (6) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).

EFFECTIVITY: ALL

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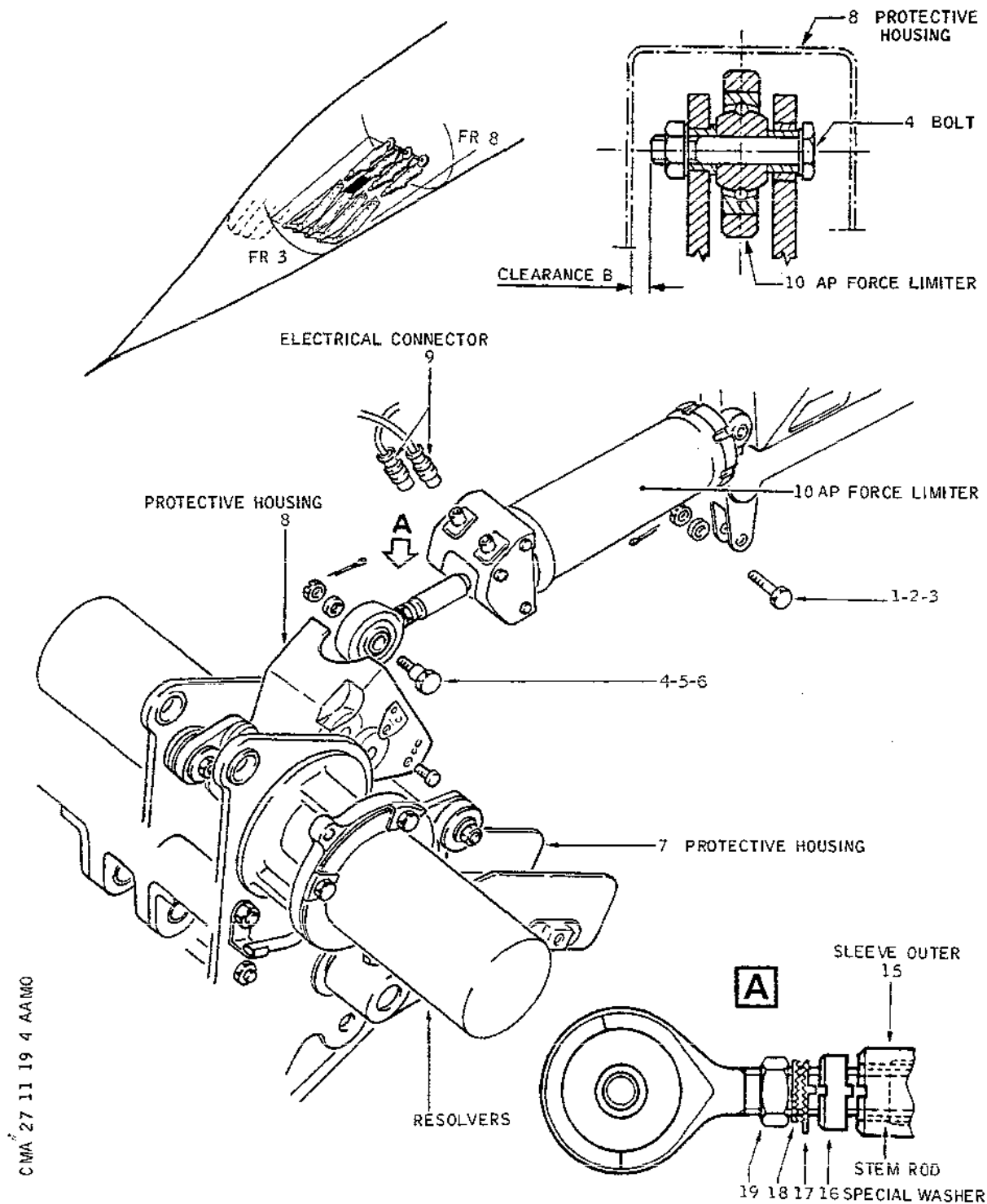
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## MAINTENANCE MANUAL



CMA 27 11 19 4 AAMO

Auto Pilot Force Limiter  
Figure 401

R

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## MAINTENANCE MANUAL

- (7) Install equipment E925019013. Make certain that rigging pin E925019105 can be easily removed and inserted in load limiting mechanism. If not, adjust length of AP force limiter as follows :
- (a) Cut lockwire and unscrew nut (19), disengage washers (18 and 17).
  - (b) Maintain special washer (16) inserted in groove provided on outer sleeve (15) and on rod stem.
  - (c) Manually rotate sleeve and rod stem in order to lengthen or shorten AP force limiter until rigging pin E925019105 can be inserted or removed easily.
  - (d) Make certain that special washer (16) is inserted in groove of rod stem and outer sleeve (15).
  - (e) Engage lock washer (17) tab in slot provided on front face of special washer.
  - (f) Engage second lock washer (18).
  - (g) Tighten nut (19).  
Torque to between 80 and 90 lbf.in. (0.9 and 1 m.daN). Wirelock.
  - (h) Check adjustment of relay jack sensor  
(Ref. 22-13-61, Adjustment/Test).
- (8) Shut down pressurization of hydraulic systems  
(Ref. 27-00-00, Servicing. Procedure to set Flight Controls in mechanical mode).
- (9) Connect electrical connectors (9).
- (10) Install protective housings (7) and (8). Tighten screws. Safety with lockwire.

NOTE : (Ref. Fig. 401 )

Check that clearance B between bolt (4) and protective housing (8) is within the following limits :

Nominal clearance	0.1181 in. (3 mm)
Minimum clearance	0.078 in. (1.98 mm)

- (11) Remove items of equipment E925019013 and E925019010 and rigging pin D925252001.
- (12) Remove safety clips and tags and set the following

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circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
AP/FD SYS1 CONT	1-213	1C 17	Q13
AP/FD SYS1 SUP	2-213	1C 20	C 5
AP/FD SYS2 CONT	5-213	2C 17	A11
AP/FD COMP1 SUP	13-215	1C 18	A 5
AP/FD COMP2 SUP	13-216	2C 18	F18
AP/FD SYS2 SUP		2C 20	A17

### F. Tests

- (1) Carry out an operational test (Ref. 27-11-00, Adjustment/Test).
- (2) Carry out an AP force limiter test (Ref. 22-10-00, Adjustment/Test, paragraph 3F (2)).
- (3) Immobilize roll resolvers with rigging pin D925252001.
- (4) Install items of equipment E925019010 and E925019013 and check that pins can be inserted and removed easily. If not, adjust AP force limiter.
- (5) Remove items of equipment E925019013 and E925019010 and rigging pin D925252001.
- (6) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access doors and panels 121GB, 121FB and 151DB.
- (3) Remove access platform.

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## MAINTENANCE MANUAL

### AUTO-PILOT FORCE LIMITER - INSPECTION/CHECK

#### 1. General

The purpose of the following procedure is to check the roll channel AP force limiter.

#### 2. AP Force Limiter

##### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

R Access Platform 3.672 m (12 ft)

##### B. Prepare

R (1) Open door 121FB.

R (2) Remove protective case of roll resolvers.

##### C. Check

(1) Rod attachment on synchro pack bellcrank.

(a) Check bolt of rod yoke for absence of end play.

R (b) Check bolt nut for correct safetying.  
R Check rod adjusting nut for correct safetying.

(2) Check electrical connectors of microswitch box for correct attachment.

R (3) Check safetying condition of microswitch box nuts.

(4) Check rod yoke attachment to the relay jack spool valve for absence of end play.

R Check rod attaching bolt nut for correct safetying.

##### D. Tests

##### E. Close-Up

(1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2) Install resolver protective case.

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## MAINTENANCE MANUAL

(3) Close door 121FB.

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## MAINTENANCE MANUAL

### JAM DETECTION STRUT - REMOVAL/INSTALLATION

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The jam detection strut causes an indicator light to illuminate on the Flight Control Unit should a jamming of the roll mechanical linkage occur after the relay jack.

#### 2. Jam Detection Strut

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins - Synchro Pack	D925252000
Rigging Pin - Mixing Unit Servo Control	D921310000
Zero Rigging Device - Relay Chassis	E925019000
Ground Power Unit - Hydraulic - Power and Preliminary Testing	EMH398E
Access Platform 3.672 m (12 ft.)	
Circuit Breaker Safety Clips	

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## MAINTENANCE MANUAL

### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Remove access panel 121GB allowing access to jam detection struts.
- (3) Make certain that pitch, roll and yaw trim controls are in zero position.
- (4) Remove access panel 121FB and immobilize roll resolvers with rigging pin D925252001.
- (5) Open floor panel 241HF allowing access to mixing unit.
- (6) Open access door 151DB, depressurize Blue, Green and Yellow hydraulic systems.

**WARNING :** DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (7) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22
PFCS ALL SURFACES MON GRN SUP	1-213	1C 54	N13
PFCS ALL SURFACES MON BLUE SUP	5-213	2C 54	E12

### C. Remove

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## MAINTENANCE MANUAL

- (1) Disconnect electrical connector (6).
- (2) Remove cotter pin and unscrew nut (10). Remove washers (9) and (8), and bolt (7).
- (3) Remove cotter pin and unscrew nut (1). Remove washers (2) and (3), and bolt (4).
- (4) Remove jam detection strut (5).

### D. Preparation of Replacement Component

### E. Install

- (1) Position jam detection strut and install bolt (7), washers (8 and 9), tighten nut (10). Torque to between 0.30 and 0.36 m.daN (27 and 32 lbf. in.). Safety with cotter pin.
- (2) Install bolt (4), washers (2 and 3), tighten nut (1). Torque to between 0.50 and 0.55 m.daN (45 and 50 lbf. in.). Safety with cotter pin.
- (3) Connect electrical connector (6).
- (4) Install equipment E925019000 and immobilize roll linkage.
- (5) Remove warning notices.
- (6) Set Flight Controls in Blue electrical mode (Ref. 27-00-00, Servicing).
- (7) Check that rigging pin D921310000 can be easily inserted in mixing unit.  
If not, adjust cable tension (Ref. 27-11-00, Removal/Installation, paragraph 1).  
  
Do not leave rigging pin on mixing unit.
- (8) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing - Procedure to set Flight Controls in electrical mode).  
Open door 151DB and depressurize Blue hydraulic system.
- (9) Remove equipment E925019000.
- (10) Remove rigging pin D925252001.

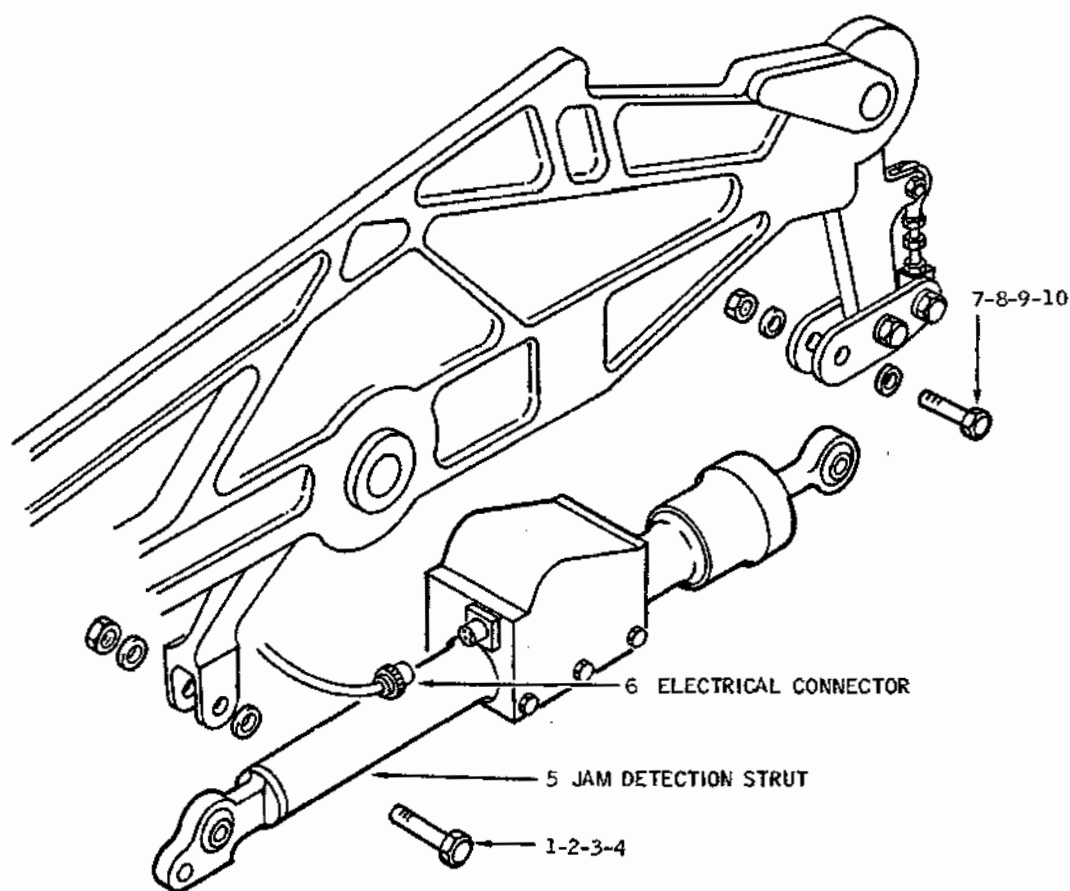
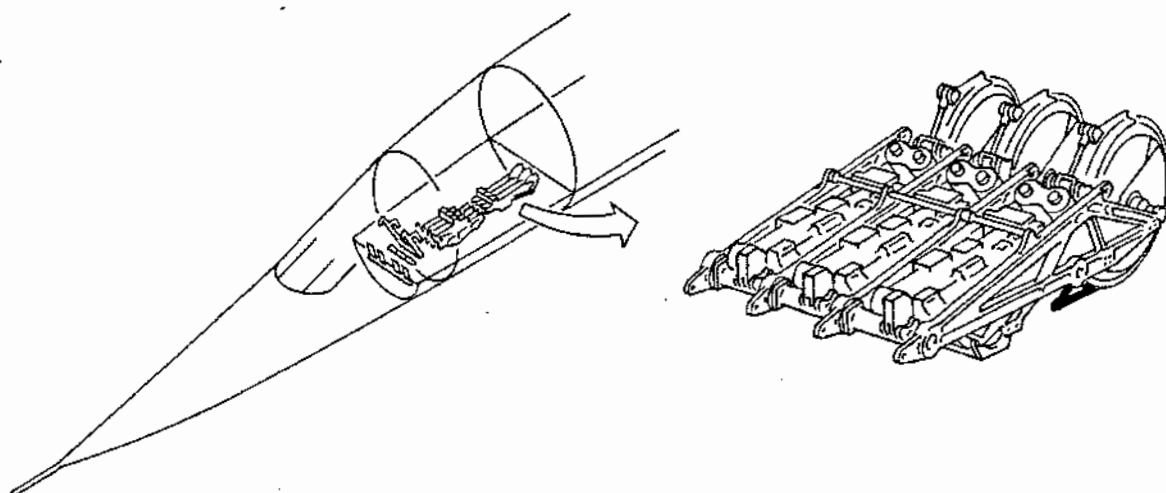
### F. Tests

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Jam Detection Strut  
Figure 401

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- (1) Ref. 27-11-21, Adjustment/Test.
- (2) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### 6. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Disconnect and remove hydraulic ground power unit.
- (3) Close access doors and panels 121GB, 121FB, 241HF and 151DB.
- (4) Remove safety clips and tags and reset the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22
PFCs ALL SURFACES MON GRN SUP	1-213	1C 54	N13
PFCs ALL SURFACES MON BLUE SUP	5-213	2C 54	E12

- (5) Remove access platform.

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## MAINTENANCE MANUAL

### JAM DETECTION STRUT - ADJUSTMENT/TEST

#### 1. General

The purpose of the following test is to check the correct operation of the roll channel jam detection strut.

#### 2. Jam detection strut test

##### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Electrical Ground Power Unit	
------------------------------	--

Access Platform 3.672 m (12 ft.)	
----------------------------------	--

Circuit Breaker Safety Clips	
------------------------------	--

Warning Notices	
-----------------	--

##### B. Prepare

(1) Open door 121GB to gain access to jam detection struts.

(2) Check that the following circuit breakers are set :

---

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
P.F.C.S INV GRN FAIL IND	1-213	1C 73	M15
P.F.C.S INV BLUE FAIL IND	5-213	2C 73	E11

---

(3) Open door 151DB and depressurize Blue, Green and Yellow hydraulic systems.

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

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## MAINTENANCE MANUAL

- (4) Trip, safety and tag the following circuit breaker :

	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
R	HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

- (5) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

### C. Check

- (1) Trip, safety and tag the following circuit breakers

	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
	PFCS ALL SURFACES MON GRN SUP	1-213	1C 54	N13
	PFCS ALL SURFACES MON BLUE SUP	5-213	2C 54	E12
(2)	Disconnect electrical connector of pitch jam detection strut.			
(3)	Remove safety clips and tags and set circuit breakers 1C54 and 2C54.			
(4)	On Flight Control Unit, place Blue inverter and Green inverter switches in OFF INV position.			
(5)	Manually compress roll jam detection strut during 2 seconds approximately.			
(6)	On Flight Control Unit, MECH JAM warning light must illuminate.			
(7)	Press MECH JAM warning light : it must go off.			
(8)	Trip, safety and tag circuit breakers 1C54 and 2C54.			
(9)	Connect electrical connector to pitch jam detection strut.			

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## MAINTENANCE MANUAL

(10) Set circuit breakers 1C54 and 2C54.

R (11) On Flight Control Unit, MECH JAM warning light must illuminate.

### D. Close up

(1) De-energize the aircraft electrical network and disconnect electrical ground power unit. (Ref. 24-41-00, Servicing).

(2) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(3) Remove warning notices.

R (4) Close access door 121GB.

(5) Remove access platform.

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**1. General**

The purpose of the following procedure is to check the roll channel jam detection strut.

**2. Jam Detection Strut****A. Equipment and Materials**

DESCRIPTION	PART NO.
Access Platform 3.672 m (12 ft)	

**B. Prepare**

- (1) Open access door 121 GB, giving access to jam detection struts.

**C. Check**

- (1) Make certain that there is no end play on rod attachment to load limiting mechanism.

Check safetying of bolt nut.

- (2) Make certain that there is no end play on rod attachment to cable tension regulator control bellcrank.

Check safetying of bolt nut.

- (3) Check electrical connector attachment for correct condition.

**D. Tests****E. Close-Up**

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

- (2) Close access door 121 GB.

- (3) Remove access platform.

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#### 1. General

##### A. Purposes

The purpose of the system is :

- To restore the loads on handwheel which are compatible with an accurate and stable flight control.
- To cut in on the autopilot load limitation.

##### B. Principle of Operation

For roll axis, the designed result is such that the rates of roll are identical for the same force applied to the handwheel whatever the flight conditions.

This result is achieved through the subordination of the variable resistance to a function of the calibrated air-speed. The variable resistance is ensured by two hydraulic jacks, each controlled by a computer. Both jacks are controlled permanently but only one is operative, the second one remaining at a stop.

The first jack, which acts in priority is supplied with Blue hydraulic system pressure ; the control computer is activated when the ROLL switch of ARTIFICIAL FEEL engage switch unit No.1 (on overhead panel) is engaged.

The second jack is supplied by Green hydraulic system pressure.

The jack control computer is activated when the ROLL switch of ARTIFICIAL FEEL engage switch unit No.2 (on overhead panel) is engaged.

When both ROLL switches are engaged, the Green jack automatically replaces the Blue jack in case of a failure of the latter.

The stand-by hydraulic pressure (Yellow) is not used. A spring rod provides the resistance corresponding to low speed conditions and ensures a minimum safety in the event of a double electro-hydraulic failure.

#### 2. Description

##### A. Artificial Feel Mechanical System (Ref. Fig. 001 )

The artificial feel components for the three Flight control

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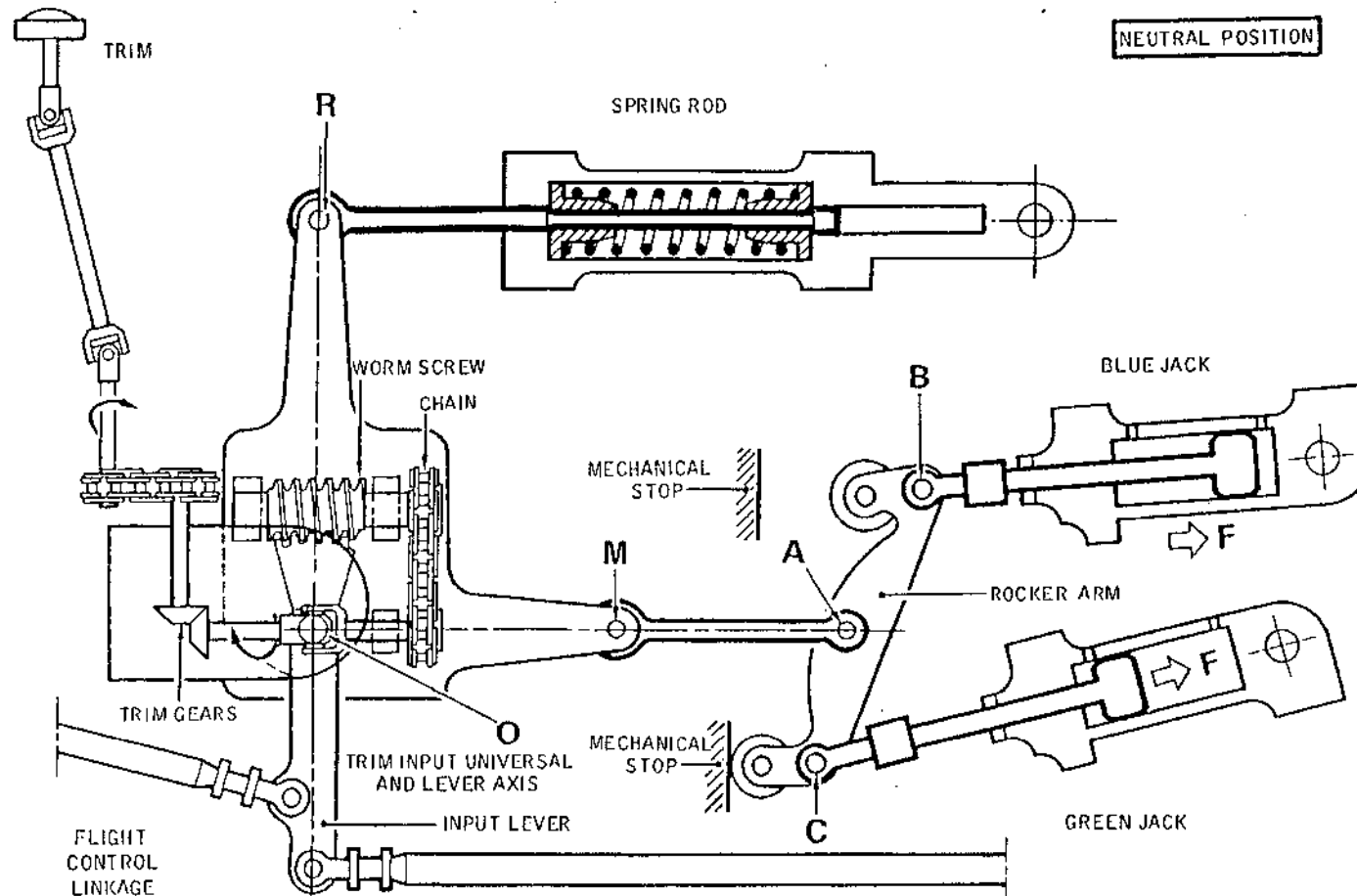
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## MAINTENANCE MANUAL

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Artificial Feel Mechanical System  
Figure 001

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## MAINTENANCE MANUAL

axes are mounted on a single chassis attached to the structure in forward compartment (zone 121).

- R The system comprises :
- R - an INTEGRAL TRIM ASSEMBLY which enables the loads of the artificial feel system to be cancelled through a differential mechanism.
- a double action - load limiting spring rod which restores loads proportional to out of trim deflections.
- R - a rocker arm which transmits loads delivered by the electro-hydraulic jacks.
- two electro-hydraulic jacks controlled by computers, ensuring variable resistance.

R B. Artificial, Feel Electronic System  
(Ref. Fig. 002 )

Two identical artificial feel systems are provided on the aircraft. They operate simultaneously.

The two systems comprise :

- two artificial feel computers :

Computer No.1 (1C235) is located in LH electronics rack, on shelf 6-215. Computer No.2 (2C235) in RH electronics rack on shelf 6-216.

They develop load laws and monitor the system.

- Two artificial feel engage switch units located on overhead panel.

They allow activation of the system and transmit orders generated by the computer.

- two press to test push buttons (1C245 and 2C245) located on panel 29-214 at Flight Engineer's station.

They enable the computer monitoring channels to be tested.

In addition, the two systems are connected to the following components :

- air data computer, for data concerning calibrated air-speed (Vc) and ADC failure.

- master warning system which receives gong and FEEL warning activation order.

R 3. Assembly - Integral Trim  
(Ref. Fig. 001 )

R This assembly comprises an input lever, toothed at its end and actuated by the pilot's mechanical control, which is meshed with a worm screw.

R The worm screw, attached to the assembly flanges, is fitted with a double pinion ensuring that it is driven by the trim gears.

The drive is effected through a universal joint : the rotational axis of the joint is the same as that of the input lever.

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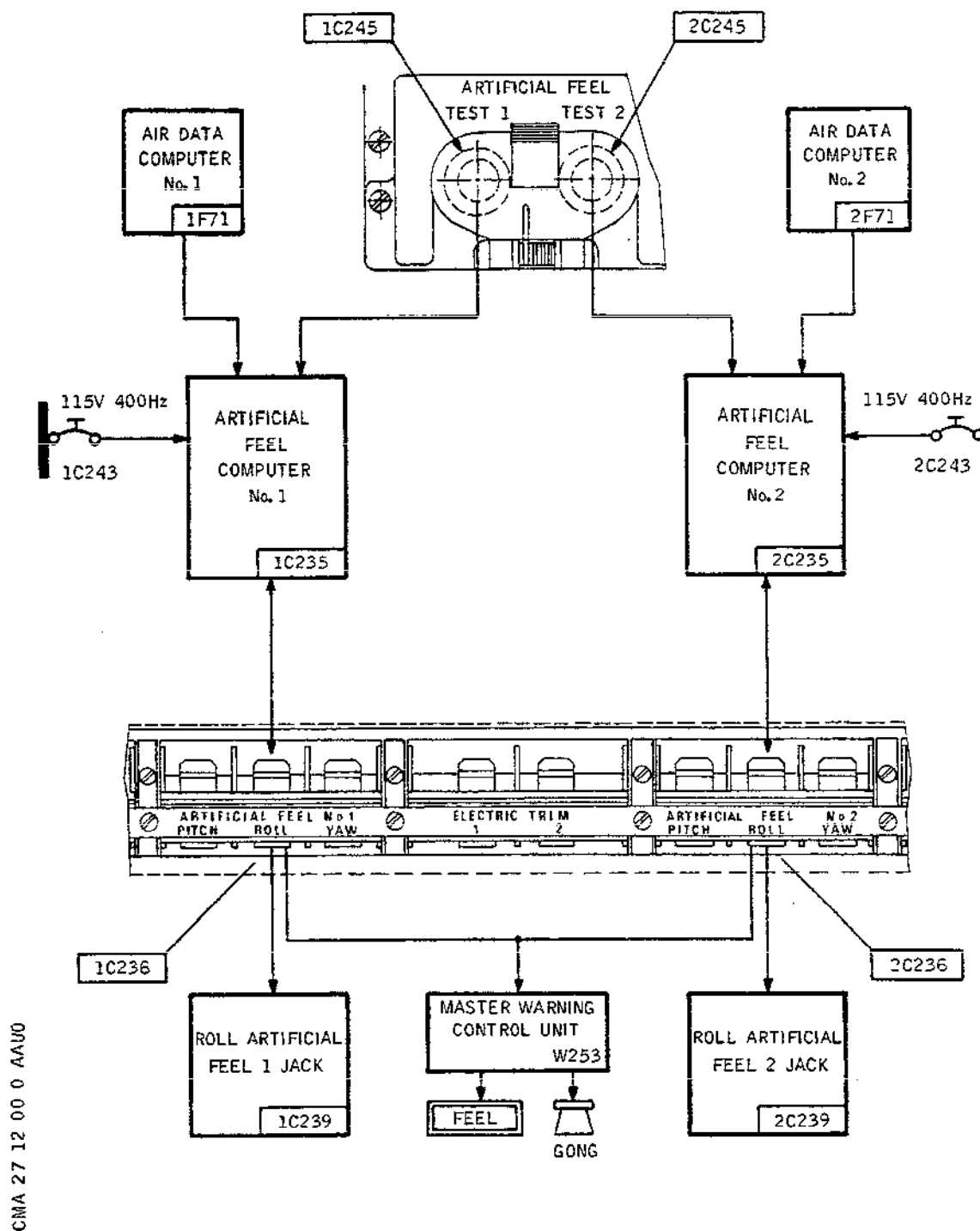
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Artificial Feel Electronic System  
Figure 002

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- R The assembly flanges form a right angle the apexes of which are represented by the letters O - R and M in the figures.
- R This assembly ensures two functions :
- cancellation of artificial feel system loads through a differential mechanism.
  - control of elevons and rudders, through an irreversible mechanical control (Flight using trim) independent of the main flight control.
- These two functions are ensured by the toothed sector/worm screw mechanism described above.

### 4. Spring Rod (Ref. Fig.001 and 003)

- The spring rod is made up of :
- R - a body (stationary) anchored to the chassis
- R - the mobile rod attached to point R on the integral trim assembly flanges.
- one spring providing the load limit for returning handwheel to neutral position and the variable resistance corresponding to low speed conditions.
- two sliders ensuring junction between spring and mobile rod. Whatever the direction of actuation, the reaction of the rod tends to align the points O.M. and A.

### 5. Jacks - Artificial Feel (Ref. Fig. 004 )

- The artificial feel jack comprises a hydraulic section and an electrical section.
- R The cylinder hydraulic supply is made through a spool valve controlled by an electro-valve ; the pressure is regulated by a servo-valve.
- The electro-valve is controlled by the monitoring electrical channel.
- The servo-valve is controlled by the electrical control channel. The piston rod is fitted with a load detector that compares the actual load on the jack with the control order.
- R If the electro-valve receives no signal, there is no hydraulic pressure on the servo-valve and the jack chambers are at tank return.
- R If the electro-valve is energized the hydraulic pressure is admitted to the servo-valve. The servo-valve modulates the pressure on the signal received from the control channel.
- R When admitted to the forward chamber of the jack this pressure maintains a load corresponding to the control signal. The rear chamber of the jack is at tank return.

### 6. Computers - Artificial Feel (Ref. Fig. 005 )

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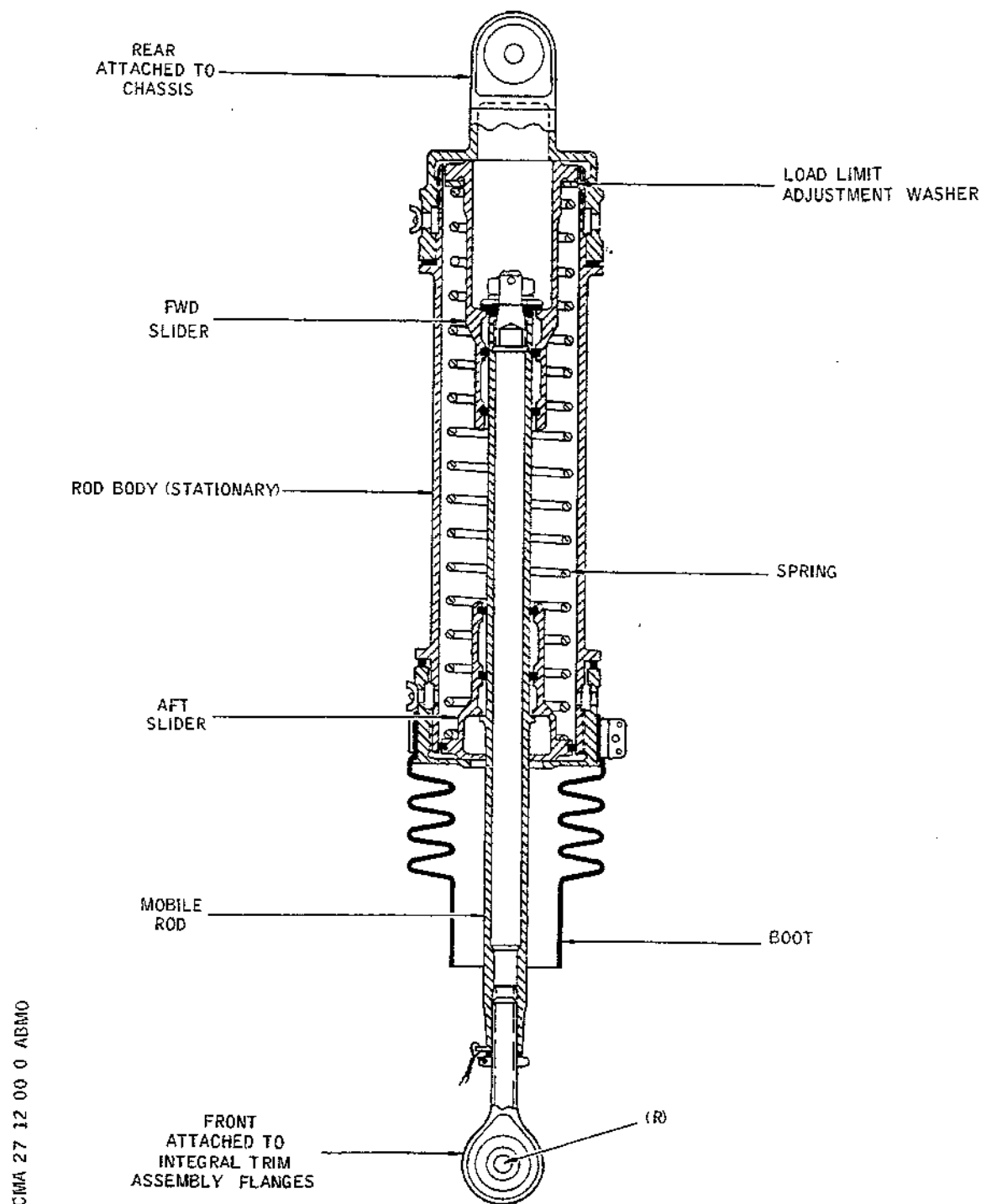
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## MAINTENANCE MANUAL



Spring Rod  
Figure 003

R

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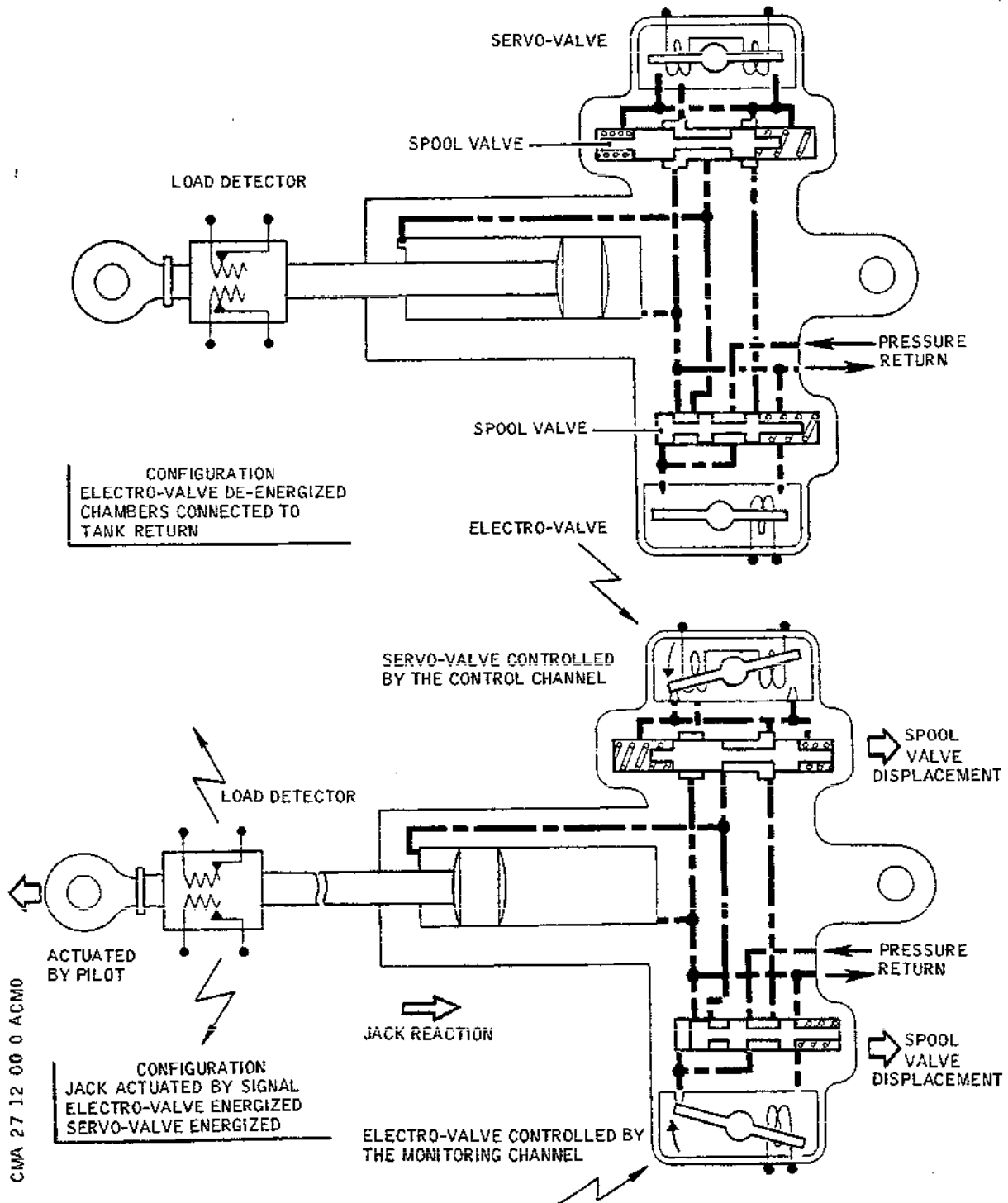
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Artificial Feel Jack - Operation  
Figure 004

R

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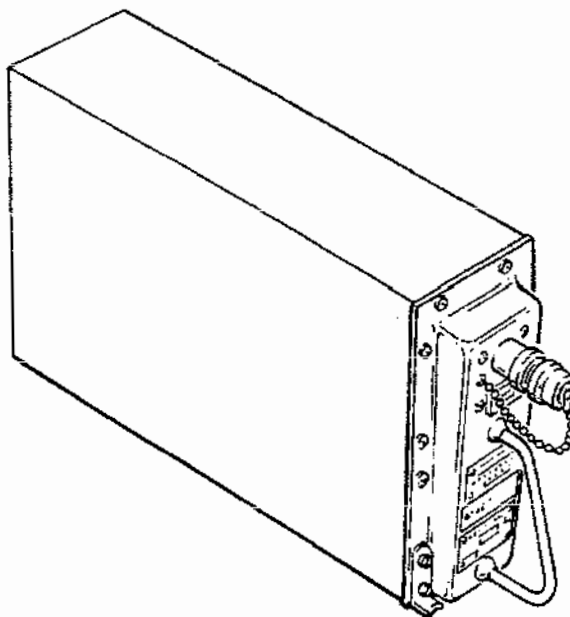
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CMA 27 12 00 0 ADMO



Artificial Feel Computer  
Figure 005

Each computer is located in a housing. This housing comprises on the front panel a connector P23 for testing and maintenance purposes, an hour meter and a handling grip. On the rear panel a double connector (DP X 2) is provided for connection to the aircraft electrical network.

A computer controls the hydraulic pressure of a jack.  
For each jack the electronic assembly comprises :

- 1 control channel.
- 1 monitoring channel.
- the supply of the load detectors of these channels.
- the supply of these channels.
- R - the circuits necessary for testing of monitoring circuits.

The control channel achieves :

- the development of the control electrical order from the various control signals with which it is provided.
- the comparison of this order with the return signals from the load detector.
- the development of the servo-valve control signal.

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- R The monitoring channel supervises the control channel
- it receives identical (and independent) control signals and develops a second electrical order.
  - it compares this second order with the return signal from the load detector second circuit.
  - it switches off the electro-valve electrical supply if the error signal, result of comparison, exceeds a given threshold.

Computer No.1 receives information from Air Data Computer No.1 and controls the Blue jacks while computer No.2 receives information from Air Data Computer No.2 and controls the Green jacks.

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### 7. Hydro-Mechanical Operation (Ref. Fig. 006 )

R The input lever actuated by the flight control linkage acts  
R through the integral trim assembly on the spring rod through  
R point R and on the rocker arm through point M. The ends of the  
rocker arm are connected to two hydraulic jacks at B and C.

The upper (Blue) jack, is supplied by the Blue hydraulic system. The lower (Green) jack is supplied by the Green hydraulic system. When they are supplied, these jacks apply two equal loads at points B and C respectively.

R The rocker arm lever AB, being longer than AC, gives priority  
R to the Blue jack.

R The Green jack abuts the stop at point E. Actuating the controls compresses the spring rod and displaces the rocker arm  
R against the action of the hydraulic jack. To overcome the spring rod resistance and the action of the jack, efforts must be applied to the controls which are proportional to :

- the control displacement
- the resistance in the system.

#### Blue Jack Failure (Ref. Fig. 007 )

R If a failure occurs in the Blue jack and the monitoring channel closes the electro-valve, there is no longer pressure at the servo-valve. Both chambers of the jack are then connected to tank return and the rocker arm actuated by the Green jack tilts. The Blue jack then abuts the stop and the system operates on the Green jack. In the event of both jacks being lost only the spring rod remains active. It is then necessary to reduce speed.

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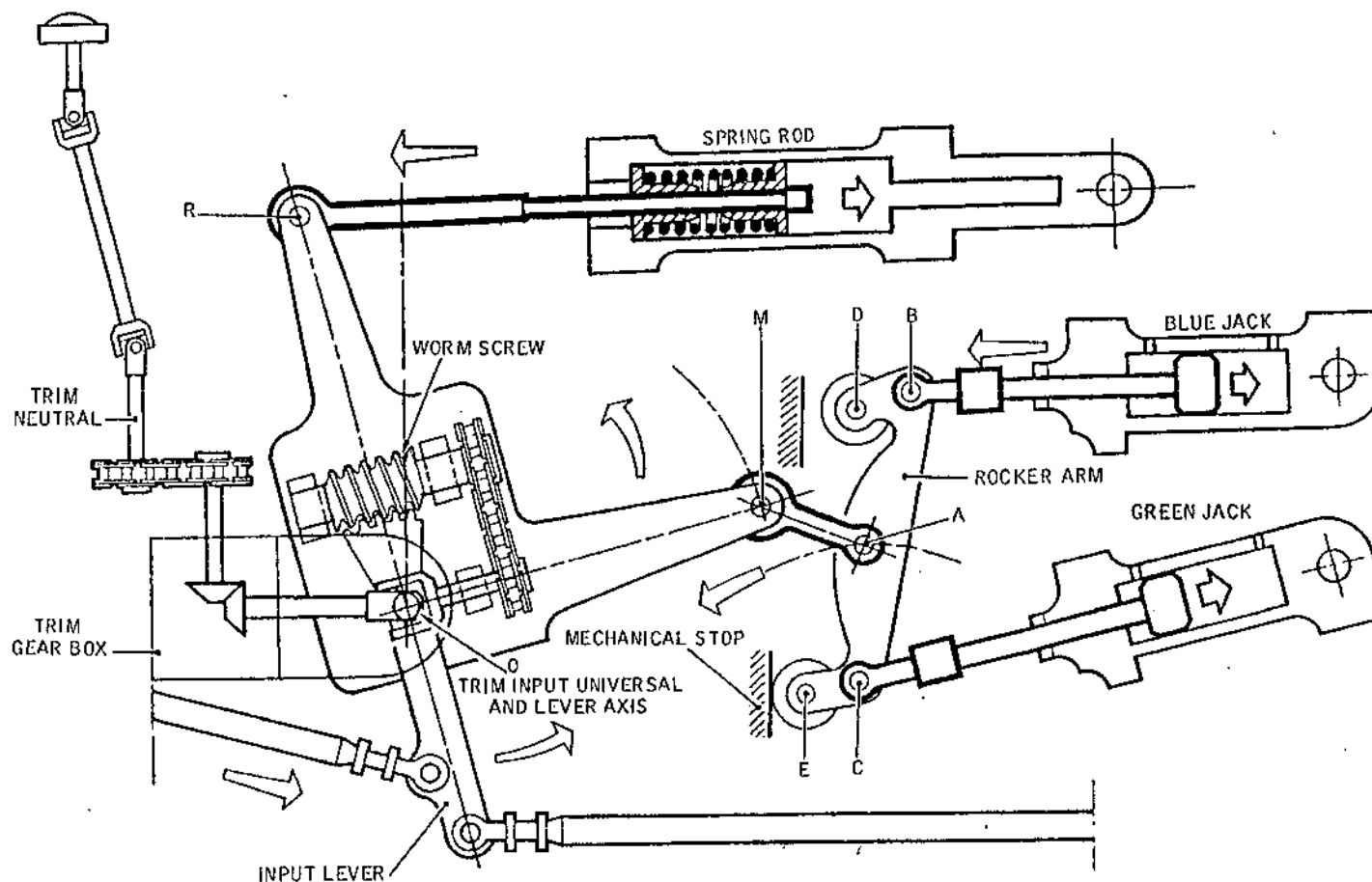
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CMA 27 12 00 0 AEMO



Artificial Feel System - Hydro-Mechanical Operation  
Figure 006

R

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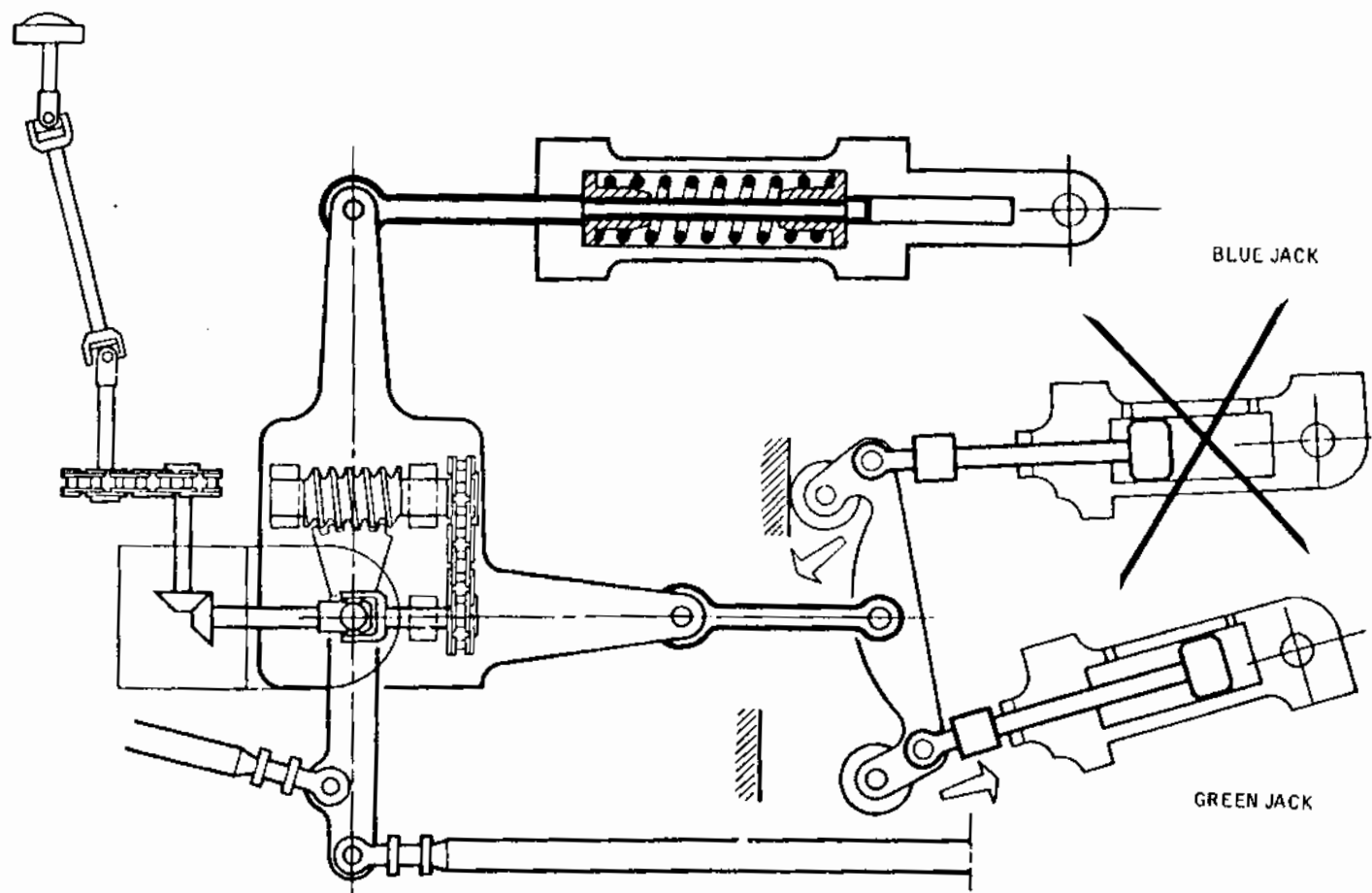
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CMA 27 12 00 0 AGM0



Blue Jack Failure  
Figure 007

R

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### 8. Electronic Operation

#### A. Achieved load law (Ref. Fig. 008 )

The load exerted by the jack is a linear law.

- Proportional to a function of calibrated airspeed ( $V_c$ ) developed by the ADC.
- Reduced by a constant value.

R The load exerted by the jack can be expressed as :

$$F_j = kV - h$$

where,

R  $F_j$  is the load exerted by the jack  
 $V$  is the signal voltage, function of  $V_c$ , from the ADC  
 $k$  and  $h$  are constants.

#### B. Control Channel (Ref. Fig. 009 )

This channel is made up of two cards

- a functional amplifier
- a functional output amplifier.

- (1) In the functional amplifier, the return signal from the load detector is compared to the sum of signals representing the load law. After demodulation, the resulting signal forms the control error signal ( $\epsilon$ ). A bias is superimposed on the error signal (difference between order to be carried out and measured force) and the sum of these two signals forms the functional channel control signal.  
A demodulator filters parasitic components in the control signal by converting the alternating components of the latter to a DC signal. The parasitic components are then eliminated by the corrective network.

- (2) The functional output amplifier comprises :
- a phase lead corrective network
  - a current amplifier
  - a circuit limiting the servo valve current

R At the channel output, the servo valve control current  $I$  is divided in two parts :

$$I = I_0 + \Delta I$$

R Where

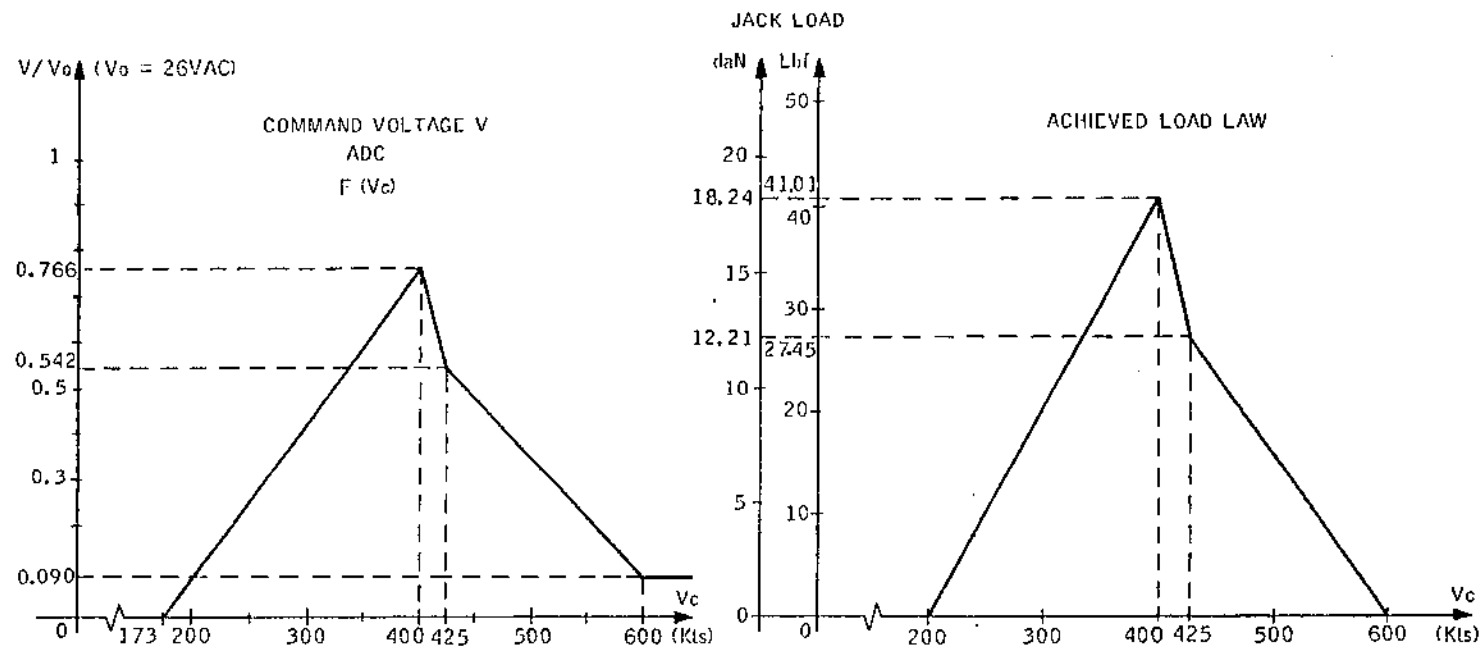
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NOTE : HANDWHEEL RESISTANCE = JACK LOAD X 0.0322 + ROD RESISTANCE

R

Load Law  
Figure 008

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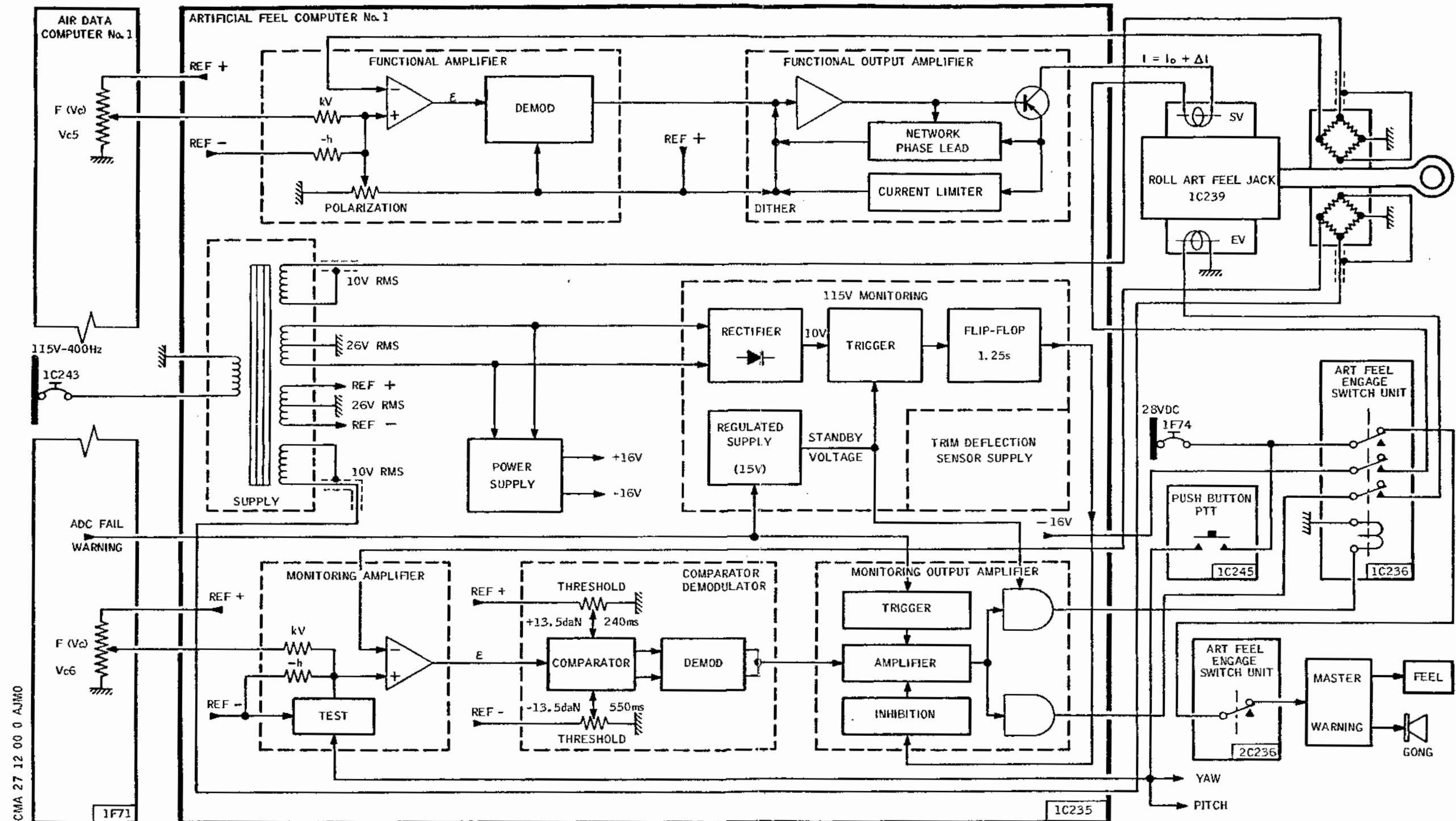
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Artificial Feel Electronic Diagram  
System No.01  
Figure 009

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$I_0$  = constant current resulting from the bias signal amplification

$\Delta I$  = variable current, positive or negative, resulting from the error signal amplification.

R This method permits the control of the servovalve the zero of which is off set (zero hydraulic flow for a control current  $I_0$ ) in order to connect the jack to tank return in the event of accidental suppression of the servovalve current.

R To reduce the inertia of the jack servovalve flapper a 400Hz signal is superimposed on the error signal at the Dither input of the output amplifier.

### C. Monitoring Channel

This channel is made up of three cards

- a monitoring amplifier
- a comparator demodulator
- a monitoring output amplifier.

#### (1) Monitoring amplifier

The monitoring channel is provided with inputs (force order and feedback) identical with those of the functional channel. In addition a Test input causes the triggering of the monitoring channel. There is no bias input on the monitoring amplifier.

#### (2) Comparator Demodulator

R The AC variation ( $\epsilon$ ) voltage, developed by the monitoring amplifier is summed separately with two AC voltages proportional to the desired triggering thresholds ( $\pm$  threshold). The result of each summing is demodulated ; polarity of voltage from either channel of the demodulator is negative if variation ( $\epsilon$ ) is greater than the triggering threshold during a period of time greater than the monitoring timing.

#### (3) Monitoring output amplifier

R If a variation greater than the triggering threshold has been detected or if a failure of the associated ADC occurs, the supply of the electrovalve and the engage switch holding coil is cut off.

To avoid disconnection in the event of a temporary 115VAC power supply loss.

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- the comparator is inhibited if the 115VAC loss occurs on the three axes (pitch, yaw, roll) of the computer considered.
  - the magnetically held switch is supplied with an emergency voltage from the 115 volts monitoring card.
- Inhibit duration is 1.25 seconds.

### D. 115 Volts Monitoring Card

This card is common to the three axes (roll, yaw, pitch). It comprises :

- a regulated DC power supply, which, from the 28 volts validity of the ADC, enables the monitoring output amplifiers and the magnetically held engage switch to be supplied in the event of loss of 115VAC.
- a circuit which generates a signal inhibiting the monitoring comparators in the event of loss of 115volts on the three axes.

Inhibit duration (1.25 seconds) is controlled by a monostable circuit.

In addition, this card comprises a circuit designed to supply the trim deflection sensor on functional side (Ref. 27-32-00, Description and Operation).

### E. General Power Supply

A transformer supplies the following outputs from the 115V 400Hz power supply :

- supply of the load detector functional measuring circuit (10 V RMS)
- supply of the load detector monitoring measuring circuit (10 V RMS)
- supply of the various potentiometers generating force orders (symmetrical windings 2 x 26 volts RMS : Ref + and Ref.)
- supply of electrical channels : two symmetrical windings supply a diode bridge followed by two LC filters. These circuits deliver the two + 16V and -16V voltages which are the stabilized power supplies.

## R 9. Controls and Indicating (Ref. Fig. 009 )

### A. Control and Indicating of the Two Artificial Feel Systems

Each artificial feel system is activated by the engagement of the magnetically held ROLL switch integral with each ARTIFICIAL FEEL engage switch unit No.1 and ARTIFICIAL FEEL engage switch unit No.2, located on the overhead panel. This switch remains engaged if the monitoring channel does not

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detect a fault of the control channels.

When detecting a fault :

- the supply of the switch engagement holding coil is cut-out.
- the supply of the electro-valve is cut-out.
- the supply of the servo-valve is cut-out.
- the engagement switch disengages and indicates OFF.
- the gong sounds and the FEEL warning light illuminates on the master warning panel. But these two warnings are only activated when both systems 1 and 2 being engaged, both monitoring channels detect a fault.

### B. Tests

At Flight Engineer's station, two ARTIFICIAL FEEL push-buttons - TEST 1 and TEST 2 enable the monitoring channel indicating system of each of systems No.1 and No.2 to be checked.

When the engagement switches of a system are placed in engaged position, action on the corresponding test push-button causes the switch to disengage.

### 10. Electrical Power Supply

SERVICE	BUS BAR	C/B PANEL
Computer No.1 (1C236) ROLL stage power supply	No.2 115 VAC ESS 6X	2-213
Computer No.2 (2C236) ROLL stage power supply	B AVIONICS 115 VAC 11Y	13-216

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### ARTIFICIAL FEEL - TROUBLE SHOOTING

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN 24-00-00, SERVICING.

#### 1. General

The following information is intended to enable faults found in flight or on the ground to be quickly rectified. This information is given in the form of fault analysis synoptic charts.

The defect can be isolated with the aid of the trouble shooting procedures and traced through OK and NOT OK paths to the appropriate charts or other specified rectification action as may be necessary. If a defect occurs perform the appropriate rectification action, then repeat the operation at which the defect was encountered to ensure the operation is OK.

Bracketed numbers in the procedures and charts indicate items on the component identification table (at the end of section). The table provides information, including component location, required for rectification.

The electrical wiring is assumed to be serviceable. However if the component fault is not found, check the wiring in accordance with the Wiring Diagram Manual (Ref. 27-12-01).

The system consists of two channels.

Trouble shooting procedure described is for channel 1. Trouble shooting procedure for channel 2 is indicated between brackets.

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## MAINTENANCE MANUAL

### 2. Prepare

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Test Set - Artificial Feel Jack and	TE3098000
Multimeter or	.
Adapter - Control Column Effort Measurement and	D921636000
Spring Scale 0-15 daN (0-33.7 lbf.)	
Electrical Ground Power Unit	
Circuit Breaker Safety Clips	

- B. Take the precautions described in the previous WARNING paragraph.
- C. Carry out Prepare operations described in 27-12-00, Adjustment/Test, Paragraph 2, Operational Test.
- D. Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).

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## MAINTENANCE MANUAL

### 3. Trouble Shooting

\*\*\*\*\*  
\*-On ADC control panel (centre console) place ADC1 \*  
\* (ADC2) switch in ON position, then place ADC1 \*  
\* (ADC2) TEST switch in position 1. After 30seconds\*  
\* approximately blue TEST indicator light must \*  
\* illuminate. Press then release amber ADC1 (ADC2) \*  
\* warning light ; it must go off. \*  
\*-On overhead panel, on ARTIFICIAL FEEL No.1 unit \*  
\* (ARTIFICIAL FEEL No.2) engage ROLL switch : ROLL \*  
\* switch remains engaged. \*  
\*\*\*\*\*

OK	NOT OK--	Disconnection of Roll Artificial Feel No1 (No2) (ROLL switch does not engage). Ref. Chart 101
----	----------	---

\*\*\*\*\*  
\* Move Captain's or First Officer's control \*  
\* handwheel and check that operation is carried out \*  
\* normally (without vibrations). \*  
\*\*\*\*\*

OK	NOT OK--	Pressure pulsations on the jack causing light vibrations of the control wheel for deflection without trim. Ref. Chart 102
----	----------	--

\*\*\*\*\*  
\* On Flight Engineer's panel 29-214, press \*  
\* ARTIFICIAL FEEL TEST 1 (TEST 2) push button. On \*  
\* overhead panel, on ARTIFICIAL FEEL No.1 \*  
\* (ARTIFICIAL FEEL No.2) unit,ROLL switch disengages\*  
\*\*\*\*\*

OK	NOT OK--	Test No.1 (No.2) inconclusive (ROLL switch does not disengage). Ref. Chart 103
----	----------	--

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||  
OK  
||

\*\*\*\*\*  
\* On overhead panel, on ARTIFICIAL FEEL No.2 \*  
\* (ARTIFICIAL FEEL No.1) unit engage ROLL switch ; \*  
\* switch disengages. \*  
\* FEEL warning light illuminates on master warning \*  
\* panel and gong sounds. \*  
\*\*\*\*\*

||  
OK  
||

NOT OK--

FEEL warning light does not illuminate and gong  
does not sound upon loss of both Artificial  
Feel systems.

Ref. Chart 104

\*\*\*\*\*  
\*-On ADC control panel (centre console) place ADC1 \*  
\* (ADC2) TEST switch in NORM position. Amber ADC1 \*  
\* (ADC2) warning light must illuminate. \*  
\*-On overhead panel, on ARTIFICIAL FEEL No.1 \*  
\* (ARTIFICIAL FEEL No.2) unit, ROLL switch disengages\*  
\*\*\*\*\*

||  
OK  
||

NOT OK--

Artificial Feel does not disconnect when an  
ADC failure occurs. Replace Artificial Feel  
computer No.1 1C235 [1] (No.2 2C235 [2])

\*\*\*\*\*  
\*-On ADC control panel (centre console) press then \*  
\* release amber ADC1 (ADC2) warning light : it must \*  
\* go off. \*  
\*-On overhead panel, on ARTIFICIAL FEEL No.1 \*  
\* (ARTIFICIAL FEEL No.2) unit engage ROLL switch \*  
\*-On circuit breaker panel 2-213 (13-216), trip and \*  
\* set during less than 1 second circuit \*  
\* breaker ROLL ART FEEL COMP 1 SUP (2 SUP) 1C243 \*  
\* (2C243), Map Ref. E 3 (G17). \*  
\*-On overhead panel, on ARTIFICIAL FEEL No.1 unit \*  
\* (ARTIFICIAL FEEL No.2) ROLL switch remains engaged\*  
\*\*\*\*\*

||  
OK  
||

NOT OK--

Disconnection of Artificial Feel due to loss of  
supply during less than 1 second.  
Replace Artificial Feel computer No.1 2C235  
[1] (No.2 2C235 [2]).

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||  
OK  
||

\*\*\*\*\*  
\* Carry out Prepare paragraph and tests described in\*  
\* 27-12-00, Adjustment/Test, paragraph 3 or 4 \*  
\* (depending on tools and equipment available). \*  
\* Results of test are conclusive. \*  
\*\*\*\*\*

		Functional channel failure causing an error on jack load smaller than the triggering threshold of the comparison channel Ref. Chart 105
OK	NOT OK--	

\*\*\*\*\*  
\* End of ROLL Artificial Feel Trouble Shooting \*  
\*\*\*\*\*

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*****		-----	
* DISCONNECTION OF ROLL ARTIFICIAL	*	GROUND EQUIPMENT REQUIRED	
* FEEL No.1 (No.2) (ROLL SWITCH DOES	*	-----	
* NOT ENGAGE).	*	DESCRIPTION	PART NO
*****		-----	
		MULTIMETER	=====
		-----	

\*\*\*\*\*  
\* Replace Artificial Feel computer No.1 1C235 [1] \*  
\* (No.2 2C235 [2]). \*  
\* On overhead panel, on ARTIFICIAL FEEL No.1 \*  
\* (ARTIFICIAL FEEL No.2) unit, engage ROLL switch ; \*  
\* it disengages. \*  
\*\*\*\*\*

		-----	=====
YES	NO--	Replaced Artificial Feel computer was faulty	
		-----	-----

\*\*\*\*\*  
\* Replace Artificial Feel No.1 unit 1C236 [3] (No.2 \*  
\* 2C236 [4]). \*  
\* On overhead panel, on ARTIFICIAL FEEL No.1 \*  
\* (ARTIFICIAL FEEL No.2) unit, engage ROLL switch ; \*  
\* it disengages. \*  
\*\*\*\*\*

		-----	-----
YES	NO--	Replaced Artificial Feel unit was faulty	
		-----	-----

\*\*\*\*\*  
\* Replace AIR DATA COMPUTER 1 1F 71 [5] (ADC2 2F 71 \*  
\* 2F 71 [6]). \*  
\* On ADC control panel (centre console) place ADC1 \*  
\* (ADC2) switch in ON, then place ADC1 (ADC2) TEST \*  
\* switch in position 1. After 30 seconds approxima- \*  
\* tely blue TEST indicator light must illuminate. \*  
\* Press and release amber ADC1 (ADC2) warning light; \*  
\* this light must go off. \*  
\*--On overhead panel, on ARTIFICIAL FEEL No.1 \*  
\* (ARTIFICIAL FEEL No.2) unit, engage ROLL switch ; \*  
\* this switch disengages. \*  
\*\*\*\*\*

		-----	-----
YES	NO--	Replaced ADC was faulty	
		-----	-----

Chart 101 (Sheet 1 of 2)

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||  
YES  
||

\*\*\*\*\*  
\* Connect a voltmeter between pins 20 and 21 of \*  
\* test connector P23 on front face of Artificial \*  
\* Feel computer No.1 (No.2) 1C235 (2C235) \*  
\* AC voltage read on voltmeter is : \*  
\*\*\*\*\*

	26V	0V---	Replace circuit breaker ROLL ART FEEL COMP 1 SUP 1C 243 [7] (COMP 2 SUP 2C243 [8]).
		-----	Replace blue jack 1C239 [9] (Green 2C239 [10])

Chart 101 (Sheet 2 of 2)

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## MAINTENANCE MANUAL

*****		-----	
* PRESSURE PULSATIONS ON THE JACK	*	GROUND EQUIPMENT REQUIRED	
* CAUSING VIBRATIONS OF THE CONTROL	*	-----	
* HANDWHEEL FOR DEFLECTIONS WITHOUT	*	DESCRIPTION	PART NO
* TRIM.	*	-----	-----
*****		-	-
		-----	

\*\*\*\*\*  
\* Replace Artificial Feel computer No.1 1C 235 [1] \*  
\* (No.2 2C 235 [2]). \*  
\* On overhead panel, on ARTIFICIAL FEEL No.1 \*  
\* (ARTIFICIAL FEEL No.2) unit engage ROLL switch \*  
\* Move Captain's or First Officer's control hand- \*  
\* wheel and check that deflection is carried out \*  
\* normally (without vibrations). \*  
\*\*\*\*\*

		-----	
YES	NO==	Replace blue jack 1C 239 [9] (Green 2C 239	
		[10]).	
		-----	
-----		Replaced Artificial Feel computer was faulty.	
		-----	

Chart 102 (Sheet 1 of 1)

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\*\*\*\*\*  
\* TEST No.1 (No.2) INCONCLUSIVE (ROLL\*  
\* SWITCH DOES NOT DISENGAGE.) \*  
\*\*\*\*\*

GROUND EQUIPMENT REQUIRED

DESCRIPTION

PART NO.

-

-

\*\*\*\*\*  
\*-On circuit breaker panel 2-213 (13-216), check that\*  
\* circuit breaker YAW ART FEEL COMP 1 SUP, 1C 242 \*  
\* (COMP 2 SUP 2C 242) Map Ref. E2 (G16) is set. \*  
\*-On overhead panel, on ARTIFICIAL FEEL No.1 \*  
\* (ARTIFICIAL FEEL No.2) unit engage ROLL and YAW \*  
\* switches. \*  
\*-At Flight Engineer's panel 29-214, press \*  
\* ARTIFICIAL FEEL TEST 1 (TEST 2) push-button \*  
\*-At overhead panel, on ARTIFICIAL FEEL No.1 \*  
\* (ARTIFICIAL FEEL No.2) unit, YAW switch disengages.\*  
\*\*\*\*\*

YES	NO---	Replace test button of Artificial Feel 1C245 [11] (2C 245 [12]).
-----		Replace Artificial Feel computer No.1 1C235 [1] (No.2 2C235 [2]).

Chart 103 (Sheet 1 of 1)

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*****	-----
* FEEL WARNING LIGHT DOES NOT ILLUMI-	* GROUND EQUIPMENT REQUIRED
* NATE AND GONG DOES NOT SOUND UPON	* -----
* LOSS OF BOTH ARTIFICIAL FEEL	* DESCRIPTION PART NO.
* SYSTEMS.	* -----
*****	* MULTIMETER -----
	-----

\*\*\*\*\*  
 \* On circuit breaker panel 2-213 (13-216), check \*  
 \* that circuit breaker YAW ART FEEL COMP 1 SUP 1C242\*  
 \* (COMP 2 SUP 2C242) Map Ref. E2 (G16) is set. \*  
 \* On overhead panel, on ARTIFICIAL FEEL No.1 and No.2\*  
 \* units engage YAW switches (YAW switch No.1 (No.2) \*  
 \* disengages). \*  
 \* On Flight Engineer's panel 29-214, press \*  
 \* ARTIFICIAL FEEL TEST 1 (TEST 2) push button. \*  
 \* FEEL warning light illuminates on master warning \*  
 \* panel and gong sounds. \*  
 \*\*\*\*\*

		-----	
YES	NO---	Ref 33-15-00, Trouble Shooting.	
		=====	

\*\*\*\*\*  
 \* On overhead panel, remove Artificial Feel No.1 \*  
 \* unit [3] 1C236, then on this unit check \*  
 \* continuity between pins 34 and 7 then 49 and 11 \*  
 \* (ROLL switch indicates OFF). There is continuity. \*  
 \*\*\*\*\*

		-----	
YES	NO---	Replace Artificial Feel No.1 unit [3]	
		=====	

\*\*\*\*\*  
 \* On overhead panel, remove Artificial Feel No.2 \*  
 \* unit [4] 2C236, then on this unit, check continui-\*  
 \* ty between pins 34 and 7 then 49 and 11 (ROLL \*  
 \* switch indicates OFF). There is continuity. \*  
 \*\*\*\*\*

		-----	
YES	NO---	Replace ARTIFICIAL FEEL No.2 unit [4]	
		-----	
		-----	
		Ref 33-15-00, Trouble Shooting	
		-----	

Chart 104 (Sheet 1 of 1)

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ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[1] Artificial feel computer No.1	215BS	6-215	1C235	Electronics rack LH	27-32-44 R/I	27-12-01
[2] Artificial feel computer No.2	216BS	6-216	2C235	Electronics rack RH	27-32-44 R/I	27-12-01
[3] Artificial feel engage switch unit No.1	-	4-211	1C236	Overhead panel	27-32-41 R/I	27-12-01
[4] Artificial feel engage switch unit No.2	-	4-211	2C236	Overhead panel	27-32-41 R/I	27-12-01
[5] Air Data Computer 1	215BS	6-215	1F 71	Electronics rack LH	34-00-00 R/I	27-12-01
[6] Air Data Computer 2	216BS	6-216	2F 71	Electronics rack RH	34-00-00 R/I	27-12-01
[7] Circuit breaker 115VAC		2-213	1C243	Map Ref, E3	24-50-00 R/I	27-12-01
[8] Circuit breaker 115VAC		13-216	2C243	Map Ref, G17	24-50-00 R/I	27-12-01
[9] Blue artificial feel jack	213BF	121	1C239	Undercabin floor	27-14-13 R/I	27-12-01
[10] Green artificial feel jack	121DB	121	2C239	Undercabin floor	27-14-15 R/I	27-12-01
[11] Press to test push-button		29-214	1C245	Flight Engineer's panel	-	27-12-01

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ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[12] Press to test push-button		29-214	20245	Flight Engineer's panel	-	27-12-01

Component Identification  
Table 101

#### 4. Close-Up

- A. Carry out Close-Up paragraph described in 27-12-00, Adjustment/Test, paragraph 3 or 4 : Functional Test.

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### ARTIFICIAL FEEL - ADJUSTMENT/TEST

WARNING: MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE: DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED: DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The purpose of the following tests is to:

- A. Check the correct operation of the Artificial Feel No.1 and No.2 monitoring and control channels.
  - (1) Pressure test.
  - (2) Disconnection due to overpressure (Test function).
  - (3) Disconnection due to underpressure.
  - (4) Disconnection due to Air Data Computer failure.
  - (5) Functional test of jack electrovalve.
- B. Check the loads delivered by Artificial Feel No.1 and No.2 systems.
  - (1) By means of equipment TE3098000.
  - (2) When equipment TE3098000 is not available.

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## MAINTENANCE MANUAL

### 2. Operational Test

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical ground power unit	-
Circuit breaker safety clips	-
Simulator - pressure sensors	87-209-455

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Aircraft must be on the ground, shock absorbers compressed.
- (3) Trip, safety and tag the following circuit breaker:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
STICK SHAKER SUP	1-213	W 513	P15

- (4) Check that the following circuit breakers are set:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW A SYS SUP	1-213	G 292	M17
ADC 1 28 V SUP		1F 74	P12
ADC 1 26 V SUP	2-213	1F 78	A 2
1ST PLT ADC INST SUP		1F 75	B 3
ROLL ART FEEL COMP 1 SUP		1C 243	E 2
ADC 1 115 V SUP		1F 73	F 3
RH UC WEIGHT SW B SYS SUP	3-213	G 294	B 9
ADC 2 28 V SUP	5-213	2F 74	F12
2ND PLT ADC INST SUP	13-216	2F 75	A14
ADC 2 26 V SUP		2F 78	F14
ADC 2 115 V SUP		2F 73	F15
ROLL ART FEEL COMP 2 SUP		2C 243	G17

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- (5) Set the following circuit breakers:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT & NAV BUS 14XS	2-213	X 355	H 2
NAV INST BUS 13XS	13-216	X 345	G 4

- (6) On ADC control panel, (centre console) check that ADC1 and ADC2 switches are in OFF position and that ADC1 and ADC2 TEST switches are in NORM position.
- (7) Carry out Prepare paragraph operations of Procedure to Set Flight Controls in Mechanical Mode (Ref. 27-00-00, Servicing).
- (8) On Captain's and First Officer's airspeed indicators (respectively located on Captain's and First Officer's instrument panels) make certain that mode selector knobs are positioned with N markers visible (Normal).
- (9) Connect pressure sensor simulator to front face of ADC1 (1F71) (on shelf 6-215).  
On this unit, make certain that:
- SIMUL-SENSOR switch is in SENSOR position,
  - ALTITUDE COARSE potentiometer is set to 1013,
  - AIRSPEED COARSE potentiometer is set to 4.

NOTE: During the following tests described below do not take into account visual and aural warnings which are not mentioned.

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## MAINTENANCE MANUAL

### C. Pressure Test

- (1) Carry out procedure to set Flight Controls in Mechanical Mode (Ref. 27-00-00, Servicing).
- (2) Move control handwheel in both directions and note that the load applied is progressive.

NOTE: Check on ICOVOL indicator (Flight Control Surface Position Indicator) (on First Officer's instrument panel) the deflection values of the control surfaces.

- (3) On ADC control panel (centre console):
  - (a) Place ADC1 and ADC2 switches in ON position.
  - (b) Place ADC1 and ADC2 TEST selector switches in position 1.
    - b1) Amber ADC1 and ADC2 warning lights must illuminate.
    - b2) After approximately 30 seconds, the Blue TEST indicator lights must illuminate.
    - b3) Press then release ADC1 and ADC2 amber warning lights. They must go off.
- (4) On overhead panel, on ARTIFICIAL FEEL No.1 engage switch unit engage ROLL switch. It must remain engaged.
- (5) Move control handwheel in both directions and check that load applied is progressive and, for a same deflection greater than during the operation described in (2).

NOTE: On ICOVOL indicator (on First Officer's instrument panel), check the deflection values of the control surfaces.
- (6) On overhead panel:
  - (a) On ARTIFICIAL FEEL No.1 engage switch unit, disengage ROLL switch.
  - (b) On ARTIFICIAL FEEL No.2 engage switch unit, engage ROLL switch. It must remain engaged.

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- (7) Repeat operation (5). Results must be identical.
- (8) On ADC control panel (centre console).
  - (a) Place ADC1 and ADC2 TEST selector switches in NORM position.
  - (b) Place ADC1 and ADC2 switches in OFF position.
  - (c) On ARTIFICIAL FEEL No.2 engage switch unit (on overhead panel) ROLL switch must disengage.
- (9) Shut down pressurization of Blue and Green hydraulic systems (Ref. 29-12-00 and 29-11-00, Servicing).
- (10) On Flight Control Unit (overhead panel) place GREEN INVERTER and BLUE INVERTER switches in PWR OFF position.

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### D. Disconnection Due to Overpressure (Test Function)

- (1) On ADC control panel, (centre console), place ADC1 and ADC2 switches in ON position. If amber ADC1 and ADC2 warning lights illuminate, press them then release. They must go off.
- (2) On overhead panel, on ARTIFICIAL FEEL No.1 engage switch unit and ARTIFICIAL FEEL No.2 engage switch unit engage ROLL switches. They must remain engaged.
- (3) On Flight Engineer's panel 29-214, press then release each ARTIFICIAL FEEL TEST1 and TEST2 push-button.
  - (a) When the first push-button is pressed, ROLL switch on ARTIFICIAL FEEL No.1 engage switch unit must disengage.
  - (b) When the second push-button is pressed:
    - Gong must sound,
    - on overhead panel, on master warning panel, FEEL warning light must illuminate,
    - ROLL switch on ARTIFICIAL FEEL No.2 engage switch unit must disengage.
- (4) On ADC control panel, (centre console), place ADC1 and ADC2 switches in OFF position.
- (5) On overhead panel, on master warning panel, press and release FEEL warning light.
  - It must go off.

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### E. Disconnection Due to Underpressure - Test (No Hydraulic Systems Pressurized).

- (1) On ADC control panel, (centre console).
  - (a) Place ADC1 switch in ON position.
  - (b) Press and release amber ADC1 warning light if necessary. This light must go off.
- (2) On pressure sensor simulator:
  - (a) Place SIMUL-SENSOR switch in SIMUL position.
  - (b) Slowly adjust AIRSPEED potentiometer so as to read 400 kts on Captain's instrument panel airspeed indicator (approximately 284 on AIRSPEED potentiometer).
- (3) On ADC control panel (centre console), if necessary, press then release amber ADC1 warning light. This light must go off.
- (4) On overhead panel, check that, on ARTIFICIAL FEEL No.1 engage switch unit, ROLL switch falls as soon as it is engaged.
- (5) On pressure sensor simulator.
  - (a) Reduce AIRSPEED potentiometer value to 4.
  - (b) Place SIMUL-SENSOR switch in SENSOR position.
- (6) On ADC control panel (centre console), place ADC1 switch in OFF position.
- (7) Disconnect pressure sensor simulator from ADC1 and, on shelf 6-216, connect it to front face of ADC2.
- (8) On ADC control panel (centre console):
  - (a) Place ADC2 switch in ON position.
  - (b) If necessary, press then release amber ADC2 warning light. This light must go off.

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- (9) On pressure sensor simulator.
  - (a) Place SIMUL-SENSOR switch in SIMUL position.
  - (b) Slowly adjust AIRSPEED potentiometer so as to read 400 kts on First Officer's instrument panel airspeed indicator (approximately 284 on AIRSPEED potentiometer).
- (10) On ADC control panel (centre console), if necessary, press then release amber ADC2 warning light. This light must go off.
- (11) On overhead panel, on ARTIFICIAL FEEL No.2 engage switch unit, check that ROLL switch falls as soon as it is engaged.
- (12) On overhead panel, on master warning panel, if necessary, press then release FEEL warning light. This light must go off.
- (13) On pressure sensor simulator.
  - (a) Reduce value of AIRSPEED potentiometer to 4.
  - (b) Place SIMUL-SENSOR switch in SENSOR position.
- (14) On ADC control panel (centre console), place ADC2 switch in OFF position.
- (15) Disconnect pressure sensor simulator from ADC2.

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### F. Disconnection Due to ADC Failure - Test

- (1) On ADC control panel, (centre console), place ADC1 and ADC2 switches in ON position. If the amber ADC1 and ADC2 warning lights illuminate, press them then release. They must go off.
- (2) On overhead panel, on ARTIFICIAL FEEL No.1 and ARTIFICIAL FEEL No.2 engage switch units, engage ROLL switches. They must remain engaged.
- (3) On ADC control panel (centre console), place ADC1 and ADC2 switches in OFF position.

On overhead panel, on ARTIFICIAL FEEL No.1 and ARTIFICIAL FEEL No.2 engage switch units, ROLL switches must disengage.

- When the second switch disengages, gong must sound and FEEL warning light, on master warning panel, must illuminate.

- (4) On overhead panel, on master warning panel, press and release FEEL warning light.

- It must go off.

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### G. Functional Test of Jack Electrovalve

- RB (1) Function Test in accordance with 27-32-44, Adjustment/Test,  
B para.2.D.(1).  
B

### H. Close-Up

- (1) Remove safety clip and tag and reset circuit breaker W 513.
- (2) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).
- (3) On overhead panel, on Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position.
- (4) Trip, safety and tag the following circuit breakers:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT & NAV BUS 14XS	2-213	X 355	H 2
NAV INST BUS 13XS	13-216	X 345	G 4

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## MAINTENANCE MANUAL

### 3. Functional Test, using Equipment TE3098000

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Test set - artificial feel jack	TE3098000
Electrical ground power unit	-
Circuit breaker safety clips	-
Voltmeter, DC, 0.5 V range, 0.1% accuracy	-

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Trip, safety and tag the following circuit breakers:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
STICK SHAKER SUP	1-213	W 513	P15
YAW ART FEEL COMP 1 SUP	2-213	1C 242	E 2
ROLL ART FEEL COMP 1 SUP		1C 243	E 3
PITCH ART FEEL COMP 1 SUP		1C 244	E 4
YAW ART FEEL COMP 2 SUP	13-216	2C 242	G16
ROLL ART FEEL COMP 2 SUP		2C 243	G17
PITCH ART FEEL COMP 2 SUP		2C 244	G18

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## MAINTENANCE MANUAL

- (3) Make certain that the following circuit breakers are set:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW A SYS SUP ADC 1 28 V SUP	1-213	G 292 1F 74	M17 P12
ADC 1 26 V SUP 1ST PLT ADC INST SUP ADC 1 115 V SUP	2-213	1F 78 1F 75 1F 73	A 2 B 3 E 3
RH UC WEIGHT SW B SYS SUP	3-213	G 294	B 9
ADC 2 28 V SUP	5-213	2F 74	F12
2ND PLT ADC INST SUP ADC 2 26 V SUP ADC 2 115 V SUP	13-216	2F 75 2F 78 2F 73	A14 F14 F15

- (4) Remove safety clip and tag and set the following circuit breaker:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
NAV. INST. BUS 13XS	13-216	X 345	G4

- (5) On shelf 6-215:

- (a) Unlock and remove Artificial Feel Computer No.1 (1C 235) (Ref. 27-32-44, Removal/Installation).
- (b) Connect equipment TE3098000 in place of the computer.
- (c) Connect computer (1C 235) to equipment TE3098000.

NOTE: Refer to the operational handbook to operate equipment TE3098000.

- (6) On front face of equipment TE3098000, make certain that M-A switches are in position A.
- (7) Carry out procedure to set Flight Controls in Mechanical Mode (Ref. 27-00-00, Servicing).

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## MAINTENANCE MANUAL

### C. Test

- (1) Remove safety clip and tag and reset the following circuit breaker:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ROLL ART FEEL COMP 1 SUP	2-213	1C 242	E 3

- (2) On shelf 6-215, on the front face of equipment TE3098000, connect voltmeter to SORTIE terminals of GAUCHISSEMENT channel and place the relevant switch in position M.

NOTE: If required, adjust voltmeter zero position.

- (3) On ADC control panel (centre console), place ADC1 switch in ON position.

The ADC1 warning light may illuminate.

- (4) If required, press and release ADC1 warning light to extinguish it.

- (5) On overhead panel, on ARTIFICIAL FEEL No.1 engage switch unit, engage ROLL switch.

- (6) On shelf 6-215, on equipment TE3098000, the voltage read at the voltmeter must be 0 V plus 0.44 V.

- (7) On ADC control panel (centre console), place ADC1 TEST switch in position 1.

(a) The amber ADC1 warning light must illuminate.

(b) After approximately 30 seconds the blue TEST indicator light must illuminate.

- (8) On shelf 6-215, on equipment TE3098000, the voltage read at the voltmeter must be 1.52 V plus or minus 0.65 V.

- (9) On ADC control panel, (centre console), place ADC1 TEST switch in NORM position and place ADC1 switch in OFF position.

- (10) On ARTIFICIAL FEEL No.1 engage switch unit, on overhead panel, disengage ROLL switch.

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## MAINTENANCE MANUAL

- (11) Trip, safety and tag the following circuit breaker:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ROLL ART FEEL COMP 1 SUP	2-213	1C 243	E 3

- (12) On shelf 6-215:

- (a) On equipment TE3098000, GAUCHISSEMENT channel, place M-A switch in position A.
- (b) Disconnect voltmeter.
- (c) Disconnect Artificial Feel Computer No.1 (1C 235) from equipment TE3098000.
- (d) Remove equipment TE3098000.
- (e) Install Artificial Feel Computer No.1 and lock on shelf (Ref. 27-32-44, Removal/Installation).

- (13) On shelf 6-216:

- (a) Unlock and remove Artificial Feel Computer No.2 (2C 235) (Ref. 27-32-44, Removal/Installation).
- (b) Connect equipment TE3098000 in place of the computer.
- (c) Connect computer (2C 235) to equipment TE3098000.
- (d) Connect the voltmeter to SORTIE terminals of GAUCHISSEMENT channel.

- (14) On equipment TE3098000 make certain that M-A switches are in position A.

- (15) Remove safety clip and tag and reset the following circuit breaker:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ROLL ART FEEL COMP 2 SUP	13-216	2C 243	G17

- (16) Repeat operations from paragraph (2) to (10) inclusive, for ARTIFICIAL FEEL No.2 and ADC2 systems. Results must be identical.

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- (17) Trip, safety and tag the following circuit breaker:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
YAW ART FEEL COMP 2 SUP	13-216	2C 242	G16

- (18) On shelf 6-216:

- (a) On equipment TE3098000, GAUCHISSEMENT channel, place M-A switch in position A.
- (b) Disconnect voltmeter.
- (c) Remove Artificial Feel Computer No.2 (2C 235) connected to equipment TE3098000.
- (d) Remove equipment TE3098000.
- (e) Install Artificial Feel Computer No.2 (2C 235) and lock (Ref. 27-32-44, Removal/Installation).

- (19) Carry out test (27-32-44, Adjustment/Test).

### D. Close-Up

- (1) Carry out Close-Up operations of Procedure to set Flight Controls in Mechanical Mode (Ref. 27-00-00, Servicing).
- (2) Remove safety clips and tags and reset the circuit breakers.
- (3) Trip, safety and tag the following circuit breaker:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
NAV INST BUS 13XS	13-216	X 345	G 4

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## MAINTENANCE MANUAL

### 4. Functional Test Without Equipment TE3098000

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Adapter - control column effort measurement	D921636000
Electrical ground power unit	-
Spring scale: 0 - 15 daN (0 - 33.7 lbf)	-
Circuit breaker safety clips	-

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Install adapter D921636000 on control handwheel and attach spring scale to :H part of equipment.
- (3) Make certain that the following circuit breakers are set:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW A SYS SUP	1-213	G 292	M17
ADC 1 28 V SUP		1F 74	P12
ADC 1 26 V SUP	2-213	1F 78	A 2
1ST PLT ADC INST SUP		1F 75	B 3
ROLL ART FEEL COMP 1 SUP		1C 243	E 3
ADC 1 115 V SUP		1F 73	F 3
RH U/C WEIGHT SW B SYS SUP	3-213	G 294	B 9
ADC 2 28 V SUP	5-213	2F 74	F12
2ND PLT ADC INST SUP	13-216	2F 75	A14
ADC 2 26 V SUP		2F 78	F14
ADC 2 115 V SUP		2F 73	F15
ROLL ART FEEL COMP 2 SUP		2C 243	G17

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- (4) Remove safety clip and tag and set the following circuit breaker:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
NAV INST BUS 13XS	13-216	X 345	G 4

- (5) Trip, safety and tag the following circuit breaker:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
STICK SHAKER SUP	1-213	W 513	P15

- (6) On ADC control panel (centre console), make certain that ADC1 and ADC2 switches are in OFF position and ADC1 and ADC2 TEST switches are in NORM position.
- (7) Carry out procedure to set Flight Controls in Mechanical Mode (Ref. 27-00-00, Servicing).
- (8) Make certain that trim controls are set to zero.
- (9) On overhead panel, on ARTIFICIAL FEEL No.1 and ARTIFICIAL FEEL No.2 engage switch units make certain that ROLL switches are not engaged.

NOTE: During test, do not take aural and visual warnings which are not mentioned into account.

### C. Test

NOTE: When during the following test, a force is to be exerted on spring scale, this force must be applied progressively and continuously.

Force must be exerted tangentially to arc described by spring scale attachment point.

- (1) Pull spring scale until an outer elevon deflection of 5 degrees is read on ICOVOL indicator.

- Spring scale must read, F 1 = 3.8 daN (8.5 lbf) approx.

- (2) Continue to pull spring scale until an outer elevon deflection of 10 degrees is obtained.

- Spring scale must read F 2 = 6.5 daN (14.6 lbf) approx.

- (3) Release force on spring scale.

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- (4) Calculate resistance as per formula:  $\frac{F2 - F1}{10 - 5}$
- This mechanical resistance must be between 0.48 daN (1.08 lbf) for each degree of elevon deflection and 0.58 daN (1.3 lbf) for each degree of elevon deflection.
- (5) On ADC control panel (centre console), place ADC1 switch in ON position.
- If ADC1 warning light illuminates, press and release it. It must go off.
- (6) On overhead panel, on ARTIFICIAL FEEL No.1 engage switch unit, engage ROLL switch.
- This switch must remain engaged.
- (7) Pull spring scale until an outer elevon deflection of 5 degrees is obtained.
- Spring scale must read: F 1 plus or minus 0.2 daN (0.45 lbf).
- (8) Continue to pull spring scale until an outer elevon deflection of 10 degrees is obtained.
- Spring scale must read: F 2 plus or minus 0.2 daN (0.45 lbf).
- (9) Release force on spring scale.
- (10) On ADC control panel (centre console), place ADC1 TEST selector switch in position 1, wait approximately 30 seconds.
- Amber ADC1 warning light must illuminate,
  - On ARTIFICIAL FEEL No.1 engage switch unit, ROLL switch must disengage,
  - ADC1 blue TEST light must illuminate.
- (11) Press and release ADC1 warning light.
- This light must go off.
- (12) On overhead panel, on ARTIFICIAL FEEL No.1 engage switch unit, engage ROLL switch.
- This switch must remain engaged.

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- (13) Pull spring scale until an outer elevon deflection of 5 degrees is obtained.
- Spring scale must read: F 3 = 5.6 daN (12.6 lbf) approx.
- (14) Continue to pull spring scale until an outer elevon deflection of 10 degrees is obtained.
- Spring scale must read: F 4 = 10.55 daN (23.7 lbf) approx.
- (15) Release force on spring scale.
- (16) Calculate mechanical resistance as per formula:  $\frac{F4 - F3}{10 - 5}$
- This mechanical resistance must be between 0.86 daN (1.93 lbf) for each degree of elevon deflection and 1.04 daN (2.34 lbf) for each degree of elevon deflection.
- (17) On overhead panel on ARTIFICIAL FEEL No.1 engage switch unit, disengage ROLL switch.
- (18) On centre console, place ADC1 TEST switch in NORM position, then place ADC1 switch in OFF position.
- (19) Repeat operations (1) to (18) above, replacing ADC1 and ARTIFICIAL FEEL No.1 by ADC2 and ARTIFICIAL FEEL No.2.
- Results must be identical.

### D. Close-Up

- (1) Carry out close-up operations of Procedure to set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (2) Remove spring scale and adapter D921636000.
- (3) Remove safety clip and tag and set the following circuit breaker:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
STICK SHAKER SUP	1-213	W 513	P15

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(4) Trip, safety and tag the following circuit breaker:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
NAV INST BUS 13XS	13-216	X 345	G 4

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## MAINTENANCE MANUAL

### SPRING ROD - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The spring rod constitutes the artificial feel at low speeds.

#### 2. Spring Rod

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins - Set - Integral Trim - Pitch/Roll/Yaw	D921277000
Access Platform 3.672 m (12 ft.)	
Circuit Breaker Safety Clips	
Rigging Pins - Synchro Pack	D925252000
Lockwire, Dia 0.8 mm (0.032 in.) Corrosion Resistant Steel	

##### B. Prepare

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- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Open access door 151DB and depressurize the Blue, Green and Yellow hydraulic systems.

**WARNING :** DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (3) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

- (4) Remove access panels 121DB and 121FB.
- (5) Insert rigging pin D925252001 in roll resolvers.
- (6) Insert rigging pin D921277000 in roll integral trim assembly.
- (7) Remove floor panels 211HF and 213BF.
- (8) Cut lockwire and loosen clamp attaching spring rod boot to housing, disengage boot from housing, remove trim assembly upper protective housing.

### C. Remove

- (1) Remove cotter (1)
- (2) Remove nut (2) and retain washers (3) and (4) for reinstallation.
- (3) Remove bolt (5).

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- (4) Remove cotter (12)
- (5) Remove nut (11) and retain washers (10) and (9) for reinstallation.
- (6) Support spring rod (7) and remove bolt (8).
- (7) Remove spring rod (7).

### D. Preparation of Replacement Component

### E. Install

- (1) Position spring rod (7) and adjust the length if necessary.  
Torque locknut (6) to 1.45 plus or minus 0.083 m.daN (124 plus or minus 7 lbf. in.).  
If length adjustment is necessary, the adjustment must be such that installation can be effected without strain or tension.

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R

NOTE : Position rod so that screw on gaiter  
aft clamp (14) is located downward.

- (2) Install bolt assembly (8) connecting aft end of spring rod to chassis (13) structure, washers (10) and (9) and nut (11).  
Torque to between 0.5 and 0.558 m.daN (45 and 50 lbf. in.).  
Safety with cotter.
- (3) Install bolt assembly (5) connecting forward end of spring rod to artificial feel lever, washers (3) and (4), and nut (2).  
Torque to between 0.5 and 0.558 m.daN (45 and 50 lbf. in.).  
Safety with cotter.
- (4) Remove rigging pin D921277000 from integral trim assembly.
- (5) Remove rigging pins D925252001 from resolvers.

### F. Test

- (1) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (2) Move control handwheel from left to right then release to neutral.

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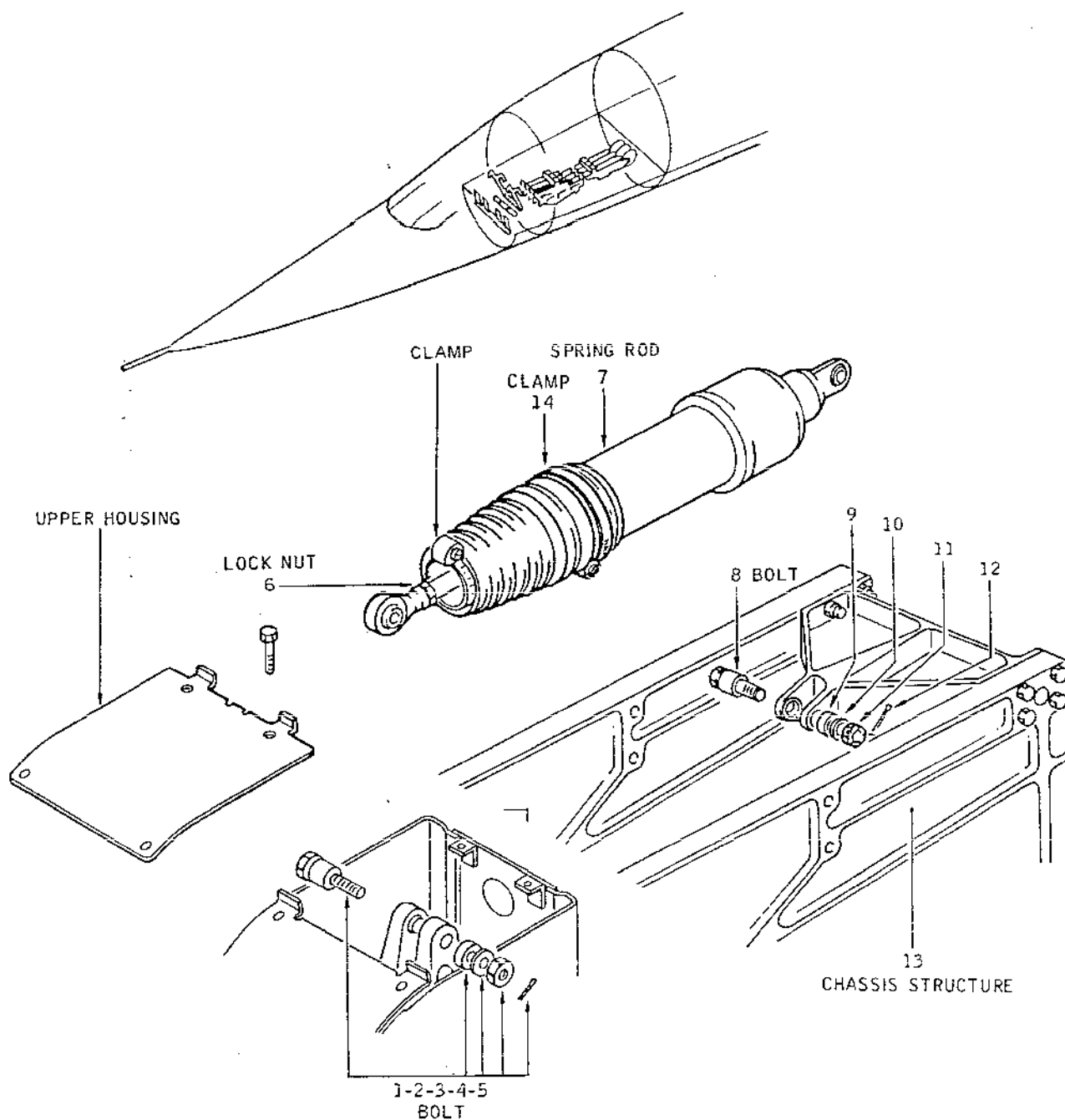
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R

# *Concorde*

## MAINTENANCE MANUAL

Check that handwheel moves freely, and that elevons return to neutral.

- (3) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
- (4) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Install trim assembly upper housing. Engage spring rod boot on housing, tighten attachment clamp and safety with lockwire (Ref. 20-21-13).
- (3) Remove safety clip and tag and set circuit breaker M 626, panel 15-216, Map Ref. F 22.
- (4) Install floor panels 211HF and 213BF.
- (5) Remove warning notices.
- (6) Close access doors and panels 121DB, 121FB and 151DB.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### SPRING ROD - INSPECTION/CHECK

#### 1. General

The purpose of the following procedure is to check the roll control Artificial Feel spring rod.

#### 2. Spring Rod

##### A. Equipment and Materials

##### B. Prepare

- (1) Remove floor panels 211HF and 213BF.
- (2) Remove integral trim assembly upper cover plate (9).

##### C. Check

- (1) At rod end/integral trim assembly attachment.
  - (a) Check that attaching bolt is not ruptured by applying force to rod.
  - (b) Check that total play (hinge play at (1) plus rod internal play, plus hinge play at (3) is less than 0.15 mm (0.0059 in.).
  - (c) Check that nut is correctly tightened and safetied with cotter pin.
  - (d) Check rod end for cracks and signs of corrosion.
- (2) Rod protective boot (2).
  - (a) Check that boot is not torn, pierced or worn.
  - (b) Check that clamp attaching boot to integral trim assembly casing is correctly installed and tightened.
  - (c) Check that clamp (6) attaching boot (2) to rod body is correctly tightened and safetied.
- (3) At rod end/structure attachment (3) ;
  - (a) Check that bolt is not ruptured by applying force to rod.
  - (b) Check that nut is correctly tightened and safetied

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## MAINTENANCE MANUAL

- (c) Check rod end for cracks and signs of corrosion.
- (4) Check that end fittings (4) are correctly tightened and safetied with lockwire.
- (5) On spring clips (5).
  - (a) Check that spigot is inserted in housing.
  - (b) Check lockwire for correct condition.
- (6) Check that adjusting nut (8) is correctly tightened and safetied.
- (7) Using lockwire, check through safety aperture (7) that threaded end is tightened within limits.
- (8) Check rod body for cracks, scores or signs of corrosion (Ref. Fig. 601 )

### D. Test

### E. Close-Up

- (1) Install integral trim assembly upper cover plate (9).
- (2) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (3) Close floor panels 211HF and 213BF.

EFFECTIVITY: ALL

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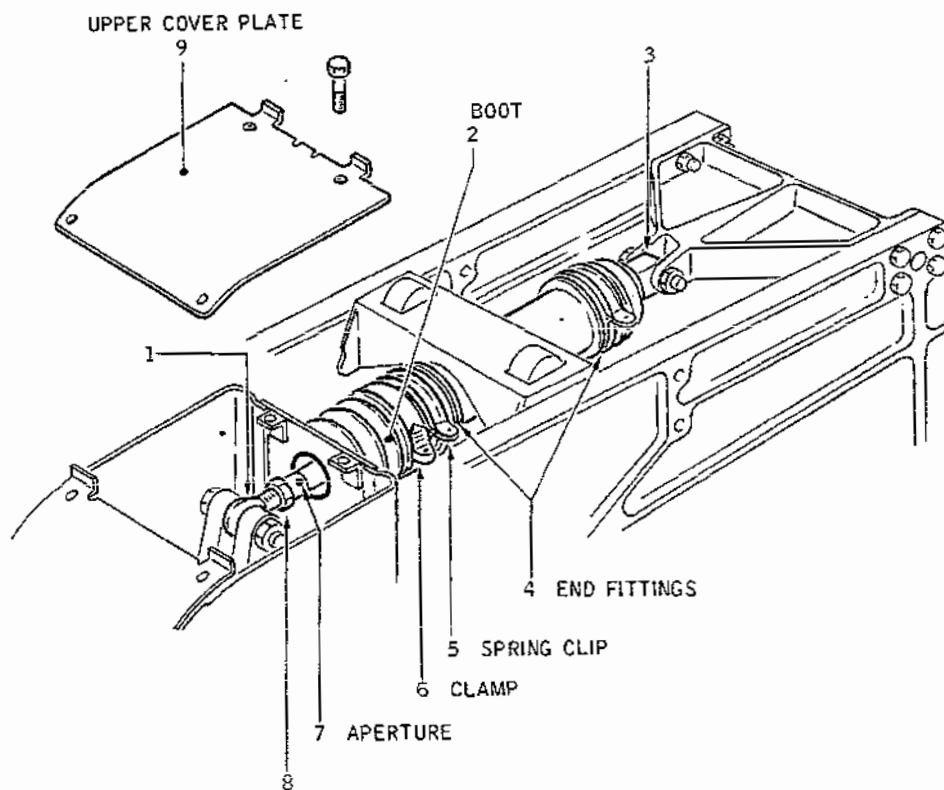
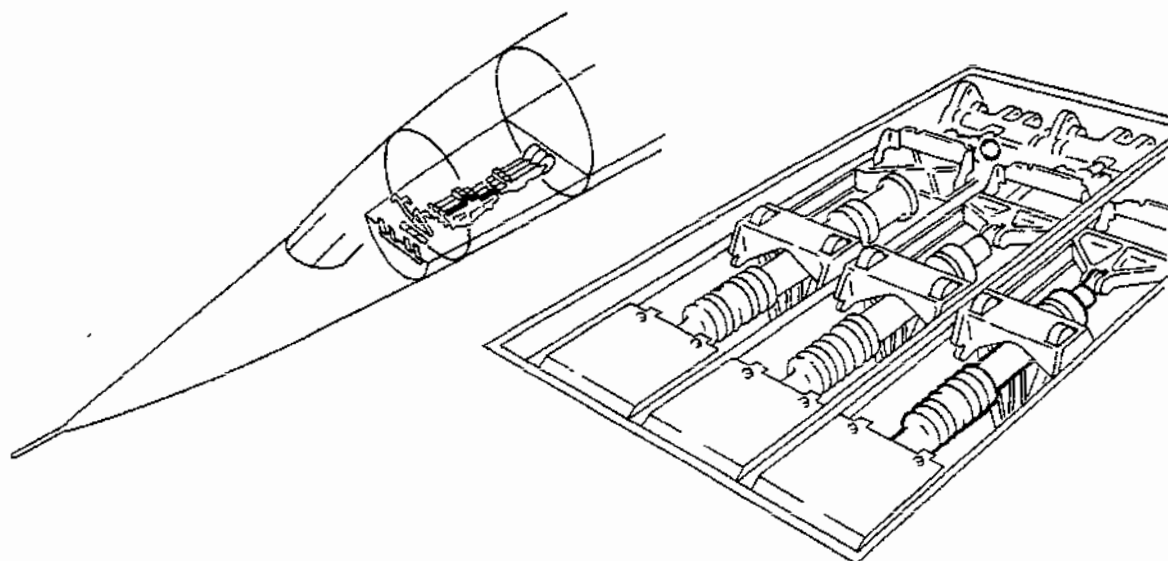
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## MAINTENANCE MANUAL



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Spring Rod  
Figure 601

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

### ARTIFICIAL FEEL JACK ROCKER ARM - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The Artificial Feel jack rocker arm transmits to the mechanical control, loads exerted by the Blue and Green Artificial Feel jacks.

#### 2. Artificial Feel Jack Rocker Arm

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins - Synchro Pack	D925252000
Circuit Breaker Safety Clips	
Access Platform 3.672 m (12 ft.)	
Lockwire Dia. 1 mm (0.041 in.) Corrosion Resistant Steel	
Warning Notices	

##### B. Prepare

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ROLL ART FEEL COMP 1 SUP	2-213	1C 243	E 3
ROLL ART FEEL COMP 2 SUP	13-213	2C 243	G17
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

- (3) Make certain that roll Flight Controls and trim controls are set to zero.
- (4) Remove access panels 121DB and 121FB and immobilize roll resolvers with rigging pin D925252001.
- (5) Open access door 151DB under fuselage and depressurize Blue, Green and Yellow hydraulic system.

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (6) Open floor panels 213AF and 213BF.
- (7) Remove Artificial Feel spring rod (Ref. 27-12-12, Removal/Installation).

C. Remove  
(Ref. Fig.401 and 402)

- (1) Disconnect Blue Artificial Feel Jack from rocker arm (Ref. 27-14-13, Removal/Installation, paragraph C).

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- (2) Disconnect Green Artificial Feel Jack from rocker arm (Ref. 27-14-15, Removal/Installation, paragraph C).
- (3) Disconnect rocker arm from integral trim assembly (Ref. 27-13-12, Removal/Installation).
- (4) Remove mounting (1) attachments.  
For each bolt, remove cotter pin and nut (5).  
Remove bolt (6) and washer (7).
- (5) Lift to disengage mounting/rocker arm assembly.
- (6) Remove mounting (1).
  - (a) Remove cotter pin, remove nut (2), bolt (3) and washer (4).
  - (b) Remove mounting (1) from support arms (8).
- (7) Remove spacer (21).
  - (a) Unsafety and remove nut (10), remove bolt (18) and washer (9).
  - (b) Remove spacer (21).
- (8) Remove cotter pin, remove nut (11) and washer (12).
- (9) Remove nut (13) and bolt (17).
- (10) Remove support arm (8) from rocker arm then remove shackle (15) connecting rocker arm to integral trim assembly.
- (11) Separate the two side plates (14) and (16) of the rocker arm : remove washers (19) and rollers (20).

### D. Preparation of Replacement Component

- (1) Install washers (19) and rollers (20) between the two side plates (14) and (16) of the rocker arm.
- (2) Install support arms (8) and shackle (15) on rocker arm.
- (3) Install bolt (17) and tighten nut (13).  
Torque to between 240 and 260 lbf.in. (2.74 and 2.937 m.daN).
- (4) Install washer (12) and tighten nut (11).  
Torque to between 140 and 145 lbf.in. (1.581 and

EFFECTIVITY: ALL

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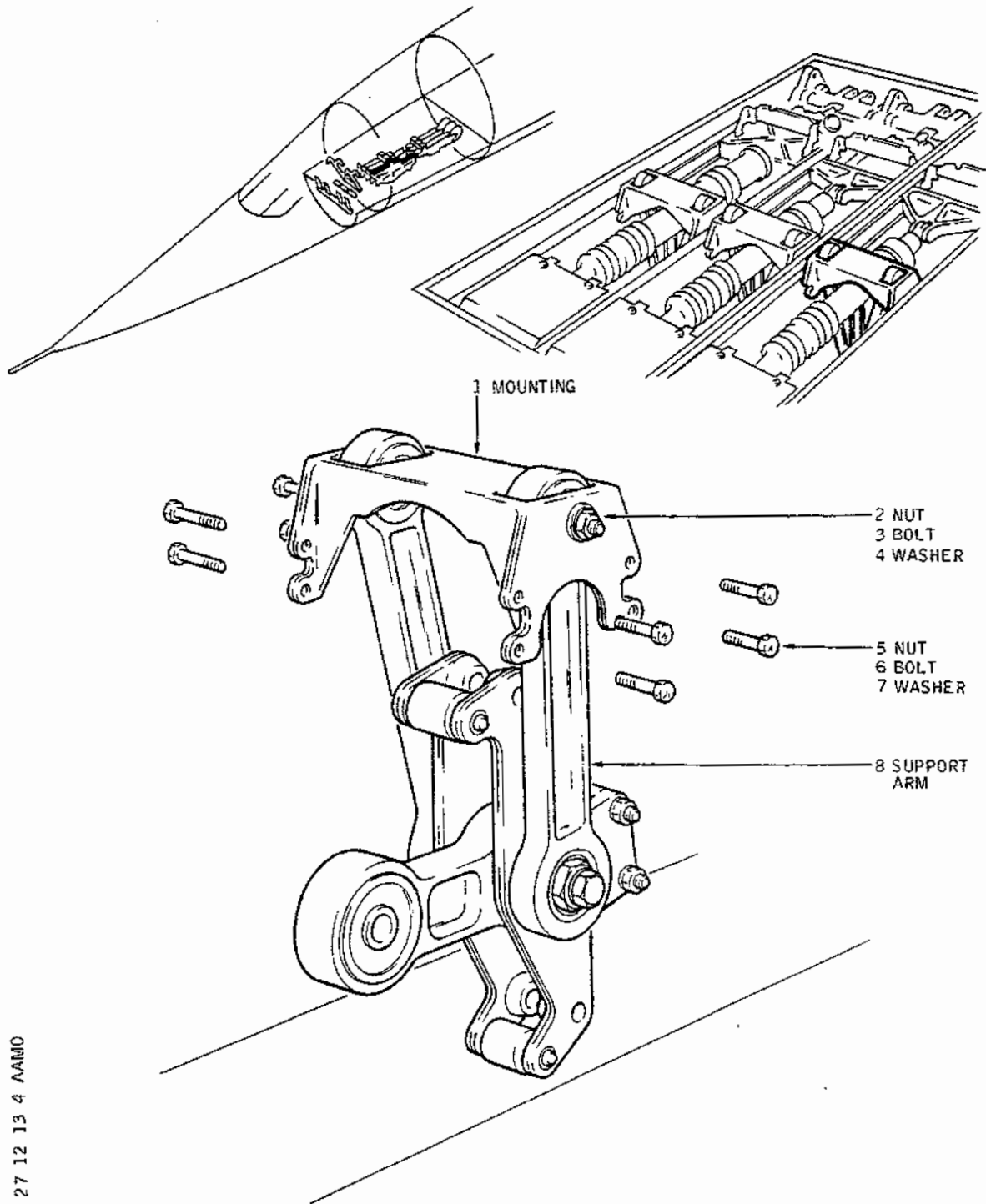
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## MAINTENANCE MANUAL



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Rocker Arm/Mounting Assembly  
Figure 401

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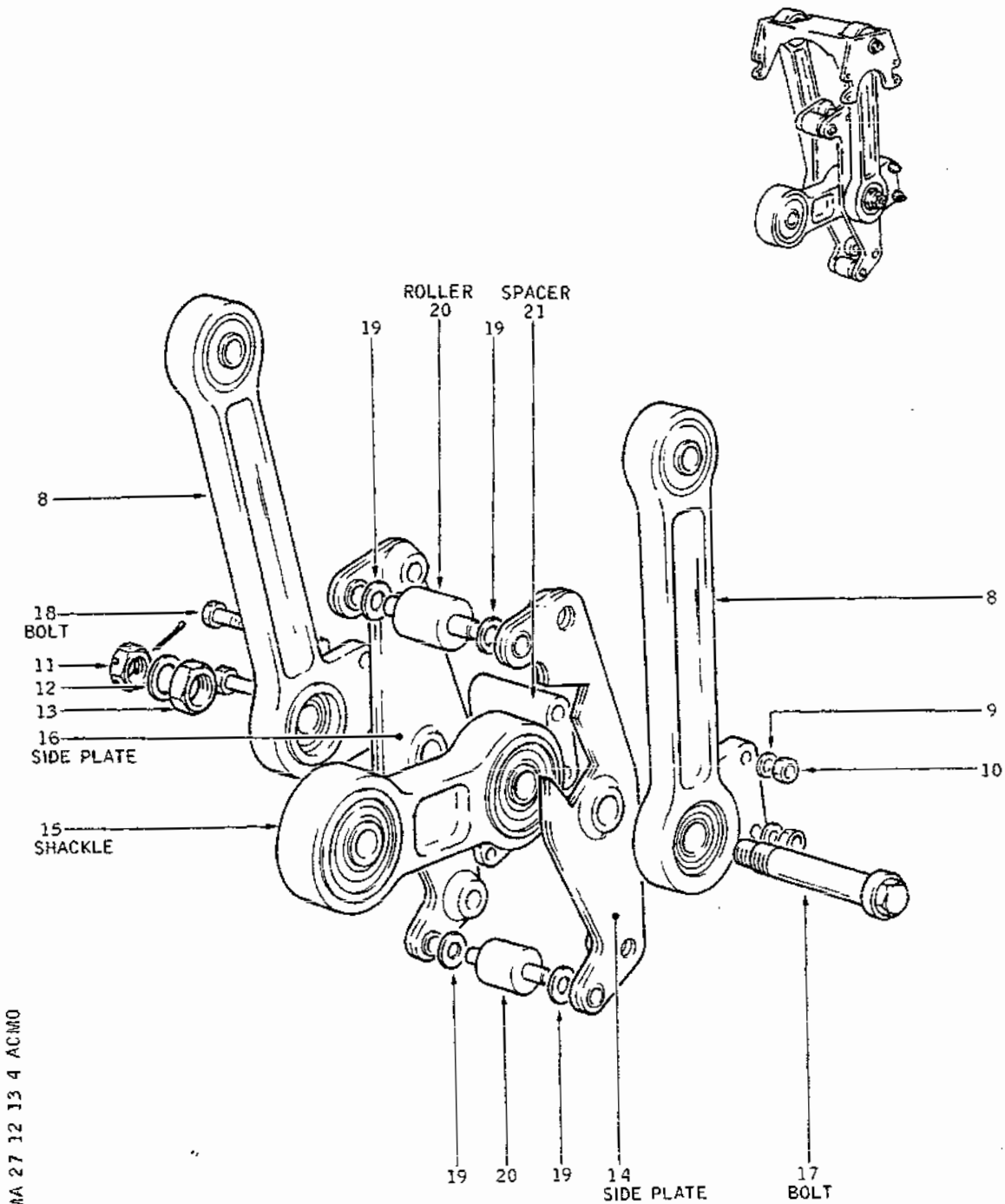
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## MAINTENANCE MANUAL



CMA 27 12 13 4 ACM0

Rocker Arm  
Figure 402

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1.638 m.daN). Safety with cotter pin.

- (5) Safety head of bolt (17) and nut (13) with lockwire as per 20-21-13.
- (6) Install spacer (21), bolts (18), washers (9) and nuts (10). Safety with cotter pin.
- (7) Attach mounting (1) to rocker arm.
- (8) Install bolts (3), washers (4) and nuts (2). Tighten nuts (2). Safety with cotter pin.
- (9) Check that rocker arm pivots freely about its axis. Check that rollers rotate freely.

### E. Install

- (1) Position rocker arm/mounting assembly on chassis.
- (2) Install bolts (6), washers (7) and tighten nuts (5). Safety nuts with cotter pin.
- (3) Attach shackle (15) to integral trim assembly (Ref. 27-13-12, Removal/Installation).
- (4) Check that minimum clearance A between upper roller and chassis is 2 mm (0.0787 in.). (Ref. Fig. 403 )
- (5) Connect Green Artificial Feel Jack to rocker arm (Ref. 27-14-15, Removal/Installation, paragraph C).
- (6) Connect Blue Artificial Feel Jack to rocker arm (Ref. 27-14-13, Removal/Installation, paragraph C).
- (7) Install Artificial Feel spring rod (Ref. 27-12-12, Removal/Installation).
- (8) Remove rigging pin D925252001 from roll resolvers.

### F. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Remove safety clips and tags and set circuit breakers.
- (3) Remove warning notices.
- (4) Close access doors and panels 121DB, 121FB, 151DB and

EFFECTIVITY: ALL

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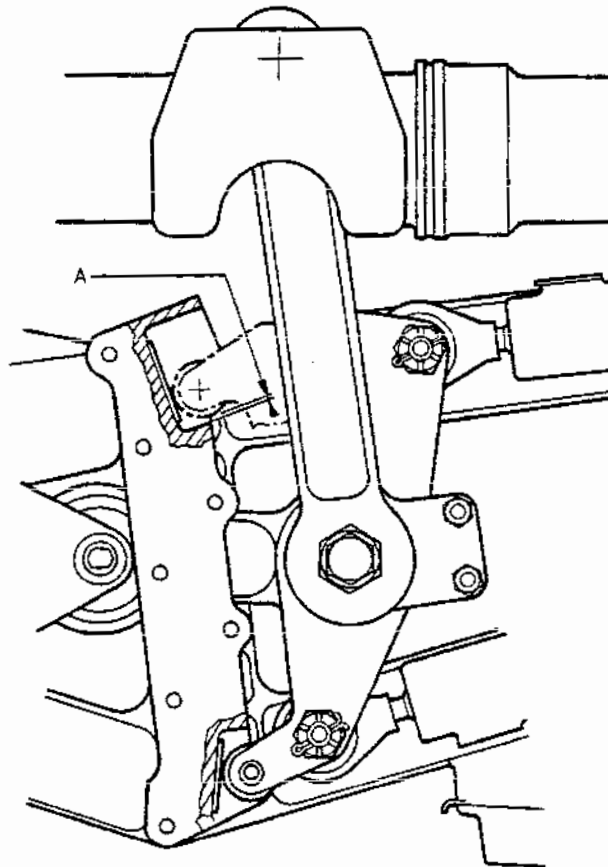
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## MAINTENANCE MANUAL



CMA 27 12 13 4 AEMO

Measurement of Clearance A  
Figure 403

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floor panels 213AF and 213BF.

(5) Remove access platform.

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## MAINTENANCE MANUAL

### TRIM CONTROL - DESCRIPTION AND OPERATION

#### 1. General (Ref. Fig. 001 )

The control wheel is mounted on the centre console in the flight compartment.

The number of turns of the control wheel is limited by a system of dog washers which engage one on the other for each turn of the wheel, the last washer forming the stop.

A graduated drum moves past a fixed index and indicates the elevon deflection value corresponding to a new neutral point of the artificial feel.

The control wheel transmission system is composed of universal joints, pinions, angle gearbox and chains.

The housing is articulated on the chassis of the artificial feel system and is equipped with a worm screw driven by the transmission system.

One end of the input lever has a toothed sector meshing with the worm screw.

The other end has pivot points for attaching the roll mechanical control rods.

The housing is in the form of crank the two arms of which are linked to the artificial feel. (Spring rod and jacks).

EFFECTIVITY: ALL

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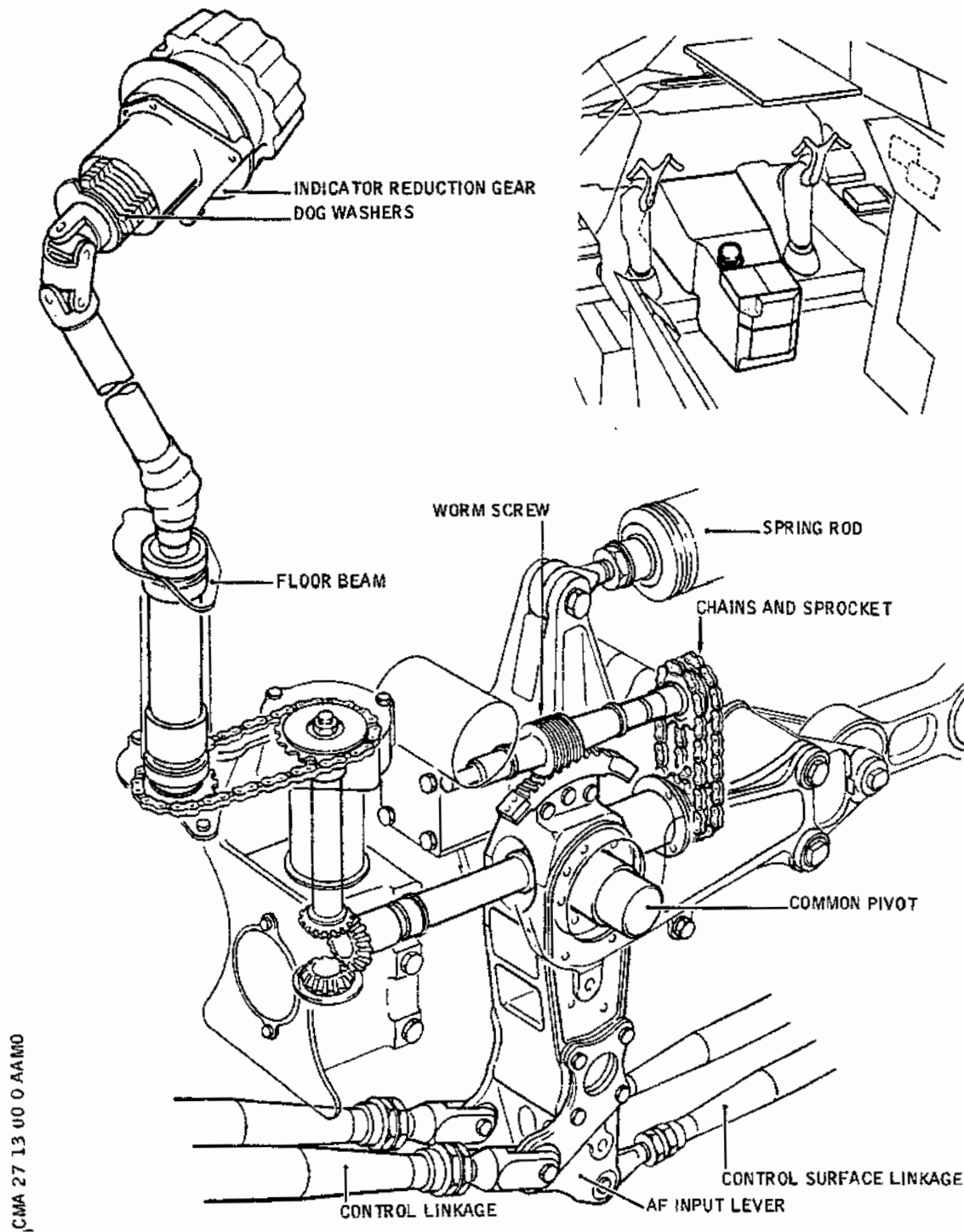
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## MAINTENANCE MANUAL



- Roll Trim Control

Figure 001

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## MAINTENANCE MANUAL

### 2. Operation (Ref. Fig.002 and 003)

Rotating the trim control wheel causes the worm screw to rotate and give relative movement to the unit with respect to the input lever.

The trim control offers two possibilities :

- The displacement of the roll control neutral point and cancellation of reaction of the artificial feel system,
- Elevon deflection in roll mode. This method of operation is used only in extreme emergency. The inertia and friction of the roll control being inferior to the artificial feel threshold, the trim operation alone causes displacement of the controls without causing an artificial feel reaction.

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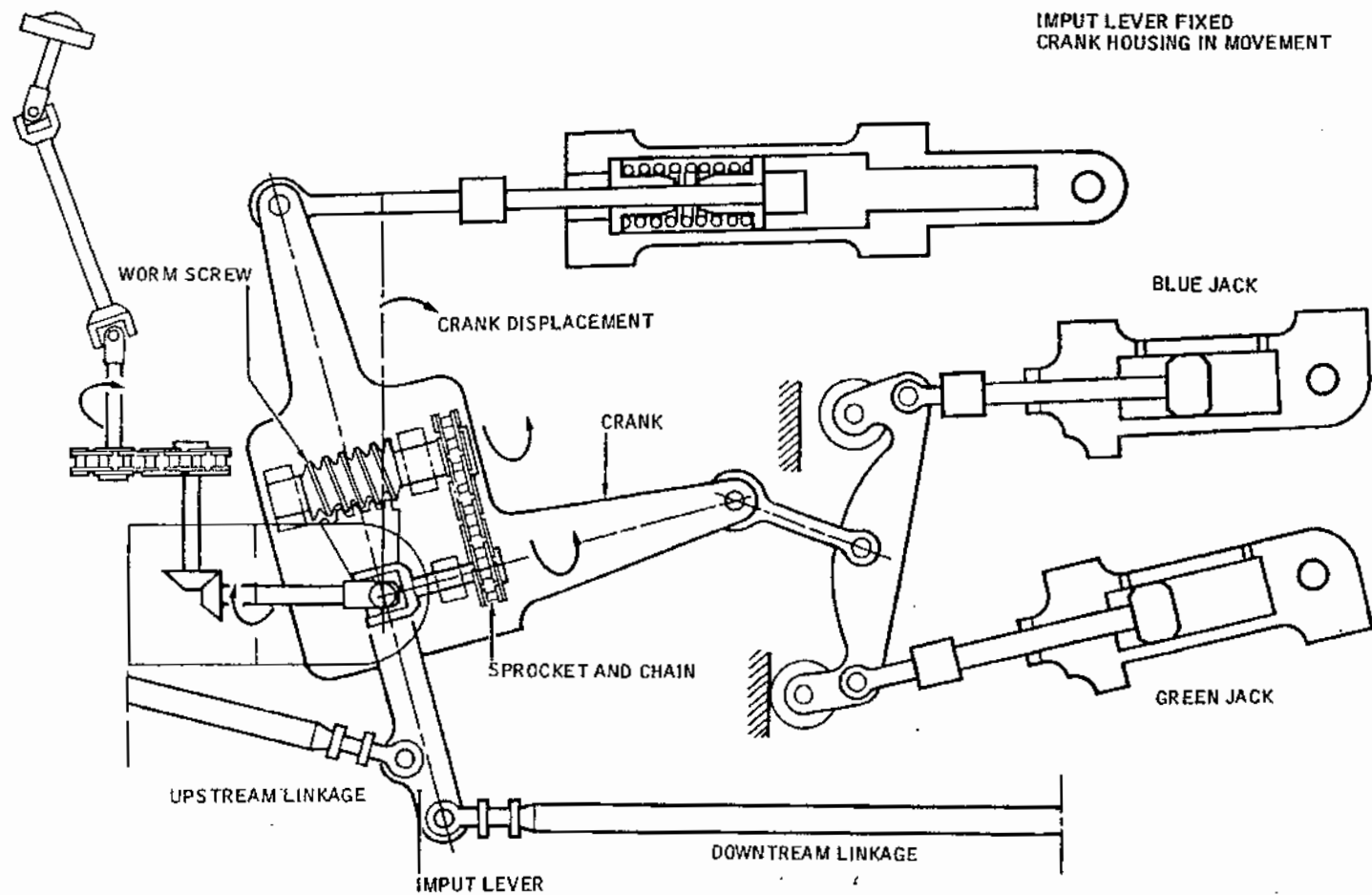
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- Artificial Feel Cancellation  
Figure 002

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MAINTENANCE MANUAL

CMA 27 13 00 0 AEMO

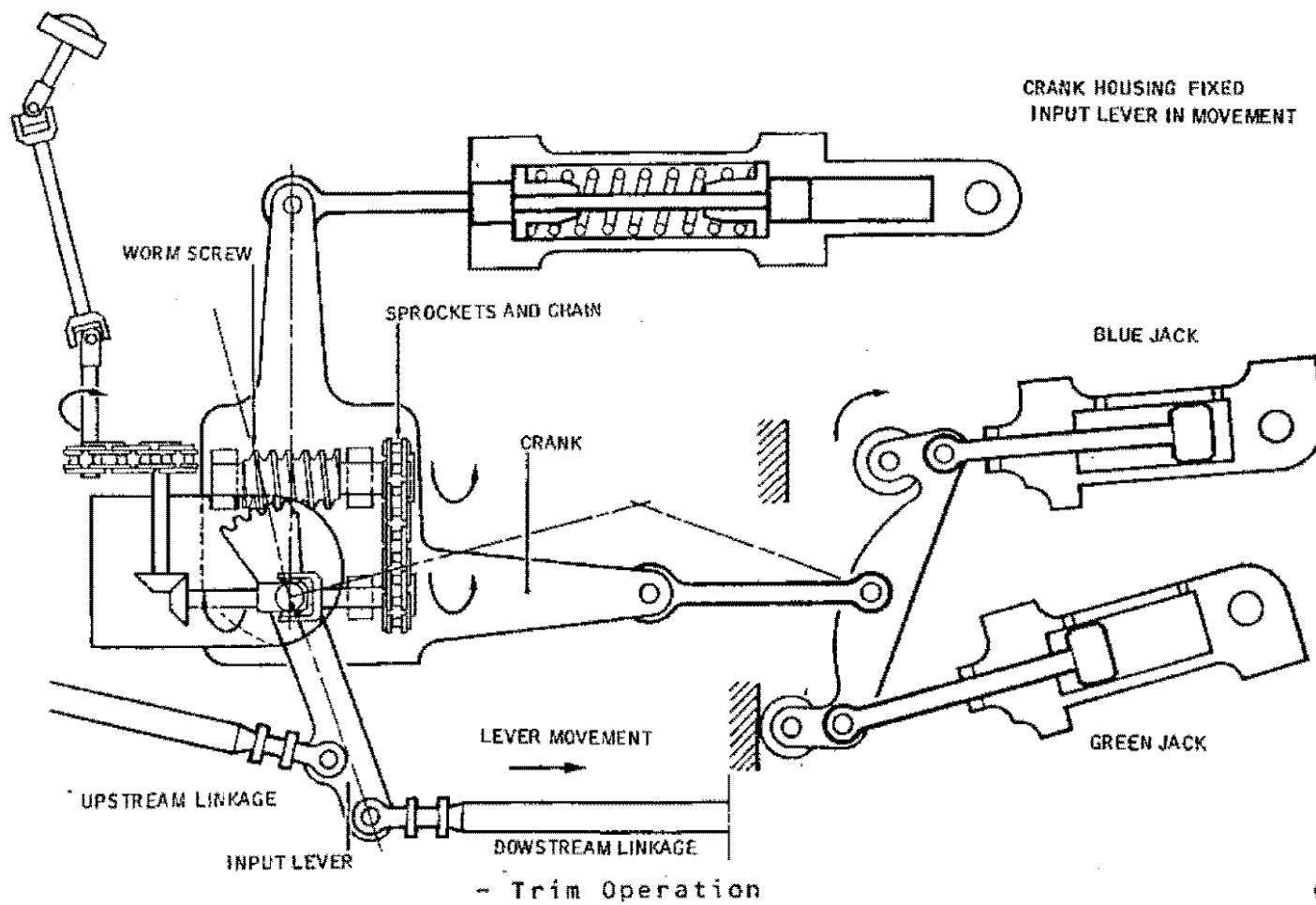


Figure 003

**27-13-00**

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## MAINTENANCE MANUAL

### TRIM CONTROL - TROUBLE SHOOTING

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The following information is intended to enable faults found in Roll trim control operation to be quickly rectified.

This trouble shooting deals with the following faults :

- Trim linkage
- Operating loads
- Play in control.

The faults can be isolated with the aid of the trouble shooting procedures and traced through OK and NOT OK paths to the appropriate charts or other specified rectification action as may be necessary. If a defect occurs perform the appropriate rectification action, then repeat the operation at which the defect was encountered to ensure the operation is OK.

Bracketed numbers in the procedure and charts indicate items on the component identification Table (Ref. Table 101).

The table provides information necessary to locate components.

#### 2. Roll Trim

##### A. General

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## MAINTENANCE MANUAL

Flight controls (electrical channels and linkage) are assumed to operate correctly, to be free of excessive play and to be within neutral tolerances.

### B. Prepare

#### (1) Equipment and Materials

DESCRIPTION	PART NO.
Protractor, Elevons and Rudder	TE2012
Rigging Template - Integral Trim	D921250000
Access Platform 3.672 m (12ft.)	

(2) Take the precautions described in the previous WARNING paragraph.

(3) Set Flight Controls in Blue electrical mode (27-00-00, Servicing).

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## MAINTENANCE MANUAL

### C. Trouble Shooting

\*\*\*\*\*  
\*Check that artificial feel systems are not engaged\*  
\*On Flight Control Unit, place O & M ELEVONS and \*  
\*IN ELEVONS switches in BLUE position. \*  
\*Open access door 121 DB. \*  
\*Position roll trim knob so as to install \*  
\*equipment D 921250000 on integral trim assembly. \*  
\*Roll trim knob graduated scale must read 0 \*  
\*degrees plus or minus 0.1 degree. \*  
\*\*\*\*\*

OK	NOT OK--	Incorrect reading on graduated scale or excessive play in control Chart 101
----	----------	---

\*\*\*\*\*  
\*Install equipment TE 2012 (protractor) on outer \*  
\*and middle elevons. \*  
\*Remove equipment D 921250000. Rotate trim knob \*  
\*in clockwise direction until it reaches stop. \*  
\*Repeat the same operation in counter clockwise \*  
\*direction. Outer and middle elevons deflect plus \*  
\*or minus 10 degrees: plus 0.5 degrees, minus 0 \*  
\*degree. Graduated scale must read plus 10.5 \*  
\*degrees, plus or minus 0.2 degree and minus 10.5 \*  
\*degrees plus or minus 0.2 degree. \*  
B\*Torque required to move control knob shall be \*  
B\*10  $\pm$  4 lbf. in. \*  
\*\*\*\*\*

OK	NOT OK--	Deflection range is incorrect Chart 102
----	----------	--

	NOT OK--	Aircraft on ground, no in-flight loads being applied, trim knob operating load is excessive Chart 103
--	----------	---

Trim operates correctly

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## MAINTENANCE MANUAL

*****		-----	
* INCORRECT READING ON GRADUATED	*	GROUND EQUIPMENT REQUIRED	
* SCALE OR EXCESSIVE PLAY IN CONTROL	*	-----	
* GRADUATED SCALE FOLLOWS CORRECTLY	*	DESCRIPTION	PART NO.
* ROTATION OF CONTROL KNOB.	*	-----	
*****		COMPARATOR -	
		SPRING SCALE -	
		ACCESS PLATFORM	
		3.672 (12 ft.) -	
		ASSEMBLY TOOLS	
		TRIM CONTROL	
		GEARBOX -	D 925184000
		-----	

OK	NOT OK--	Excessive play at graduated scale driving mechanism. Graduated scale can be manually displaced by a value greater than 0.50 mm (0.413 in.).
		Replace trim gear box assembly [1]

\*\*\*\*\*

- \* Immobilize trim control tube at floor level \*
- \* Remove trim knob (cover, cotter pin, nut, knob, \*
- \* dial). Install equipment D927261000. \*
- \* Using a comparator attached to casing, measure \*
- \* play at datum mark on equipment arm. \*
- \* Play is equal to or less than 0.83 mm \*
- \* (0.327 in.). \*

\*\*\*\*\*

OK	NOT OK--	Replace trim gear box assembly and associated tube above floor [2].
----	----------	---

\*\*\*\*\*

- \* Check tension of chain underneath floor. \*
- \* Chain deflection should be between 2 and 3.2 mm \*
- \* (0.078 and 0.126 in.) for a tension of 1.4 to 2.5 \*
- \* m.daN (10.32 and 18.43 lbf. ft) \*

\*\*\*\*\*

OK	NOT OK
----	--------

Chart 101 (Sheet 1 of 2)

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## MAINTENANCE MANUAL

After adjustment of chain tension (Ref.  
procedure 27-13-12, Removal/Installation  
paragraph E) check play at roll trim knob

\*\*\*\*\*  
\* Replace integral trim \*  
\* assembly [3] \*  
\*\*\*\*\*

\*\*\*\*\*  
\* Shut down pressurization of hydraulic systems \*  
\* (Ref. 27-00-00, Servicing, Procedure to set Flight\*  
\* Controls in electrical mode). \*  
\* Remove comparator and equipment D 927261000. \*  
\*\*\*\*\*

Chart 101 (Sheet 2 of 2)

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## MAINTENANCE MANUAL

*****		-----	
* DEFLECTION RANGE IS INCORRECT	*	GROUND EQUIPMENT REQUIRED	
*****		-----	
		DESCRIPTION	PART NO.
		Comparator	
		-----	

\*\*\*\*\*  
\* Disconnect the four rods from integral trim \*  
\* assembly lower lever (Ref. 27-13-12, Removal/ \*  
\* Installation. Paragraph 2 C.) \*  
\* Attach a comparator to lower lever, at 200 mm \*  
\* (7.87 in.) from lever fulcrum apply a 2 daN \*  
\* (4.5 lbf) load to trim lever. Play is equal to \*  
\* or less than 0.34 mm (0.0134 in.) \*  
\*\*\*\*\*

		-----	
OK	NOT OK--	Ref. Chart 102, sheet 2	
		-----	

\*\*\*\*\*  
\* Connect the four rods to integral trim assembly \*  
\* (Ref. 27-13-12, Removal/Installation, Paragraph E)\*  
\* Measure deflection of integral trim assembly \*  
\* lower lever at 200 mm (7.87 in.) from lever \*  
\* fulcrum. \*  
\* When trim knob is fully rotated, deflection is \*  
\* between 33.7 and 34.4 mm (1.326 and 1.354 in). \*  
\*\*\*\*\*

		-----	
NOT OK--		Check that there is no friction or jamming, then remove trim gear box assembly [1] in centre console.	
		-----	
NOT OK--		Deflection range is incorrect. Replace integral trim assembly [3]	
		-----	

Chart 102 (Sheet 1 of 2)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* Apply a 2 daN (4.5 lbf.) load to control rod \*  
\* attachment point. Using a comparator attached to \*  
\* structure, measure play at rigging point at 157 mm\*  
\* (6.18 in.) from trim fulcrum. Play is equal to or \*  
\* less than 0.08 mm (0.0031 in.) \*  
\*\*\*\*\*

||  
OK  
||

NOT OK--

-----  
| Check ends of spring rod, then remove  
| spring rod [4]  
|  
-----

\*\*\*\*\*  
\* Replace integral trim assembly [3] \*  
\*\*\*\*\*

\*\*\*\*\*  
\* Shut down pressurization of hydraulic systems \*  
\* (Ref. 27-00-00, Servicing. Procedure to set flight\*  
\* controls in electrical mode) \*  
\* Remove comparator. \*  
\*\*\*\*\*

Chart 102 (Sheet 2 of 2)

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## MAINTENANCE MANUAL

*****		-----	
* AIRCRAFT ON GROUND, NO IN-FLIGHT	*	GROUND EQUIPMENT REQUIRED	
* LOAD BEING APPLIED, TRIM KNOB	*	-----	
* OPERATING LOAD IS EXCESSIVE.	*	DESCRIPTION	PART NO.
*****		-----	
		SPRING SCALE	
		-----	

\*\*\*\*\*  
\* Check tension of integral trim assembly input \*  
\* control chain. With a 1.4 to 2.5 daN (3.147 to \*  
\* 5.620 lbf) load applied to the chain, deflection \*  
\* is between 2 and 3.2 mm (0.078 and 0.126 in.) \*  
\*\*\*\*\*

		-----	
		Adjust tension of chain. Ref. procedure detai-	
OK	NOT OK--	led in 27-13-12, Removal/Installation.	
		Paragraph E.	
		-----	

\*\*\*\*\*  
\* Disconnect trim control chain, on control pinion \*  
\* side. Using a spring scale, pull chain. Load is \*  
\* equal to 2.7 daN (6.07 lbf). \*  
\*\*\*\*\*

		-----	
OK	NOT OK--	Replace integral trim assembly [3].	
		-----	

\*\*\*\*\*  
\* If load is abnormal check mechanism between \*  
\* control knob and control pinion under floor. \*  
\*\*\*\*\*

\*\*\*\*\*  
\* Shut down pressurization of hydraulic systems \*  
\* (Ref. 27-00-00, Servicing, Procedure to set Flight \*  
\* Controls in electrical mode). \*  
\* Connect control chain to control pinion side. \*  
\*\*\*\*\*

Chart 103 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[1] Trim gear-box assembly in centre console		122		Centre console	27-13-11 R/I	
[2] Control tube		122		Under floor	27-13-11 R/I	
[3] Integral trim assembly	121DB	122		Under floor	27-13-12 R/I	
[4] Spring rod	211HF 213BF	122		Under floor	27-12-12 R/I	

Component Identification  
Table 101

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## MAINTENANCE MANUAL

### TRIM CONTROL - ADJUSTMENT/TEST

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. Operational Test

##### A. General

The purpose of the test is to check the Flight controls operation by means of the trim.

##### B. Equipment and Materials

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DESCRIPTION	PART NO.
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Access Platform 4.47 m (14 ft. 8 in.)	
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##### C. Prepare

(1) Take the precautions described in the previous WARNING paragraph.

(2) On overhead panel :

- Make certain that ARTIFICIAL FEEL No.1 and ARTIFICIAL FEEL No.2 engage switches are in OFF position.
- On SERVO CONTROLS unit check that selector switches are in NORMAL position.

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- On RELAY JACK unit place switch in NORMAL position.
- On Flight Control Unit make certain that O and M ELEVONS and IN. ELEVONS switches are in MECH position.

(3) Check that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RELAY JACK HYD SEL IND & SUP	1-213	C 281	N17
PFC IND		C 287	N18
PFC & RELAY JACK "A" SYS		C 285	P16
CONT YELL/GRN GRN FAIL			
PFC & RELAY JACK "A" SYS		C 286	P17
CONT YELL/BLUE BLUE FAIL			
PFC & RELAY JACK "A" SYS		C 288	P18
CONT YELL L/LEVEL			
FLT CONT POSN IND CONT		C 83	R11
FLT CONT POSN IND 26 V 400 Hz SUP	2-213	C 84	B 4
PFC & RELAY JACK "B" SYS	3-213	C 282	A 8
CONT YELL L/LEVEL			
PFC & RELAY JACK "B" SYS		C 283	A 9
CONT YELL/GRN GRN FAIL			
PFC & RELAY JACK "B" SYS		C 284	A10
CONT YELL/BLUE BLUE FAIL			

- (4) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing)
- (5) On overhead panel place BLUE INVERTER and GREEN INVERTER switches in OFF INV position.
- (6) On ICOVOL indicator (Flight Control Surface Position indicator), check that the 6 magnetic indicators corresponding to elevons display M.
- (7) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).
- (8) Check that pitch and roll trim controls are set to zero.
- (9) Check that pitch and roll flight controls are at neutral

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### D. Test

- (1) Turn roll trim knob to the left up to graduation 10.
  - On ICOVOL indicator check position of elevons :
    - Outer and middle elevons : plus or minus 10°
    - Inner elevons : plus or minus 7°
- (2) Turn roll trim knob to the right up to graduation 10.
  - On ICOVOL indicator check position of elevons :
    - Outer and middle elevons : plus or minus 10°
    - Inner elevons : plus or minus 7°
- (3) Bring back trim control to position zero.
  - On ICOVOL indicator check that elevons are in neutral position.

### E. Close-Up

- (1) On overhead panel, place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position.
- (2) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in electrical mode).
- (3) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).
- (4) Remove access platform.

EFFECTIVITY: ALL

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### 2. System Test

#### A. General

The purpose of the test is to check that displacement values of trim controls correspond with control surface deflections.

#### B. Equipment and Materials

DESCRIPTION	PART NO.
Protractor - Elevon and Rudder	TE2012000
Rigging Pins - Synchro Pack	D925252000
Rigging Pins - Set - Integral Trim	D921277000
Access Platform 4.47 m (14 ft. 8 in.)	

#### C. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) On overhead panel
  - Make certain that ARTIFICIAL FEEL No.1 and ARTIFICIAL FEEL No.2 engage switches are in OFF position.
  - On SERVO CONTROLS unit check that selector switches are in NORMAL position.
  - On RELAY JACK unit place switch in NORMAL position.
  - On Flight Control Unit make certain that O and M ELEVONS and IN-ELEVONS switches are in MECH position.
- (3) Check that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RELAY JACK HYD SEL IND & SUP	1-213	C 281	N17
PFC IND		C 287	N18
PFC & RELAY JACK "A"		C 285	P16
SYS CONT YELL/GRN GRN FAIL			
PFC & RELAY JACK "A"		C 286	P17
SYS CONT YELL/BLUE BLUE FAIL			
PFC & RELAY JACK A SYS CONT		C 288	P18

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
YELL L/LEVEL FLT CONT POSN IND CONT		C 83	R11
FLT CONT POSN IND 26 V 400 Hz SUP	2-213	C 84	B 4
PFC & RELAY JACK "B" SYS CONT YELL/GRN GRN FAIL	3-213	C 282	A 8
PFC & RELAY JACK "B" SYS CONT YELL/GRN GRN FAIL		C 283	A 9
PFC & RELAY JACK "B" SYS CONT YELL/BLUE BLUE FAIL		C 284	A10

- (4) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing)
- (5) On overhead panel, place BLUE INVERTER and GREEN INVERTER switches in ON position.
- (6) On ICOVOL indicator, check that the 6 magnetic indicators corresponding to elevons display M.
- (7) Set Flight Controls in Blue electrical mode (Ref. 27-00-00, Servicing).
- (8) Check that pitch and roll trim controls are set to zero.
- (9) Check that pitch and roll flight controls are at neutral.
- (10) Make certain that rigging pin D921277000 inserts easily in integral trim assembly and pin D925252001 in synchro pack. Leave the latter inserted in synchro pack and remove former from trim assembly.
- (11) Set up protractor equipment TE2012000 on outer and middle elevons. Adjust protractors to zero and remove pin D925252001 from synchro pack.

### D. Mechanical Mode Test

- (1) Turn roll trim knob by successive 2° stages through graduated scale :

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- zero to left turn and return to zero
- zero to right turn and return to zero.

NOTE : Trim value setting must be made precisely.

- (2) For each stage, check that values indicated on graduated scale correspond with elevon position (See table).  
(Ref. Fig. 501 )

LEFT OR RIGHT TURN				
TRIM	TRIM SCALE ROTATION ANGLE	ELEVON DEFLECTION		
		MIN	THEORETICAL	MAX
0	0	- 0.05	0	+ 0.05
2	21.875	1.95	2.05	2.15
4	43.750	3.95	4.11	4.25
6	65.750	6.00	6.18	6.35
8	87.625	8.00	8.24	8.45
10	109.50	10.05	10.29	10.55

CMA 27 13 00 5 AAMG

Cross-Reference Table - Roll  
Figure 501

- (3) Check that artificial feel jacks do not move during operations.

### E. BLUE Electrical Mode Test

- (1) On Flight Control Unit place O and M ELEVONS and IN ELEVONS switches in BLUE position. Press RESET push-button.  
Check that magnetic indicators on IC0VOL display B.
- (2) Repeat procedure described in paragraph 2 D "mechanical

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mode Test".

### F. GREEN Electrical Mode Test

- (1) On Flight Control Unit place O and M ELEVONS and IN ELEVONS switches in GREEN position.  
On ICOVOL indicator, check that magnetic indicators display G.
- (2) Repeat procedure described in paragraph 2 D "mechanical Mode Test".

### G. Close-Up

- (1) On Flight Control Unit place O and M ELEVONS and IN ELEVONS switches in MECH position.
- (2) On overhead panel, place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position.
- (3) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in electrical mode).
- (4) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).
- (5) Remove measuring equipment TE2012000.
- (6) Close access doors.
- (7) Remove access platforms.

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### 3. System Load Application Test

#### A. General

The purpose of the test is to make certain that trim control operation is normal.

#### B. Equipment and Materials

DESCRIPTION	PART NO.
Hand Equipment - Effort Measurement- Trim Controls	TE3019400
Access Platform 4.47 m (14 ft. 8 in.)	

#### C. Prepare

- (1) Take the precautions described in previous WARNING paragraph.
- (2) On overhead panel
  - Make certain that ARTIFICIAL FEEL No.1 and ARTIFICIAL FEEL No.2 engage switches are in OFF position.
  - On SERVO-CONTROLS unit, check that selector switches are in NORMAL position.
  - On RELAY JACK unit, place switch in NORMAL position.
  - On Flight Control Unit, make certain that O and M ELEVONS and IN ELEVONS switches are in MECH position.
- (3) Check that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RELAY JACK HYD SEL IND & SUP	1-213	C 281	N17
PFC IND		C 287	N18
PFC & RELAY JACK "A" SYS CONT YELL/GRN GRN FAIL		C 285	P16
PFC & RELAY JACK "A" SYS CONT YELL/BLUE BLUE FAIL		C 286	P17
PFC & RELAY JACK "A" SYS CONT YELL/L/LEVEL		C 288	P18
FLT CONT POSN IND CONT		C 83	R11
FLT CONT POSN IND 26V 400HZ SUP	2-213	C 84	B 4

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFC & RELAY JACK "B" SYS CONT YELL L/LEVEL	3-213	C 282	A 8
PFC & RELAY JACK "B" SYS CONT YELL/GRN GRN FAIL		C 283	A 9
PFC & RELAY JACK "B" SYS CONT YELL/BLUE BLUE FAIL		C 284	A10
(4) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).			
(5) On overhead panel, place BLUE INVERTER and GREEN INVERTER switches in ON position.			
(6) Check that the 6 IC0VOL magnetic indicators associated with elevons display M.			
(7) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).			
(8) Check that pitch and roll trim controls are at zero.			
(9) Check that pitch and roll flight controls are at neutral.			
B B B	(10) Set up equipment TE3019409 for measuring load applied to trim control. Alternatively a torque wrench and 7/16 AF socket may be used.		

### D. Load Measurement

- (1) Using a spring scale, pull slowly and evenly on the cord wound round the measuring equipment pulley.

Carry out the following trim operations :

- Move control knob from neutral to turn to left position and return it to neutral.
- Move control knob from neutral to turn to right position and return it to neutral

- B  
B
- (2) In each case, the torque required to move the control knob shall be  $10 \pm 4$  lbf. in.

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### E. Close-Up

- (1) On overhead panel, place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position.
- (2) Shut down pressurization of hydraulic system (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in electrical mode).
- (3) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).
- (4) Remove equipment TE3019407.
- (5) Remove access platform.

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## MAINTENANCE MANUAL

### TRIM GEARBOX ASSEMBLY IN CENTRE CONSOLE - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

Gearbox assembly in centre console controls Roll trim through control knob.

#### 2. Gearbox Assembly in Centre Console

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins - Set - Integral Trim - Pitch/Roll/Yaw	D921277000
Lockwire (Dia. 1 mm) (0.041 in.) Corrosion Resistant Steel	
Special Products (Ref. 20-30-00, No.51)	
Circuit Breaker Safety Clips	
Access Platform 3.672 m (12 ft.)	

EFFECTIVITY: ALL

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### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Check that roll, pitch and yaw trim controls are set to zero.
- (3) Remove access panel 121DB, immobilize pitch, roll and yaw trim controls with rigging pins D921277000.
- (4) Open access door 151DB, depressurize Blue, Yellow and Green hydraulic systems.

**WARNING :** DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (5) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

### C. Remove

- (1) Pitch control wheel (21) :
  - Remove cover (18)
  - Remove cotter pin (19) and nut (17); remove washer (20). Remove wheel (21) and ratchet mechanism (22).
- (2) Yaw control knob (30).  
Remove cover (1); remove cotter pin (2), and nut (32), remove washer (31), knob (30) and dial (29).
- (3) Roll control knob (7) :  
Remove cover (3), remove cotter pin (5), and nut (4);

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remove washer (6), knob (7) and dial (8).

- (4) Electro-luminescent panel (9).  
After removing the roll and yaw control knobs and their dials, remove screws (28), retain washers for reinstallation and remove electro-luminescent panel (9).
- (5) Trim gearbox assembly (27).
  - (a) Remove screws (15), retain washers for reinstallation and remove side panel (16).
  - (b) On side panel (25), remove plugs (23) remove screws (24), retain washers for reinstallation and remove side panel (25).
  - (c) Remove screws (26) attaching trim gearbox assembly on centre pedestal, retain washers for reinstallation.
  - (d) Remove spring pins (12), disconnect the three torque tubes (13) from universal joints (14), then from gearbox assembly.
  - (e) Remove gearbox assembly (27) by pulling it upwards.
  - (f) Remove nuts (11) and electro-luminescent panel (10).

### D. Preparation of Replacement Component

### E. Install

#### (1) Trim Gearbox Assembly

NOTE : The electro-luminescent panel must undergo a functional check before being installed on the centre console.

- (a) Install electro-luminescent panel (10) on centre console and secure with nuts (11).
- (b) Remove pitch control wheel (21) and ratchet mechanism (22) from gearbox assembly (27).
- (c) Install gearbox assembly (27) on centre console with screws (26). Torque to between 0.450 and 0.565 m.daN (40 and 50 lbf.in.).

EFFECTIVITY: ALL

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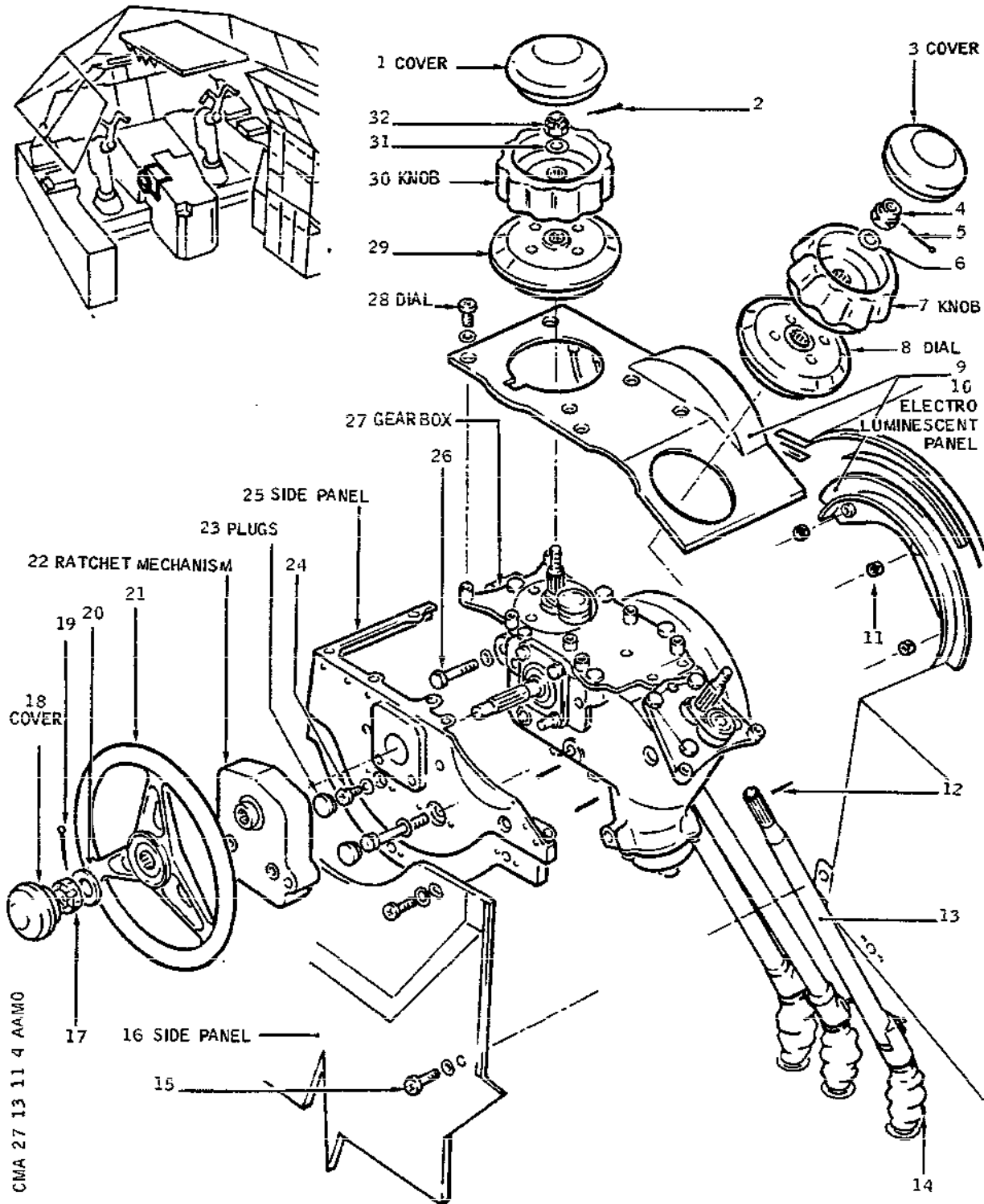
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Trim Gearbox Assembly  
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EFFECTIVITY: ALL

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- (d) Install side panel (25) on gearbox assembly (27). Make certain that panel (25) is in contact with the gearbox assembly bosses, attach with screws (24) and install plugs (23).

### (2) Electro-luminescent panel (9)

NOTE : The electro-luminescent panel must undergo a functional check before being installed in the centre console.

- (a) Fully turn yaw and roll control knobs (7)(30) to right or left then remove.
- (b) Remove roll and yaw dials (8) and (29).
- (c) Install electro-luminescent panel (9) on gearbox assembly (27) with screws (28).

### (3) Roll control knob (7).

- (a) The control knob having been turned fully to right or left before being removed; install roll dial a half division beyond full travel. Apply a light coat of product No.51 to gears and carefully mesh gear teeth. Check the overtravel in the opposite direction and if necessary remesh gear teeth to obtain equal amounts of overtravel in both directions.
- (b) Install roll control knob on its splined shaft. Install washer (6) and nut (4). Torque to between 0.450 and 0.565 m.daN (40 and 50 lbf.in.). Safety with cotter pin (5). Install cover (3).

CAUTION : FROM ITS NEUTRAL POSITION KNOB MUST BE ABLE TO ROTATE 4 REVS AND 283° MINIMUM IN BOTH DIRECTIONS.

### (4) Yaw control knob (30)

- (a) The control knob having been turned fully to right or left before being removed; install yaw dial a half division beyond full travel. Apply a light coat of product No.51 to gears and carefully mesh gear teeth. Check the overtravel in the opposite direction and if necessary remesh gear teeth to obtain equal amounts of overtravel in both directions.

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- (b) Install the yaw control knob (30) on its splined shaft.  
Install washer (31) and nut (32).  
Torque to between 0.450 and 0.565 m.daN (40 and 50 lbf.in.). Safety with cotter pin (2). Install cover (1).

CAUTION : FROM ITS NEUTRAL POSITION KNOB MUST BE  
ABLE TO ROTATE 4 REVS AND 287° MINIMUM  
IN BOTH DIRECTIONS.

### (5) Pitch Control Wheel

Apply a light coat of product No.51 to splined shaft and install ratchet mechanism (22) and control wheel (21) on splined shaft.  
Install washer (20) and nut (17). Torque to between 0.450 and 0.565 m.daN (40 and 50 lbf.in.).  
Safety nut with cotter pin (19), install cover (18) on control wheel.

CAUTION : FROM ITS NEUTRAL POSITION HANDWHEEL MUST BE  
ABLE TO ROTATE 2 REVS AND 104° MINIMUM  
FORWARD AND 4 REVS AND 199° MINIMUM AFT.

### (6) Torque tubes

- (a) Place pitch, roll and yaw trim controls in neutral position.
- (b) Apply a light coat of product No.51 to torque tube (13) splines.
- (c) Install pitch, roll and yaw torque tubes, one by one, as follows :
- (c1) Engage torque tube to corresponding splined bore taking care not to displace trim control from neutral position.
- (c2) Engage the other end of torque tube in universal joint (14).  
If necessary, slightly rotate torque tube to align splines.
- (c3) Install spring pin (12) and safety with lockwire (Ref. 20-21-13).

- (7) Install side panel (16) with washers and screws (15).
- (8) Remove rigging pins D921277000 from pitch roll and

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yaw trim controls.

(9) Remove warning notices.

(10) Remove safety clip and tag and reset the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

### F. Tests

- (1) Carry out operational test (Ref. 27-13-00, Adjustment/ Test).
- (2) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access doors and panels 121DB, 151DB.
- (3) Remove access platforms.

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### INTEGRAL TRIM ASSEMBLY - REMOVAL/INSTALLATION

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The integral trim assembly transmits the trim control movements to the roll linkage control rods.

#### 2. Integral Trim Assembly

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pin - Pitch Roll Shaft	D925367000
Rigging Pin - Synchro Pack	D925252000
Rigging Pin - Set - Integral Trim Pitch/Roll/Yaw	D921277000
Zero Rigging Device - Relay Chassis	E925019000
Rigging Template - Integral Trim	D921250000
Circuit Breaker Safety Clips	
Access Platform 3.672 m (12 ft.)	

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### DESCRIPTION

### PART NO.

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Lockwire Dia. 1 mm (0.041 in.)  
Corrosion Resistant Steel

General Lubricant (Ref. 20-30-00,  
No.51)

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (3) Check that pitch, yaw and roll trim controls are set to zero.
- (4) Remove panel 121FB, immobilize roll and pitch resolvers with rigging pins D925252001 and D925252003.
- (5) Remove panel 121GB and install items of equipment E925019010 and E925019012 on pitch linkage.
- (6) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
- (7) Open door 151DB, depressurize Blue, Yellow and Green hydraulic systems.
- (8) Trip, safety and tag the following circuit breaker :

---

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE OUT	15-213	M 626	F22

---

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S

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STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (9) Remove panels 113DB and 121AB, immobilize pitch/roll mixing cams with rigging pin D925367000.
- (10) Open panel 121DB, allowing access to integral trim assembly.
- (11) Remove floor panels 211HF.
- (12) Remove panel 211CS.

### C. Remove

- (1) Remove spring rod (Ref. 27-12-12, Removal/Installation)
- (2) Unsafety and unscrew the attachment bolts securing the upper section of the protective casing (17). Remove the casing upper section.
- (3) Remove cotters and unscrew nuts (19) : remove washers (21) and (20), and bolts (22). Note position of bolts and disconnect rods (18).
- (4) Remove cotters and unscrew nuts (23) : remove washers (24) and (25), and bolts (26). Note position of bolts and disconnect rods (27).
- (5) Remove cotters and unscrew nuts (1) : remove washers (2), bolt (7) and tension adjuster (6) complete with bolt (5).
- (6) Remove spacer (3) and washer (4).
- (7) Unscrew the bolts attaching housing (9) and disengage the chain.
- (8) Unsafety lock-nut (16). Remove cotter and unscrew nut (15) : remove washer (14). Unscrew lock-nut (16) and pivot the artificial feel lever in order to remove bolt (13).
- (9) Remove cotters and unscrew nuts (12) : remove washers (11) and bolts (10) in order to remove the integral trim assembly. Install bolts (10) in order to sup-

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

port the yaw control assembly.

### D. Preparation of Replacement Component

### E. Install

- (1) Remove bolts (10) from yaw control assembly side : position the integral trim assembly, install bolt (10) and washers (11) in their original positions. Tighten nuts (12) and safety with cotters.
- (2) Pivot the artificial feel lever and install bolt (13) : tighten lock-nut (16). Torque to between 2.70 3 m.daN (240 and 260 lbf.in.).
- (3) Install washer (14) and tighten nut (15). Torque to between 1.53 and 1.60 m.daN (140 and 145 lbf.in.). Safety nut (15) with cotter and lock-nut (16) with lockwire.
- (4) In flight compartment
  - (a) Cut lockwire and remove spring pin (32).
  - (b) Disconnect torque tube (31) from universal joint (30) splined shaft, by sliding it upwards ; maintain torque tube in this position.
- (5) Insert rigging pin D921277000 in the integral trim assembly.
- (6) Engage the chain on its sprocket.
- (7) Install housing (9).
- (8) Install tension adjuster (6) complete with bolts (5) and (7).  
Install spacer (3) with washer (4) : install washers (2) and tighten nuts (1). Safety with cotters.
- (9) Apply a load of 3 - 5 lbf. (1.33 - 2.22 daN) to the centre of the chain and measure the deflection. The deflection of the chain should be : 0.080 - 0.125 in. (2.3 to 3.2 mm).  
To adjust chain : Remove cotter and unscrew nut (8) locking the serrated tension adjuster : lengthen or shorten the adjuster to obtain the required tension. Tighten nut (8). Torque to between 1.40 and 1.60 m.daN (125 and 140 lbf.in.). Safety with cotter.  
Make certain that the clearance between the base of the housing and washer (4) is between 0.003 and

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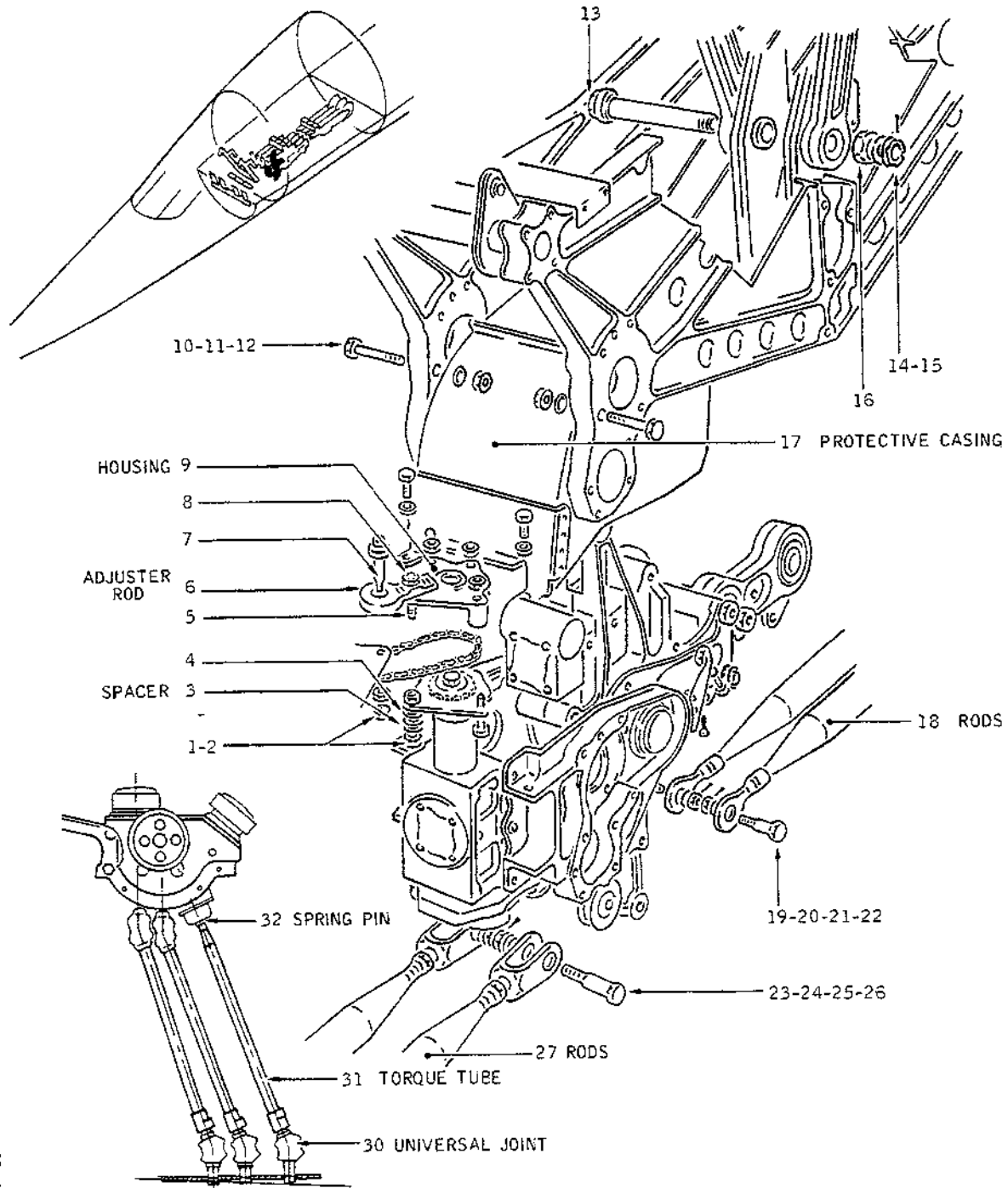
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## MAINTENANCE MANUAL



CMA 27 13 12 4 AAM0

Integral Trim Assembly  
Figure 401

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## MAINTENANCE MANUAL

0.008 in. (0.07 and 0.2 mm).

If the clearance is below limits, adjust washer (4).

If the clearance is above limits, change and adjust washer (4).

(10) In flight compartment

(a) Rotate roll trim knob until dia reads zero.

(b) Coat splines of tube and shaft with a light film of product No.51.

(c) Force fit torque tube (31) to universal joint (30) spined shaft. If necessary align splines by rotating slightly torque tube (31).

(d) Install spring pin (32), safety with lockwire (Ref. 20-21-13).

(11) Install equipment D921250000 on roll integral trim assembly.

(12) Connect rods (18) and install bolts (22), washers (21) and (20).

Tighten nuts (19) : Torque to between 0.30 and 0.35 m.daN (27 and 32 lbf.in.). Safety with cotters.

(13) Connect rods (27) and install bolts (26), washers (24) and (25).

Tighten nuts (23). Torque to between 0.52 and 0.60 m.daN (45 and 50 lbf.in.).

Safety with cotters.

NOTE : If rods (18) and (27) cannot be easily connected to integral trim assembly lever adjust length of these rods as follows :

(a) Rods between torque tube and integral trim assembly lower lever.

(a1) Remove cotter pins and rod coupling clamps

(a2) Remove rod assigned to Captain's side and install it on First Officer's side.

Adjust and tighten rod to length enabling pin to be easily removed and inserted on mixing cam.

Safety ends of rod with lockwire (Ref. 20-21-13).

(a3) Remove this rod and finally install it on

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## MAINTENANCE MANUAL

Captain's side. Install bolt, special washer, flat washer, nut on eye end fittings. Torque to between  
Torque tube side ; 27 and 32 lbf.in. (0.30 and 0.36 m.daN)  
Integral trim assembly side ; 45 and 50 lbf.in. (0.52 and 0.60 m.daN)  
Safety with cotter pin.

- (a4) Install rod assigned to First Officer's side.

Adjust and tighten rod to length enabling rigging pin to be easily removed and inserted on mixing cam. Safety ends of rod with lockwire (Ref. 20-21-13). Install bolt, special washer, flat washer, nut on eye end fittings. Apply the same tightening torque as for Captain's side rod. Safety with cotter pin.

- (a5) Install safety attachments and coupling clamps

Torque to between 12 and 15 lbf.in. (0.15 and 0.18 m.daN). Safety with cotter pin.

- (b) Rods between integral trim assembly lower lever and synchro pack.

- (b1) Remove cotter pins and rod coupling clamps.

- (b2) Adjust length of rods so that attachment bolts can be inserted freely. Tighten and safety rod ends ; install bolt, special washer, flat washer, nut on eye end fittings. Torque to between 27 and 32 lbf.in. (0.30 and 0.35 m.daN). Safety with cotter pin.

- (b3) Install safety attachments and coupling clamps.

Torque to between 12 and 15 lbf.in. (0.15 and 0.18 m.daN). Safety with cotter pin.

- (14) Install spring rod (Ref. 27-12-12, Removal/Installation).

Install protective casing (17) ; safety the bolts with lockwire (Ref. 20-21-13).

- (15) Remove warning notices.

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## MAINTENANCE MANUAL

- (16) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (17) Remove items of equipment E925019012, E925019010, D921250000, and rigging pins D925367000, D921277000, D925252001 and D925252003.
- (18) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).

### F. Tests

- (1) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (2) Carry out an operational test (Ref. 27-13-00, Adjustment/Test).
- (3) With trim controls set to zero, immobilize pitch and roll resolvers with rigging pins D925252001 and D925252003.
- (4) Make certain that rigging pins D921277000 and D925367000 can be easily inserted and removed. If not, repeat removal/installation adjustments.
- (5) Remove rigging pins D925367000, D921277000, D925252003 and D925252001.
- (6) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
- (7) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access doors and panels 121FB, 121GB, 151DB, 121AB, 113DB, 121DB, 211CS.
- (3) Install floor panels 211HF.
- (4) Remove safety clips and tags and reset circuit breaker M626, panel 15-213, Map Ref F22.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

(5) Remove access platform.

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**END OF THIS  
SECTION**

**NEXT**

# *Concorde*

## MAINTENANCE MANUAL

### HYDRAULIC SYSTEM - DESCRIPTION AND OPERATION

#### 1. General (Ref. Fig. 001 )

The flight controls use the three aircraft hydraulic systems : Blue, Green and Yellow.

The power flight control units (PFCU) and relay jacks (RJ) are supplied in normal operation by the Blue and Green hydraulic systems.

The Yellow hydraulic system is used in emergency only to replace the Blue or Green systems in the event of a pressure drop.

R The supply is achieved through eight servo control selector valves, four for the PFCUs and four for the RJs.

R The two normally operating (Blue and Green) selector valves of the RJs are equipped with pressure maintaining valves.

R Four low pressure switches are included in the system between the selector valves and the PFCUs.

The two artificial feel (AF) jacks are supplied, one by the Blue system and the other by the Green system.

A monitoring system enables possible hydraulic faults to be determined (Ref. 27-17-00) and takes the necessary remedial action.

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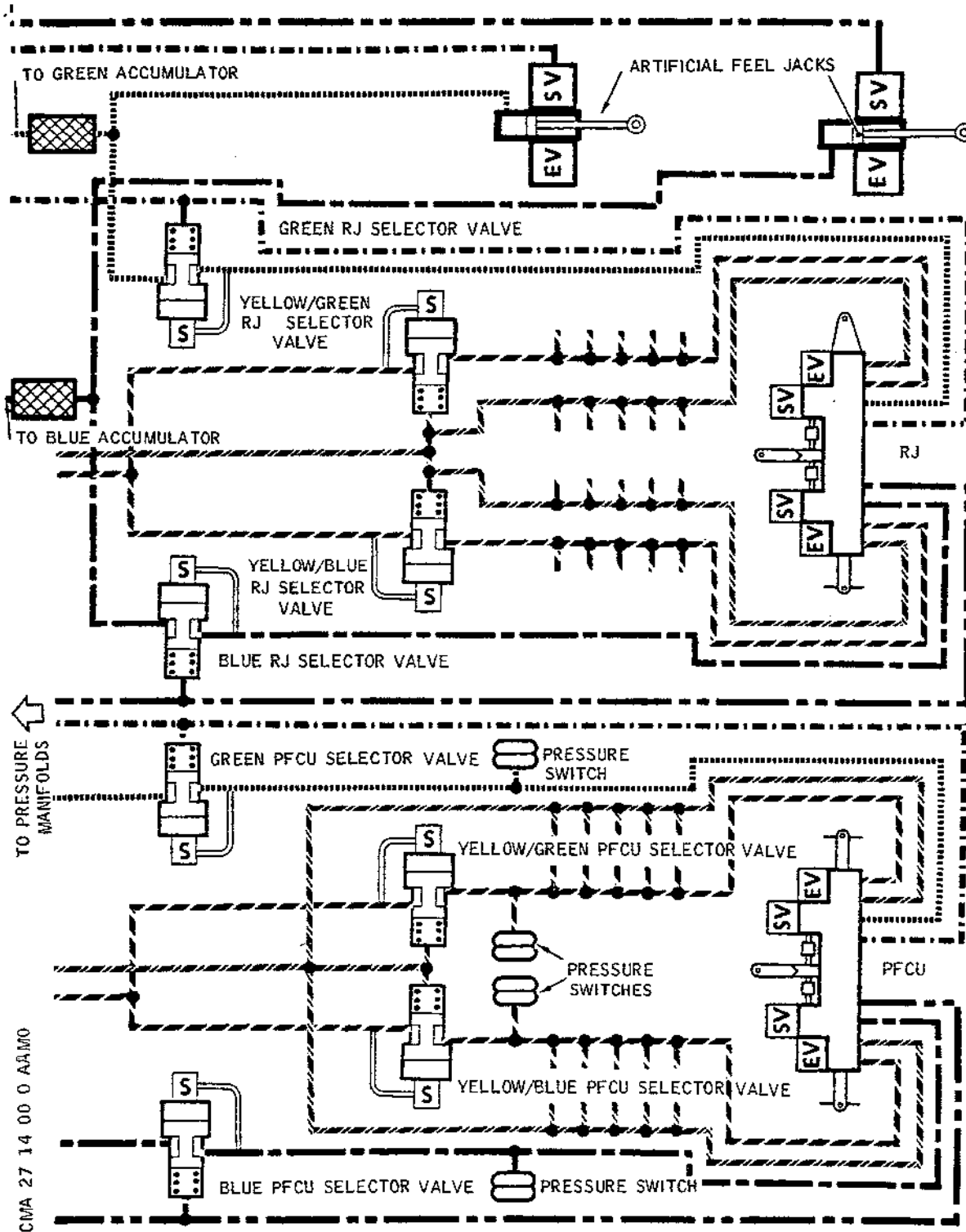
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## MAINTENANCE MANUAL



Hydraulic Supply  
Figure 001

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## MAINTENANCE MANUAL

### R 2. Selector Valves-PFCU Electro Hydraulic

R The PFCU selector valves ensure hydraulic pressure supply to the  
R PFCU and the return to the tank.

R Each is a three-way, two-position selector valve.

R A. Normal Selector Valve (Blue or Green)  
(Ref. Fig. 002 )

R In the normal position, the solenoid is not energized.  
Pressure acts on the annular section of spool valve (D)  
which opens the supply port (A) to the system port (C).

R Energizing the solenoid causes its spool valve (E) to  
displace, the hydraulic pressure and the spring thus  
R displace spool valve (D) which opens the system port (C)  
R to the tank return.

EFFECTIVITY: ALL

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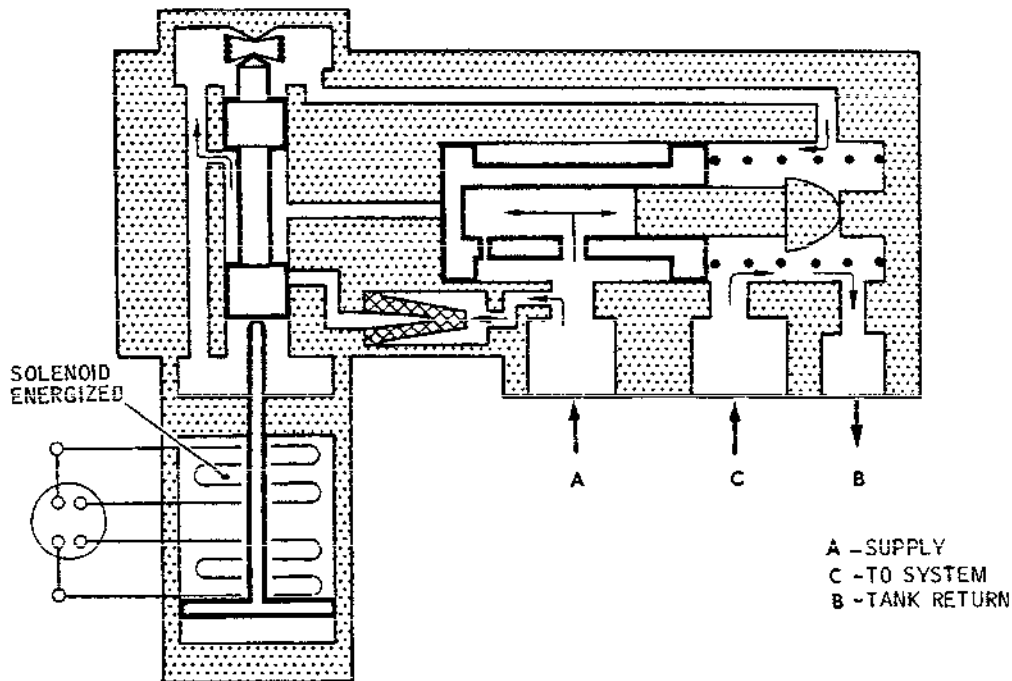
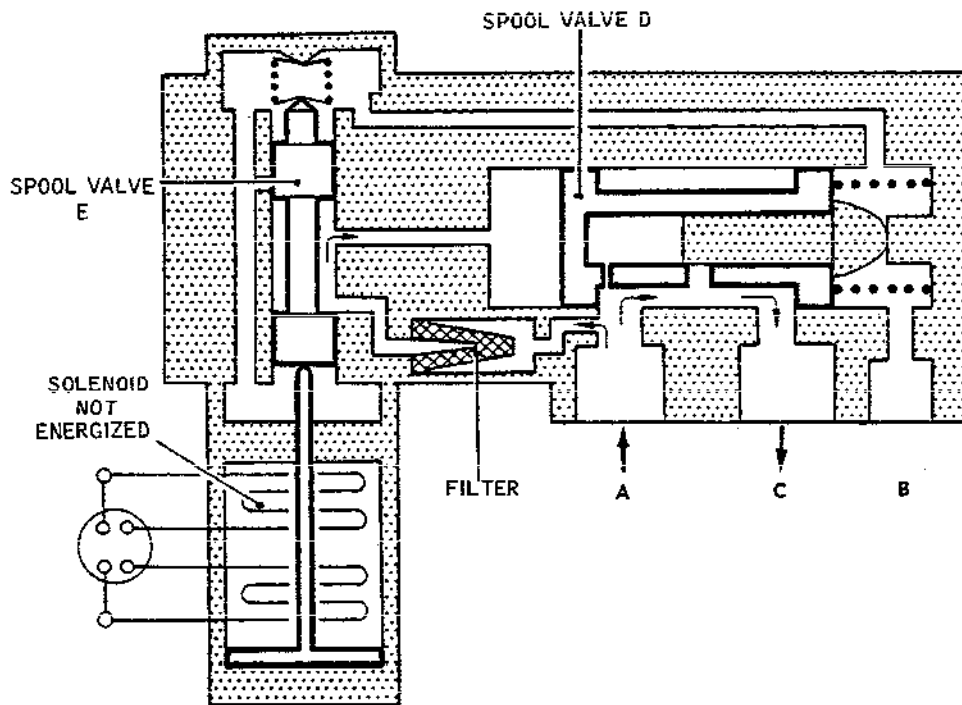
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PFCU Selector Valve  
Figure 002

R

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## MAINTENANCE MANUAL

R        B.   Standby Selector Valve (Yellow/Blue or Yellow/Green)  
             (Ref. Fig. 003 )

R                In the normal position the solenoid is not energized.  
R        Spool valve (D) closes supply port (A) ; the system port (C)  
             is open to the tank return (B).

R                When the solenoid is energized, it causes spool valve (E) to  
R        displace and opens supply port (A) to the system port (C).

EFFECTIVITY: ALL

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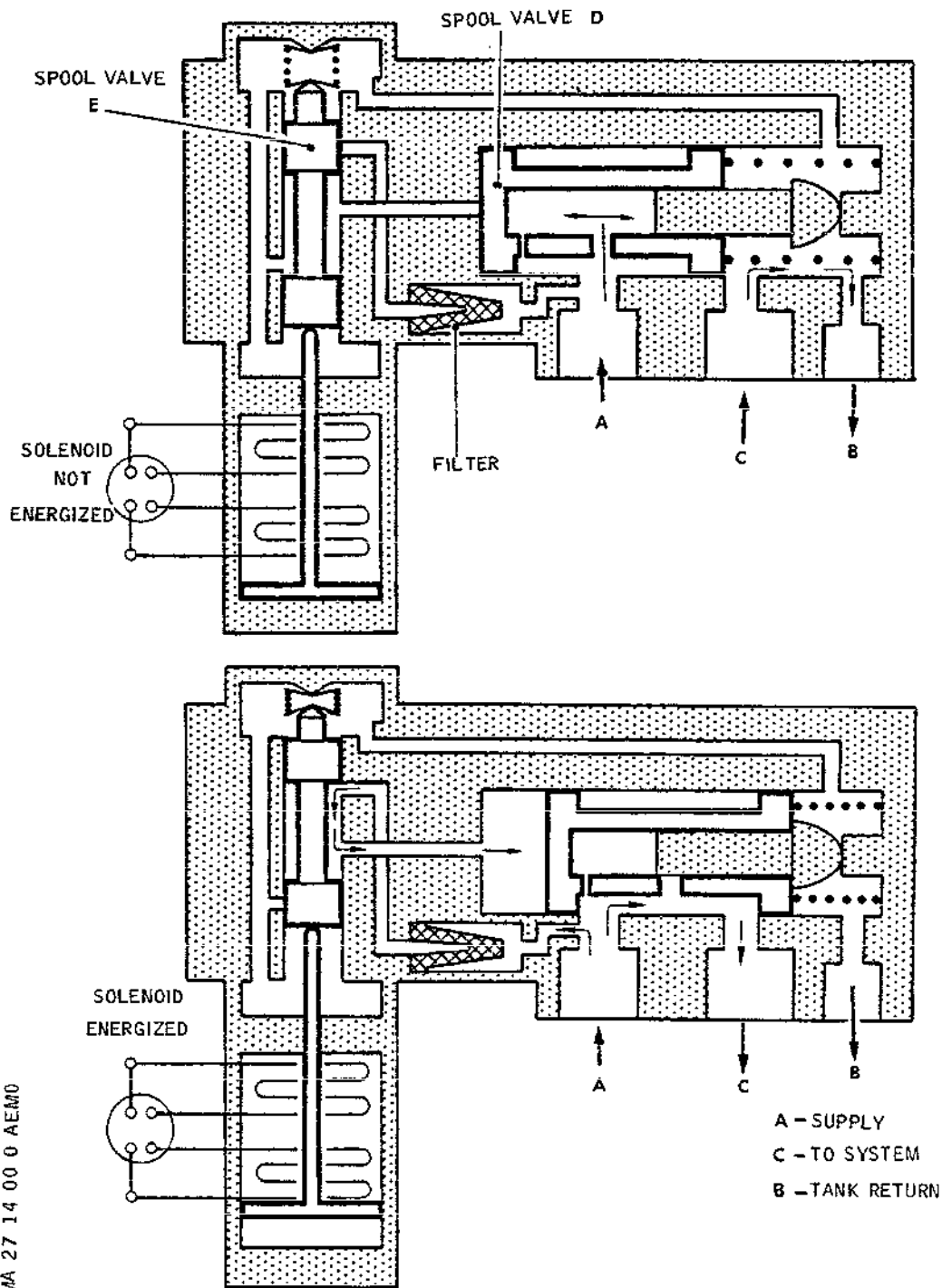
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## MAINTENANCE MANUAL



PFCU Standby Selector Valve  
Figure 003

R

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# *Concorde*

## MAINTENANCE MANUAL

### R 3. Selector Valves - Relay Jack Electro - Hydraulic

R The RJ selector valves ensure hydraulic pressure supply to the  
R RJs and the return to the system tank.

R Each is a three-way, two-position selector valve.

#### R A. Normal Selector Valve (Blue or Green) (Ref. Fig. 004 )

R In normal operation the solenoid is not energized. Pressure  
acts on the annular section of spool valve (D) which opens  
the supply port (A) to the system port (C).

R When the solenoid is energized, it shuts off access to the  
R annular section of spool valve (D) and connects it to  
R the tank return. The spool valve is displaced, closing sup-  
R ply port (A) and opening system port (C) to the tank return  
(B).

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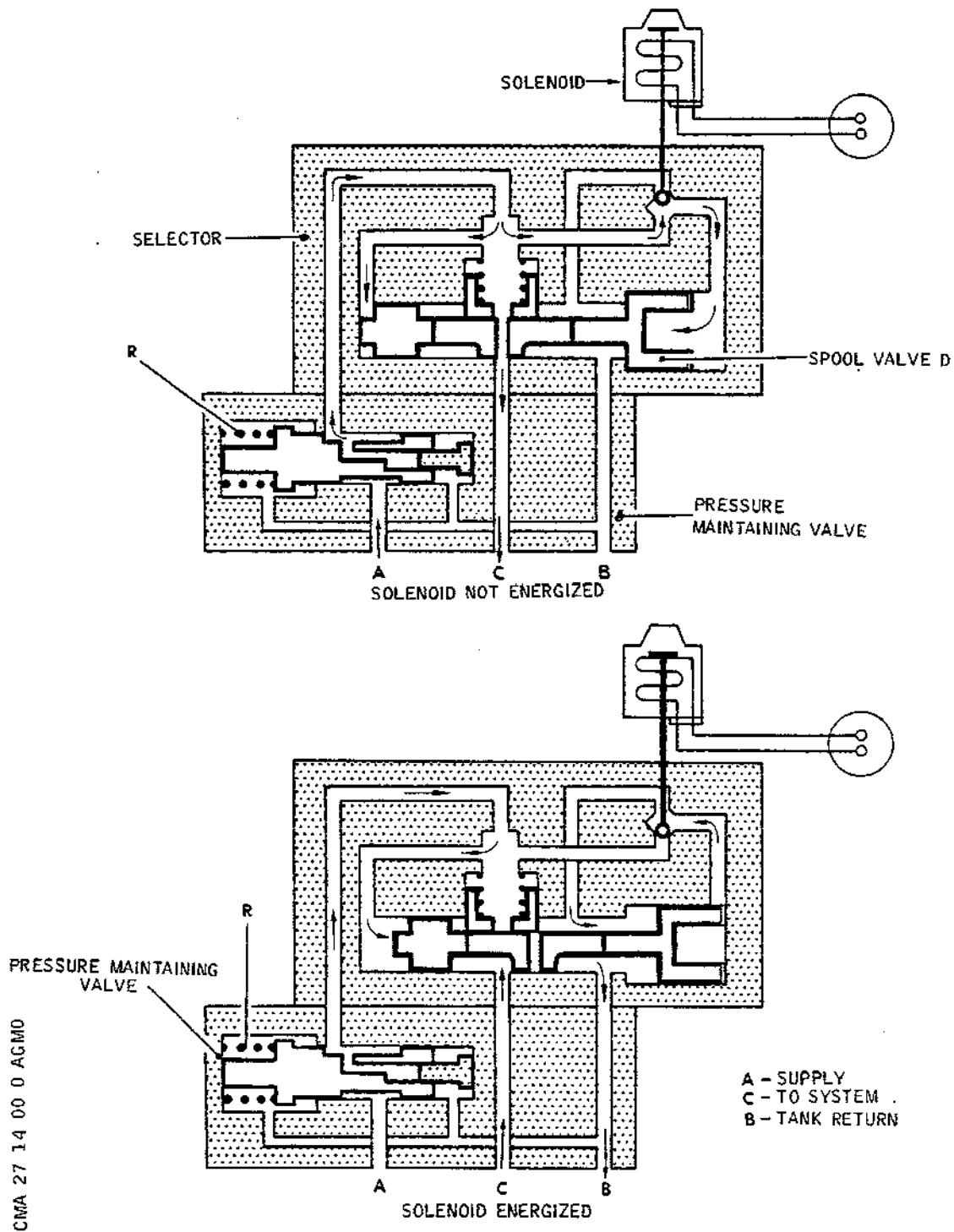
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## MAINTENANCE MANUAL



RJ Selector Valve (Yellow/Blue - Yellow/Green)  
Figure 004

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# *Concorde*

## MAINTENANCE MANUAL

- R B. Standby Selector valve (Yellow/Blue - Yellow/Green)  
(Ref. Fig. 005 )

R In normal operation the solenoid is not energized, the  
pressure acts on the annular side of spool valve (D) ;  
system port (C) is open to the tank return (B).

R When the solenoid is energized, it shuts off access to the  
annular section of spool valve (D) and connects it to the  
R tank return. The spool valve is displaced and opens supply  
R port (A) to the system port (C).

#### 4. Valve-Pressure Maintaining

R The pressure maintaining valves are mounted directly on the  
normal Blue and Green RJ selector valves.

R A calibrated spring holds the spool valve closed until the pres-  
R sure reaches 100 bars. At this pressure, the spool valve is dis-  
placed and admits supply pressure to supply port (A) from the  
R associated selector valve.

EFFECTIVITY: ALL

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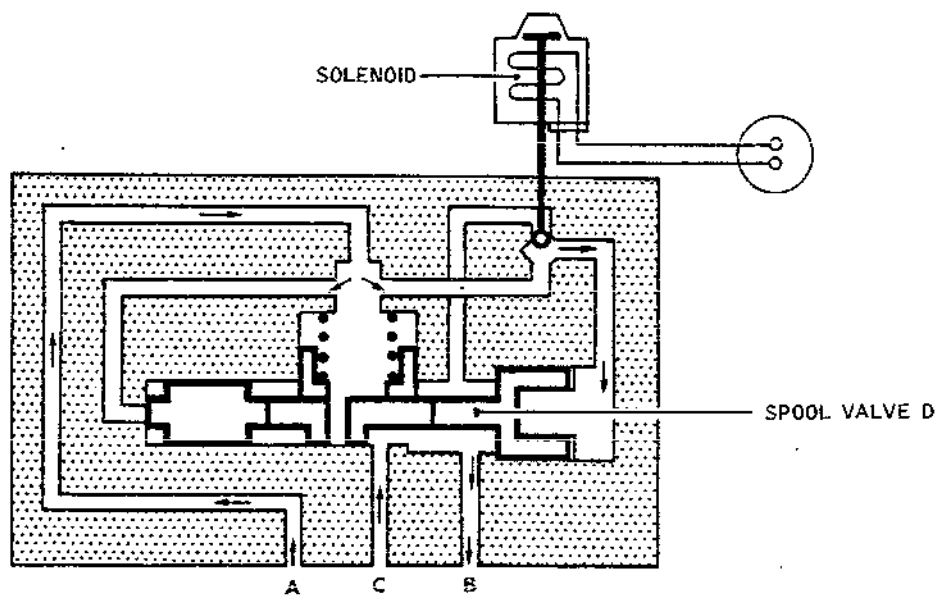
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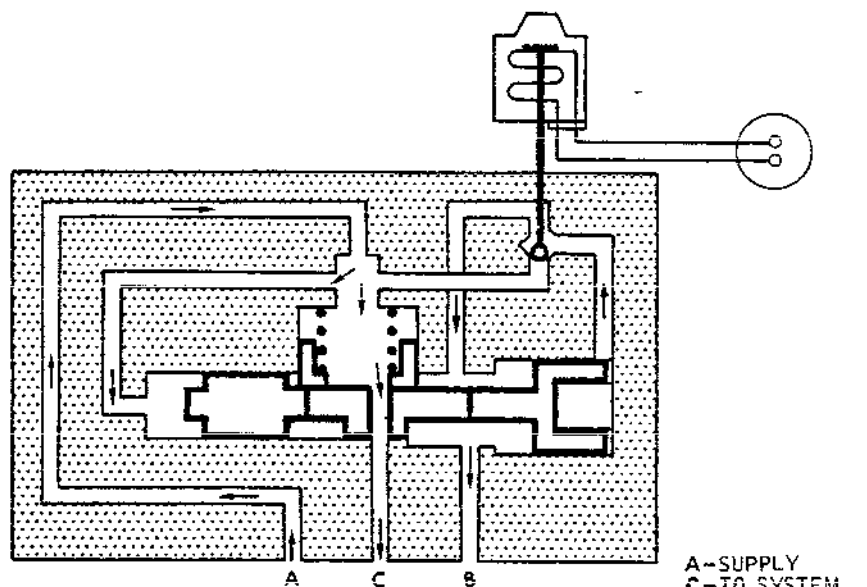
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## MAINTENANCE MANUAL



SOLENOID NOT ENERGIZED



SOLENOID ENERGIZED

CMA 27 14 00 0 AJM0

RJ Standby Selector Valve  
Figure 005

R

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## MAINTENANCE MANUAL

### 5. Jack-Artificial Feel (Ref. Fig. 006, 007 and 008)

The artificial feel jack is part hydraulically and part electrically operated.

The hydraulic supply is achieved through two spool valves.

A load detector on the jack piston rod transmits an electrical signal to a comparator, proportional to the load applied to the piston rod.

R A double servo-valve regulates the hydraulic pressure.

An electro-valve controlled by the monitoring channel of the artificial feel hydraulically supplies the servo-valve.

R When no signals are received at the electro-valve, there is no hydraulic pressure in the servo-valve and the two chambers of the jack are connected to tank return.

R When the electro-valve is energized, hydraulic pressure is admitted to the servo-valve. This pressure is regulated according to the electrical signal from the control channel.

R The regulated pressure admitted to the front chamber of the jack maintains a load corresponding to the control channel signal. The rear chamber of the jack remains connected to tank return.  
R

R When a fault occurs, the electro-valve is no longer energized and cuts-off the hydraulic supply. With no pressure in the servo-valve the two chambers of the jack are opened to the tank return. The rocker arm pivots and the green jack takes over

R Should both jacks fail, only the spring rod remains active. Its calibrated setting, calculated for approach conditions, permits rapid control surface movement which can be dangerous at high speeds. A reduction of speed is therefore necessary.

EFFECTIVITY: ALL

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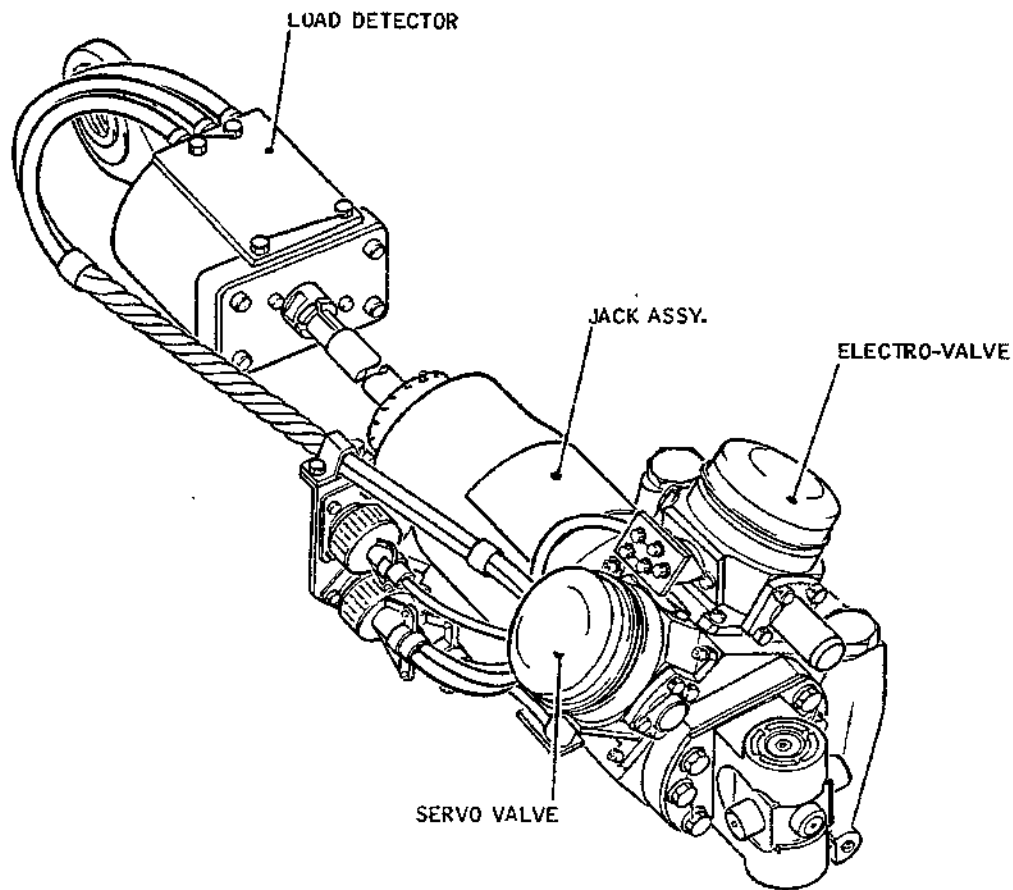
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## MAINTENANCE MANUAL



CMA 27 14 00 0 ALMO

Artificial Feel Jack  
Figure 006

EFFECTIVITY: ALL

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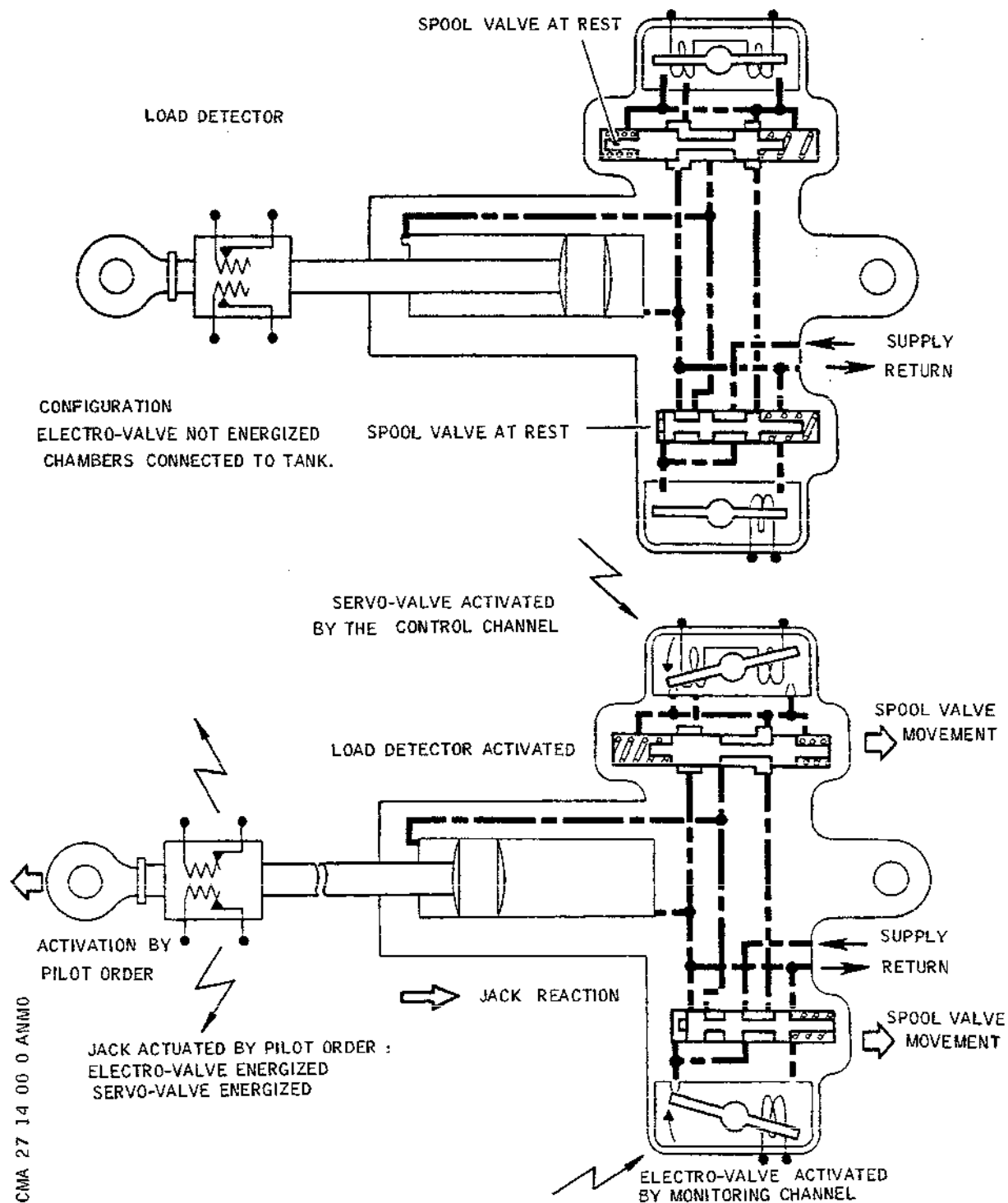
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## MAINTENANCE MANUAL



Artificial Feel Jack  
Figure 007

R

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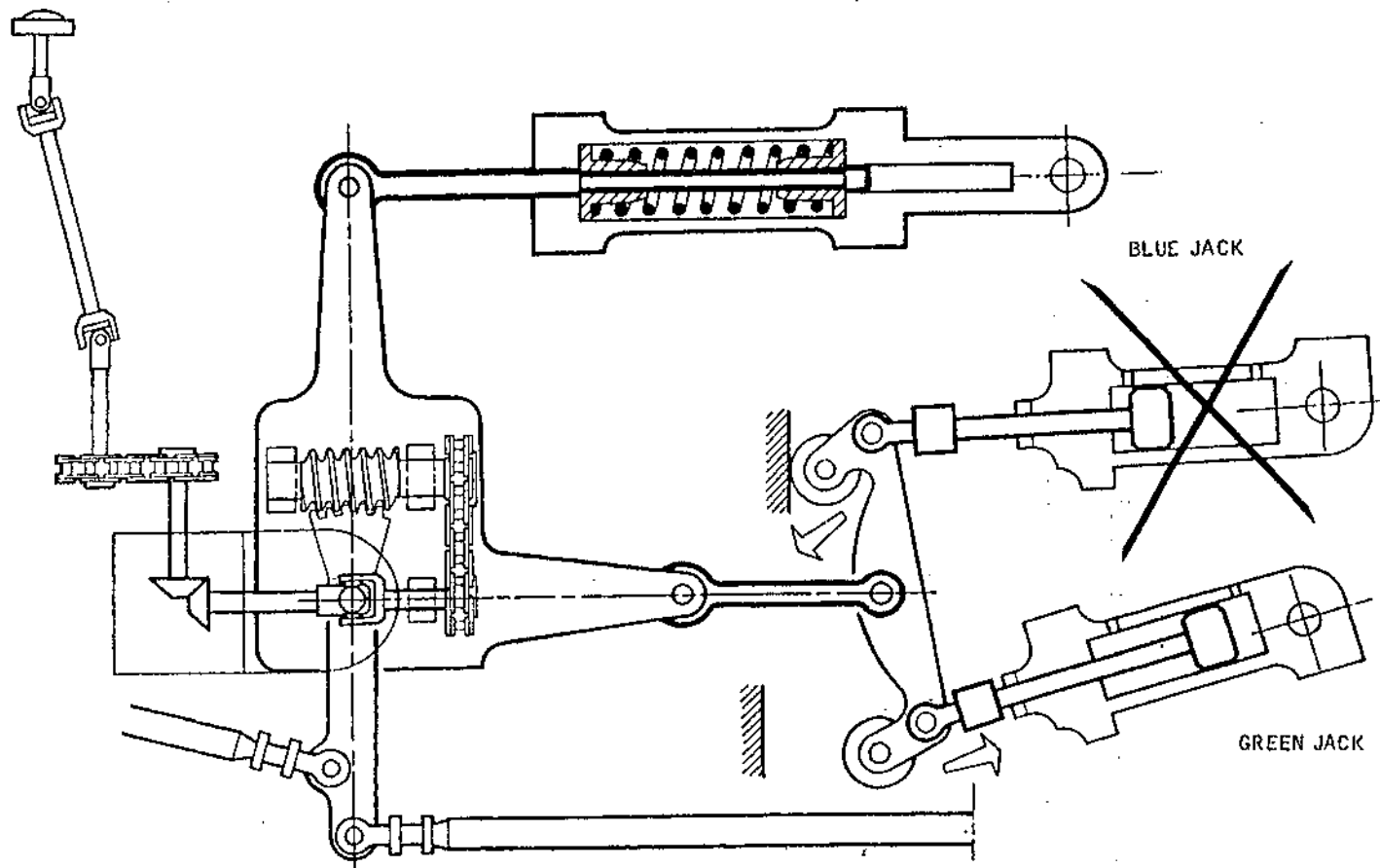
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## MAINTENANCE MANUAL

CMA 27 14 00 0 AQMO



Artificial Feel - Blue Jack Failure  
Figure 008

R

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# *Concorde*

## MAINTENANCE MANUAL

### 6. Relay Jack (RJ) (Ref. Fig. 009 )

R The RJ consist of a mobile body, consisting of two cylinders,  
R moving on two pistons mounted in tandem.

The piston rod is connected to the structure and the body to the control linkage.

The RJ transmit pilot orders, in manual flight, to the mechanical control linkage ; and in automatic flight to the mechanical control linkage and to the resolvers of the electrical controls.

In both cases, the displacement of the spool valves causes the RJ body to be displaced on the piston rods.

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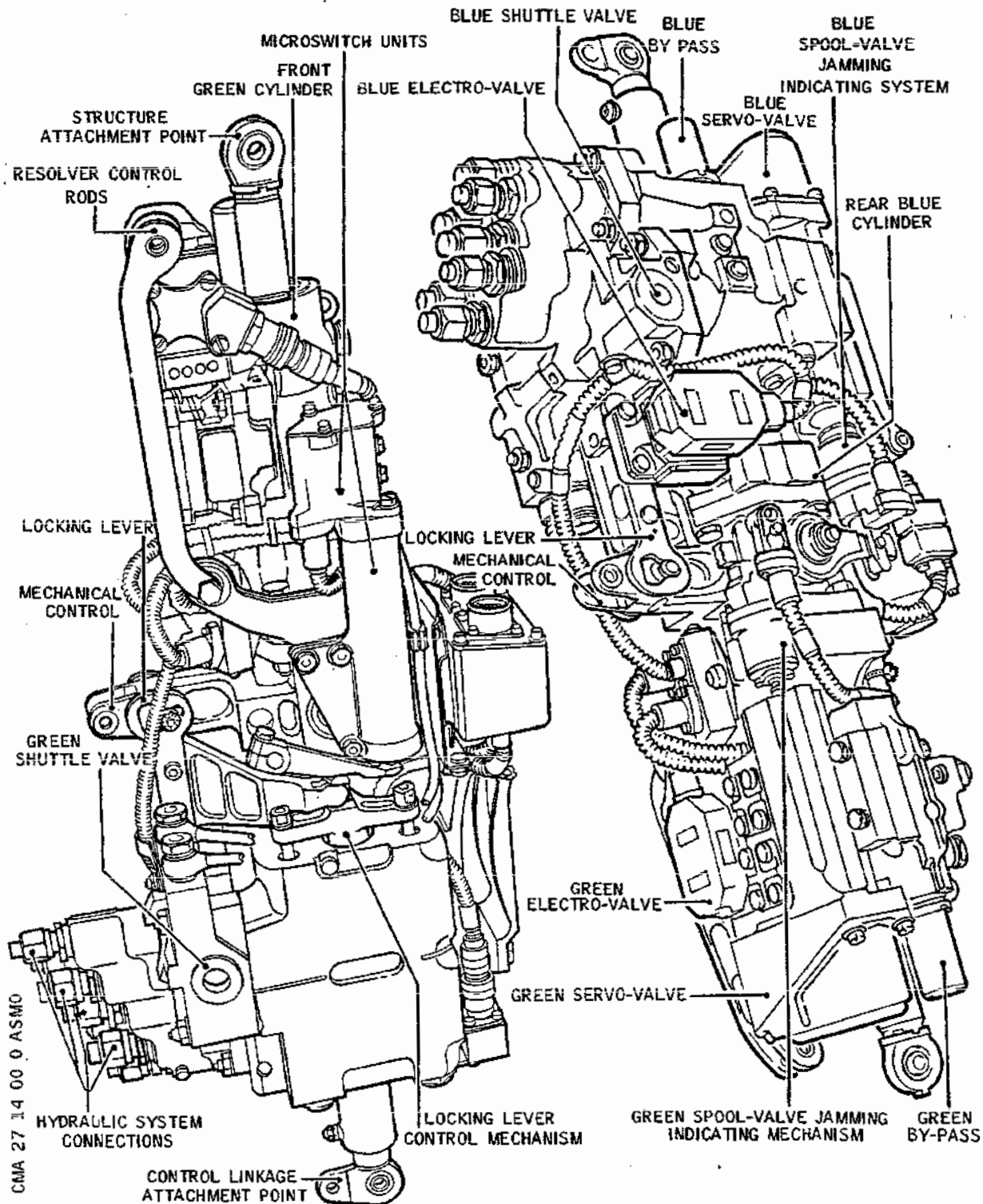
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## MAINTENANCE MANUAL



Relay Jack (RJ)  
Figure 009

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# *Concorde*

## MAINTENANCE MANUAL

### A. Mechanical Control (Ref. Fig. 010 )

In manual control, the input lever is locked to the spool valves.

R

Any movement of the lever displaces the two spool valves and hydraulic pressure is admitted to each cylinder through a by-pass valve.

R

Under hydraulic pressure, the relay jack body moves in the same direction as the spool valve. When moving, the body cuts-off the hydraulic supply and sets the spool valve to the neutral position, which corresponds to the new position of the system.

R

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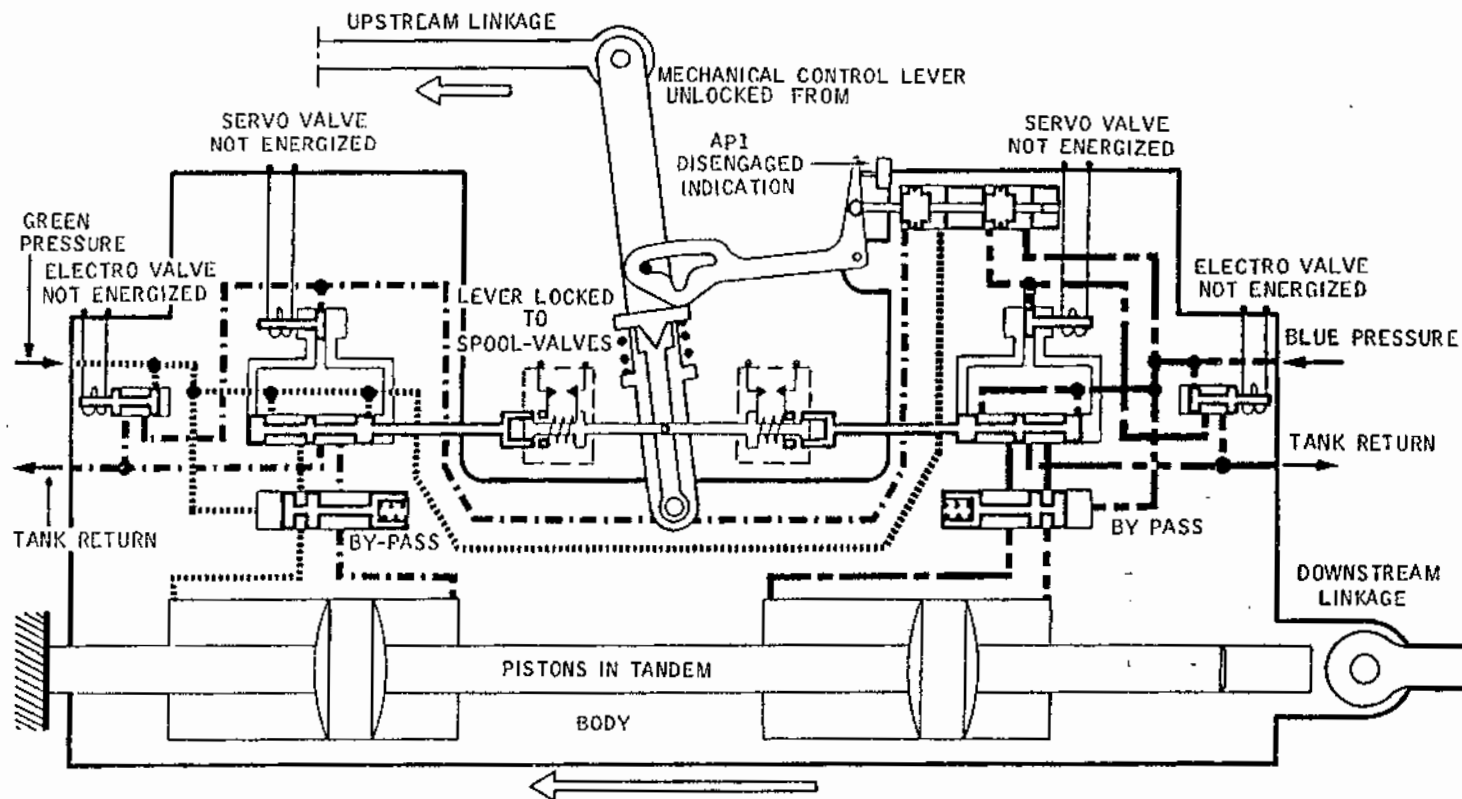
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## MAINTENANCE MANUAL

CMA 27 14 00 0 AUM0



RJ Mechanical Control  
Figure 010

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R

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## MAINTENANCE MANUAL

### B. Electrical Control (Ref. Fig. 011 )

R The electrical control is used by the autopilot system.

In this configuration the input lever is disconnected from the spool valves and locked to the relay jack body.

R The No.1 AP commands are addressed to the Blue system  
R servo-valve and the No.2 AP commands to the Green system servo-valve. With only one auto-pilot being active at any one time, only one servo valve operates.

The monitoring system ensures the electrical supply to the electro-valve.

The electro-valve hydraulic pressure locks the input lever to the relay jack body and supplies the servo-valve.

R The relay jack body displaces, driving the downstream lin-  
R upstream linkage via the input lever.

R The displacement of the upstream linkage rotates the Cap-  
tain's and First Officer's control column handwheels and drives the resolvers. The downstream linkage operates the PFCU input lever. (The input lever being un-locked from the spool valves in AP or in electrical mode).

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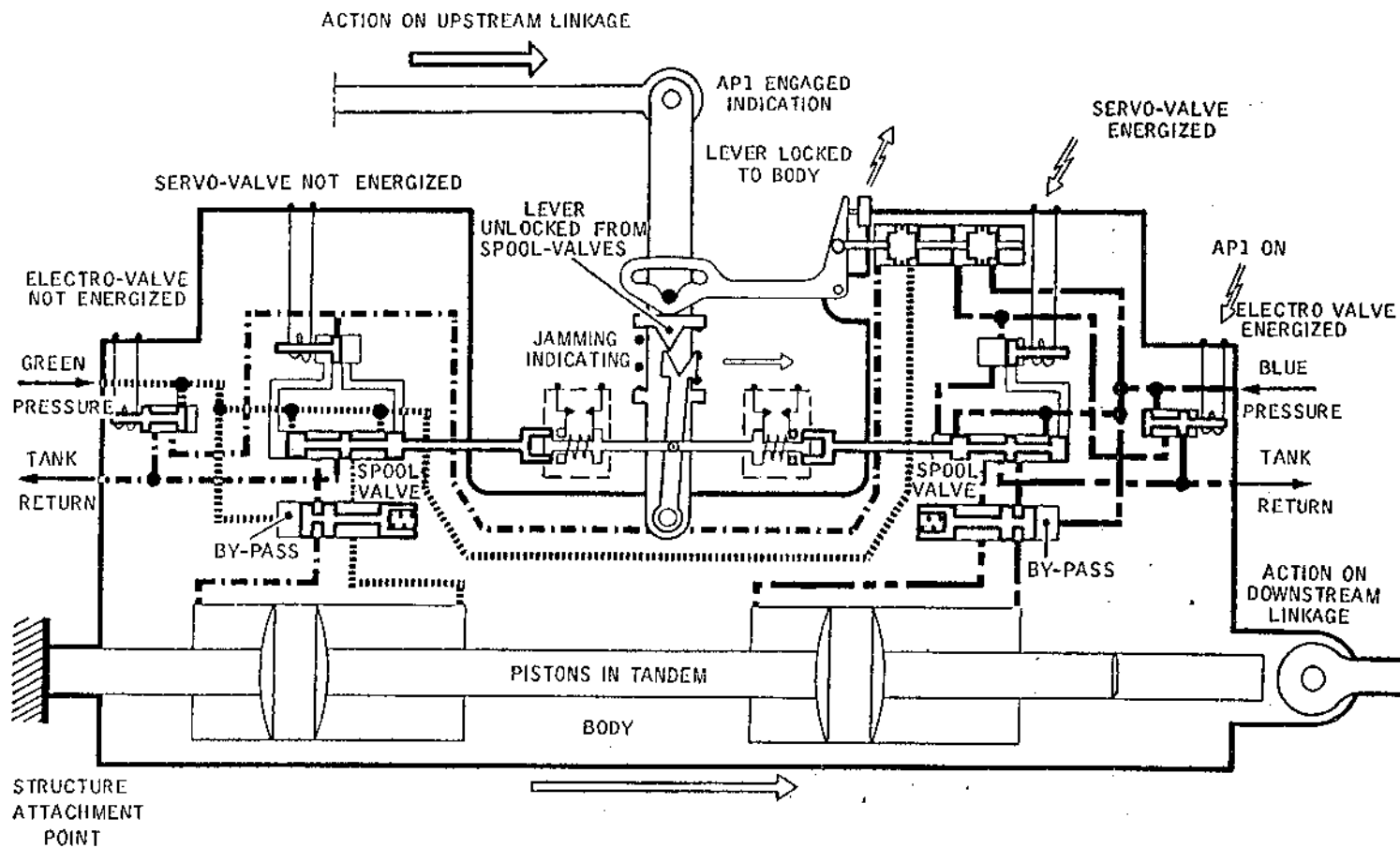
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## MAINTENANCE MANUAL

CMA 27 14 00 0 AWM0



R

RJ Electrical Control  
Figure 011

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# *Concorde*

## MAINTENANCE MANUAL

### R 7. Power Flight Control Unit (PFCU) (Ref. Fig. 012 )

R The PFCU consists of a mobile body, consisting of two cylinders,  
R moving on two pistons mounted in tandem.

The piston rod is connected to the structure and the PFCU body to the control surface.

Displacement of the PFCU is achieved by hydraulic pressure admitted to the cylinders via the spool valves which move it to one side or other of the pistons.

The two spool valves are mechanically linked in order to synchronize the orders in the two cylinders.

The spool valves can be controlled in two ways :

- In mechanical mode
- In electrical mode.

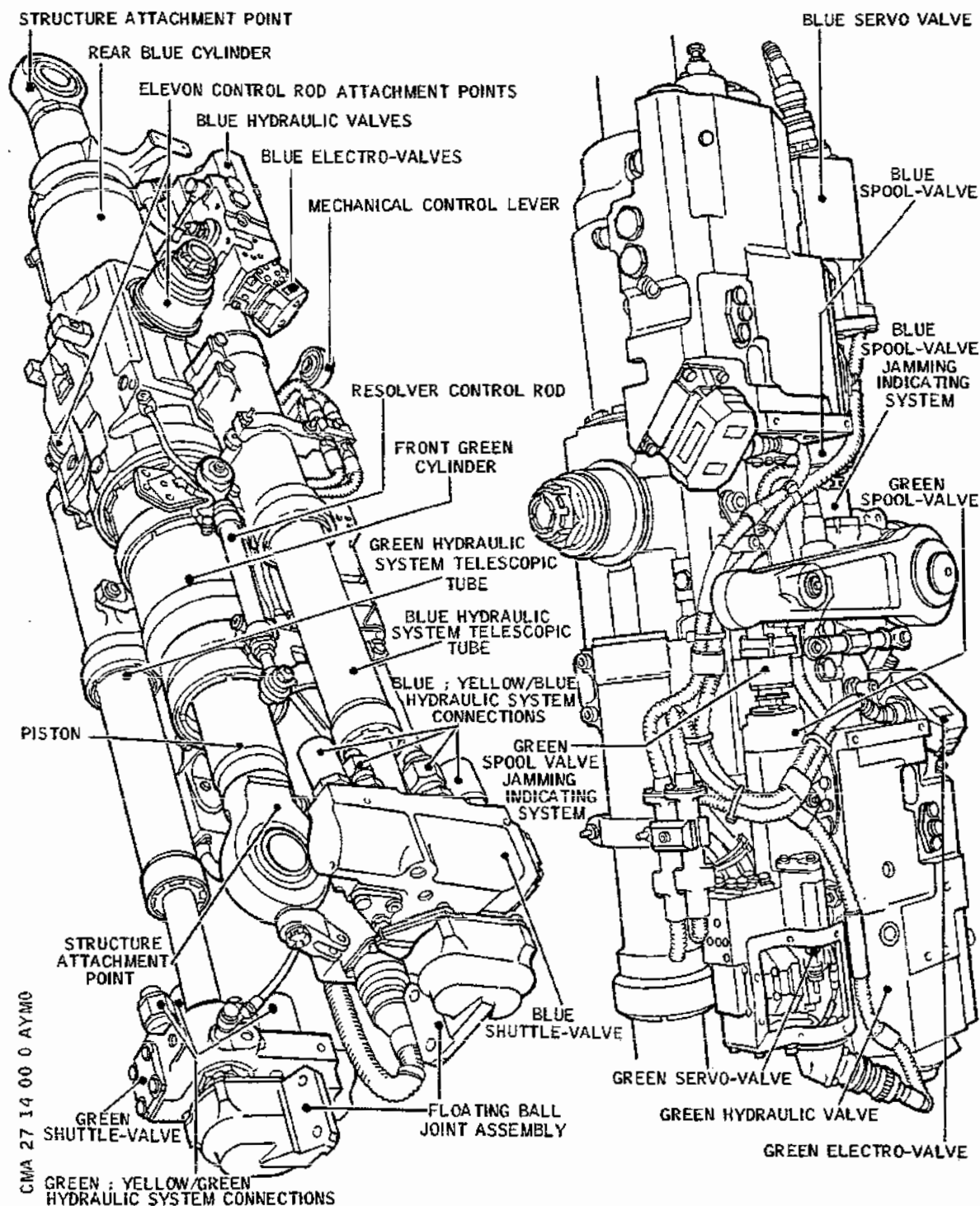
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Power Flight Control Unit (PFCU)

Figure 012

R

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## MAINTENANCE MANUAL

### A. Mechanical Mode (Ref. Fig. 013 )

- R From the moment of pressurizing, the PFCU input lever is mechanically linked to the two spool valves by a clutch.
- R Any movement of the lever displaces the two spool valves and hydraulic pressure is admitted to each cylinder through a by-pass valve which opens at the moment of pressurization.
- R Under the effect of the hydraulic pressure the PFCU body moves in the same direction as the spool valve. When displacing, the body cuts-off the hydraulic supply and sets the spool-valve to a neutral position which corresponds to a new position of the system.

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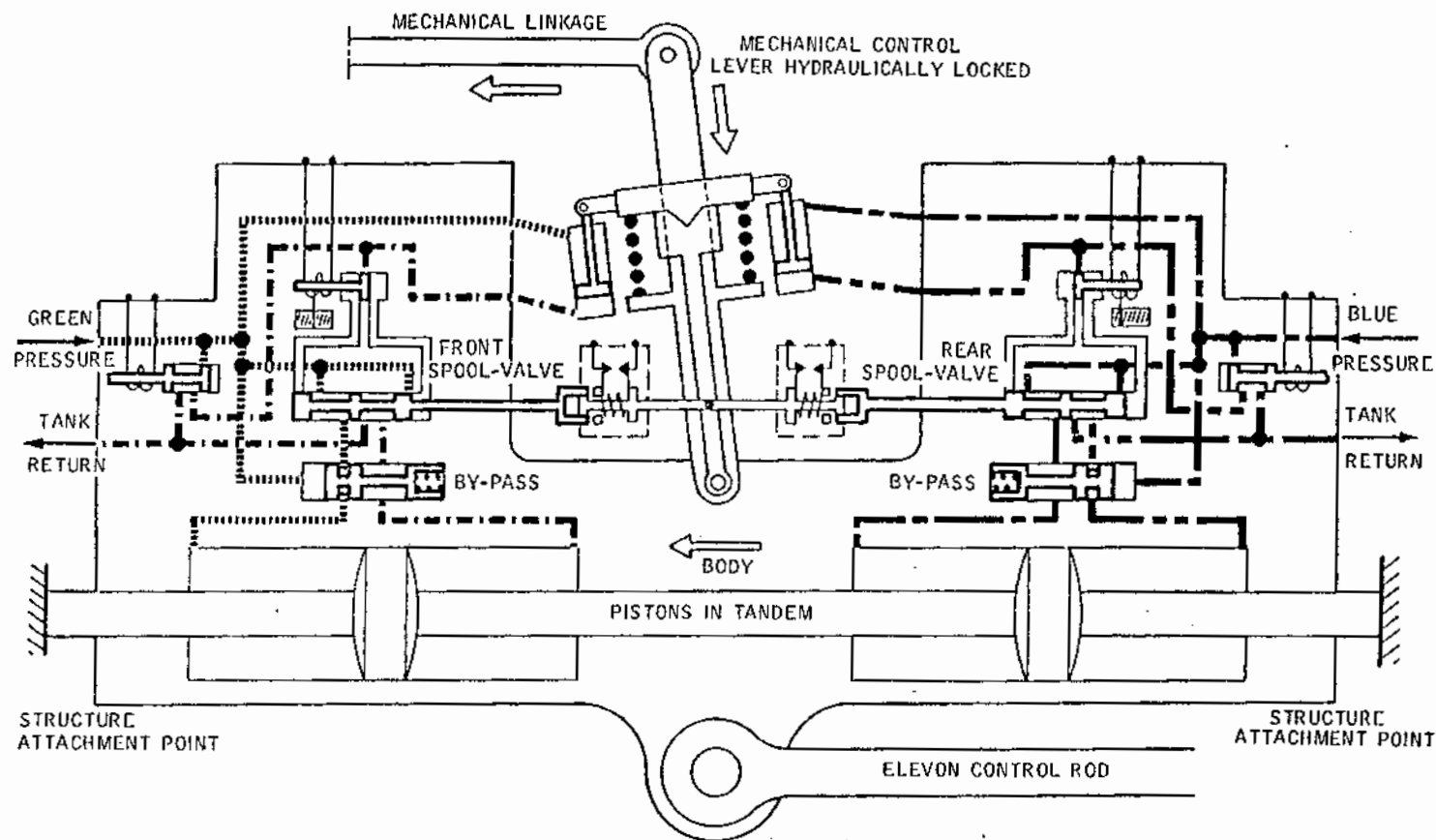
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## MAINTENANCE MANUAL

CMA 27 14 00 0 BAM0



PFCU Mechanical Control  
Figure 013

R

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### B. Electrical Mode (Ref. Fig. 014 )

R The PFCU has two servo-valves, one Blue and one Green, which receive signals from the flight control electrical channels. Each servo-valve hydraulically controls the spool valve with which it is associated.

R Each servo valve is supplied by its associated electrovalve

In normal operation the Blue servo-valve receives the signal from the Blue electrical control channel and the Blue electro-valve is opened by the Blue monitoring channel. The servo-valve is hydraulically actuated and controls the spool valve with which it is associated. This spool valve mechanically drives the second spool valve, the whole assembly controlling the admission of pressure to the two cylinders.

Opening the electro-valve admits pressure to the mechanical lever locking actuator and unlocks the lever. This lever only follows the control orders for the spool valves without acting on them.

R If the Blue channel fails the Blue electro-valve is closed by the Blue monitoring channel and the Blue servo valve becomes inoperative. Reacting to the Green channel operation, the Green electro-valve is simultaneously opened, activating the Green servo valve.

R If the Green electrical channel fails, the monitoring system closes the Green electro-valve. With the two electro-valves closed, hydraulic pressure locks the mechanical control lever and the operation continues in mechanical mode

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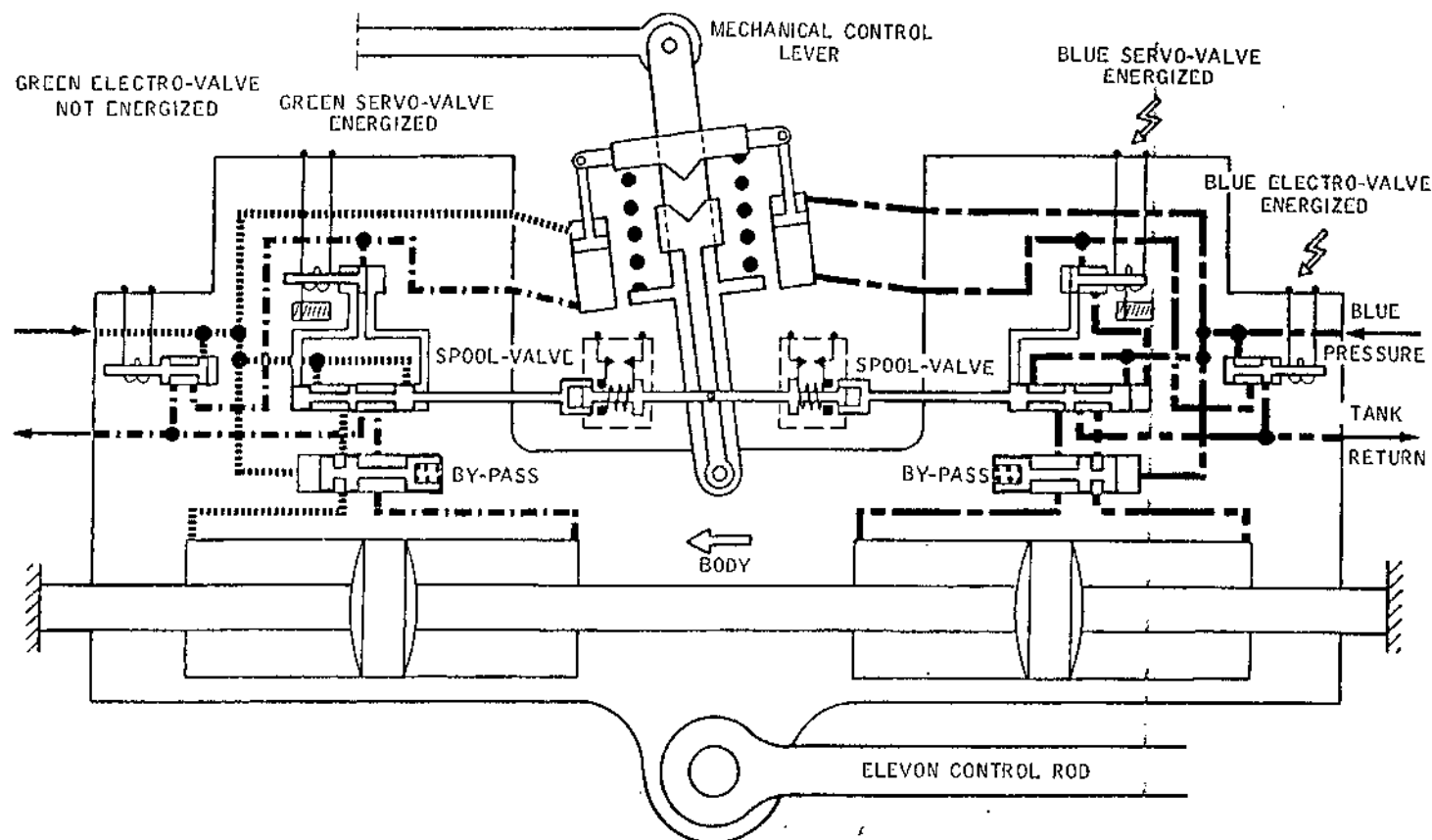
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## MAINTENANCE MANUAL

CMA 27 14 00 0 BCM0



PFCU Electrical Control  
Figure 014

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R

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### C. PFCU Control Mechanical Follow Mode

R During normal electrical control, the mechanical input  
R lever is disengaged but moves to follow the electrical  
R control orders. This prevents possible overloading of lin-  
kage resulting from positional variations between mechan-  
ical input and PFCU's

These variations can arise from :

normal difference in phase between mechanical linkage and  
the electrical control,

the auto-stabilization not cutting in except in the elec-  
trical mode,

a failure at servo-control level,

the effects of ground gusts (servo-controls unpressurized).

R On the ground, a spring device disengages the mechanical  
R control lever in the absence of hydraulic pressure. The  
disengagement allows a deflection of  $9^{\circ}36'$  for the inner  
elevons and  $16^{\circ}$  for the middle and outer elevons each side  
of neutral. Beyond these deflections mechanical linkage is  
protected by the various load limiting components.

On the ground, in the absence of hydraulic pressure, cham-  
bers in the same cylinder are connected by the by-pass  
valve, whose construction is such that it creates a  
restriction and acts as a damper.

### R 8. Monitoring and Indicating (Ref. Fig. 015 )

The indicators monitoring operation of the hydraulic system are  
mounted on the overhead panel.

R The master warning panel comprises :

- R - a PFC warning light for the servo-controls,
- R - a FEEL warning light for the artificial feel jacks,
- R - a HYD warning light for the hydraulic supplies,
- a general aural warning gong.

R The SERVO CONTROLS unit comprises :

- R - two caption lights ; BLUE JAM and GREEN JAM (PFCU valve  
jamming),
- a three position selector, GREEN ONLY - NORMAL - BLUE ONLY,
- four green indicator lights signalling the closing of the

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- normal Green and Blue selector valves,
- two low pressure caption lights : GREEN LOW PRESS and BLUE LOW PRESS,
  - a three position selector YELLOW/GREEN - NORMAL - and YELLOW/BLUE,
  - four green indicator lights signalling the opening of the standby selector valves Yellow/Blue and Yellow/Green.
  - four test push-buttons, each of which checks the master warnings (PFC and gong) and the associated caption light.
  - a push-button YELLOW LEVEL TEST, this push-button is used to simulate a Yellow tank low 1st level warning and causes the standby electro-hydraulic selector valves (PFCU and RJ) to close.

The RELAY JACK unit comprises :

- A three position switch ; GREEN ONLY, NORM, BLUE ONLY
- Two test buttons BLUE and GREEN, each of which checks the master warnings (PFC and gong) and the associated caption light.
- Two caption lights BLUE JAM and GREEN JAM signalling relay jack spool valve jamming

R

EFFECTIVITY: ALL

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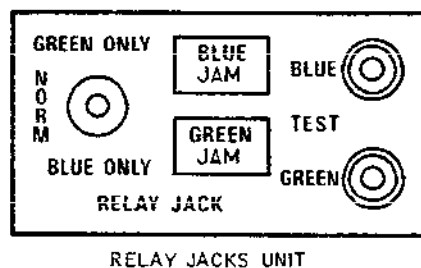
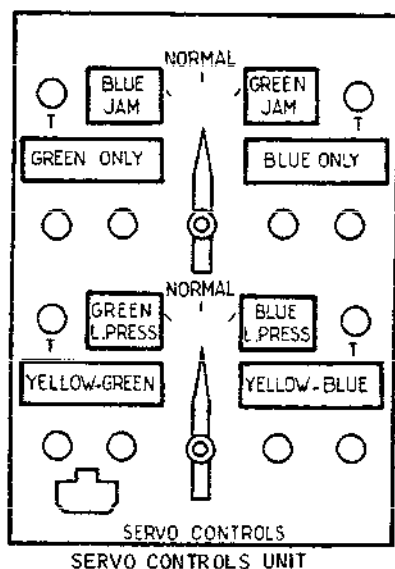
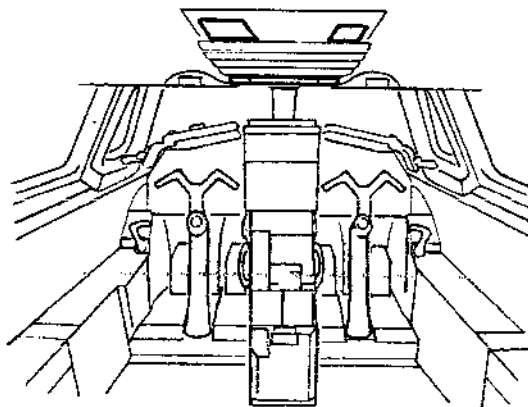
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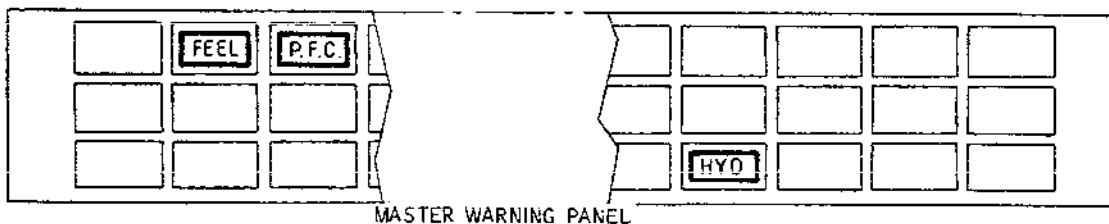
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Monitoring and Indicating  
Figure 015

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## MAINTENANCE MANUAL

### 9. Operation

#### A. Normal Operation (Ref. Fig. 016 )

- R On SERVO CONTROLS unit, place the selectors in NORMAL position.  
R
- R On RELAY JACK unit, place switch in NORMAL position.
- All warning indicators are extinguished.
- R Blue and Green system hydraulic pressure supplies the various flight control components which react according to the pilot's movement of the controls.

EFFECTIVITY: ALL

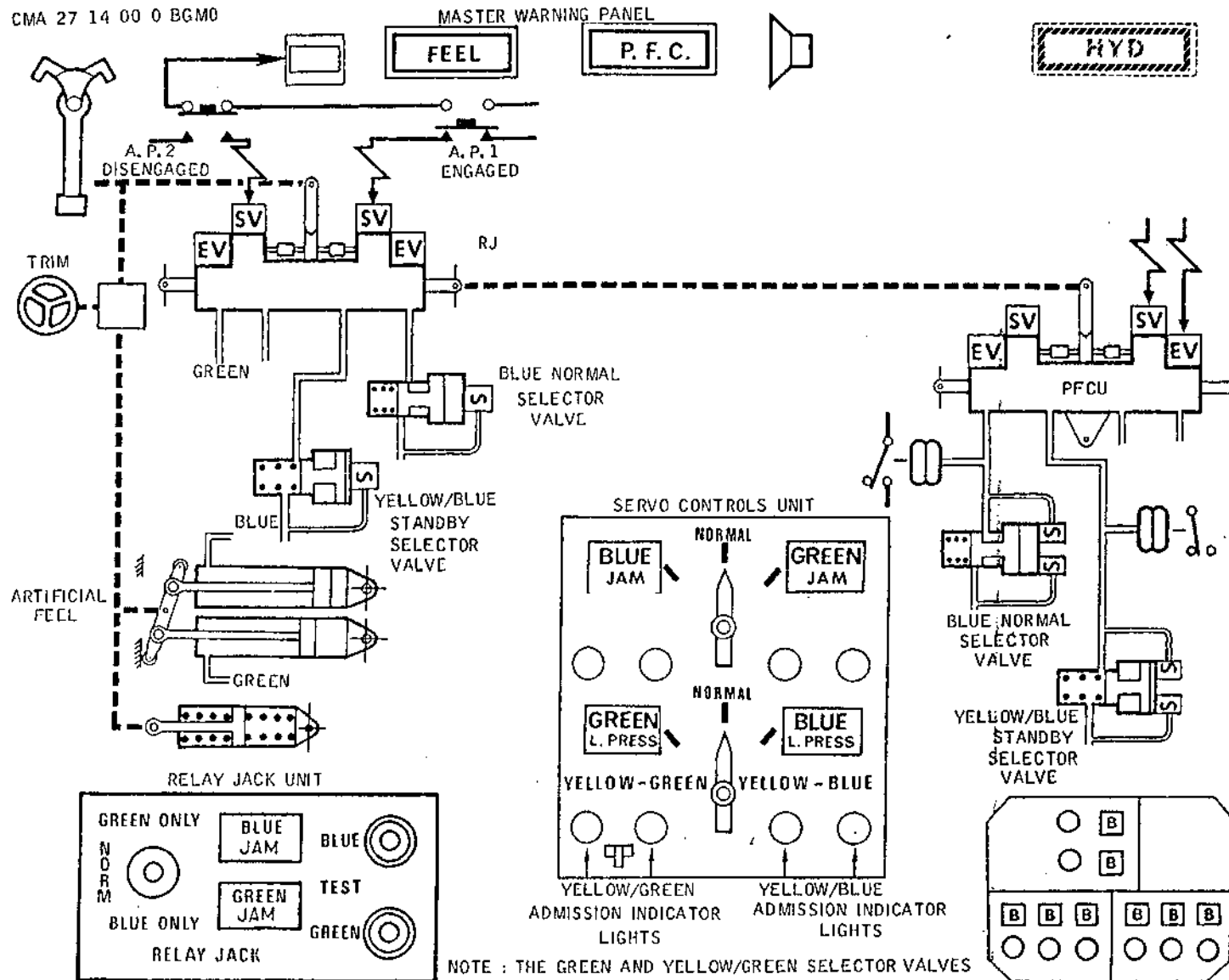
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CMA 27 14 00 0 BGM0



Monitoring and Indicating, Normal Flight -  
Blue Electrical Mode  
Figure 016

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EFFECTIVITY: ALL

BA



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## MAINTENANCE MANUAL

- B. Blue System Low Pressure, in Normal Flight in the Blue Electrical Mode (Ref. Fig. 017 )

### Indications :

R The BLUE LOW PRESS caption light illuminates on the SERVO-  
R CONTROLS unit.

R On the master warning panel the PFC and HYD warning lights  
R illuminate and the gong sounds. The flight control surface  
R position indicator (ICOVOL) displays 'G' as monitoring has  
caused the Blue electro-valve to close and the Green electro-valve to open.

### Results :

R The servo-controls operate on one cylinder only. (Green  
system). If auto pilot No.1 is engaged, it disengages. Only  
the Green jacks on the artificial feel are available.

EFFECTIVITY: ALL

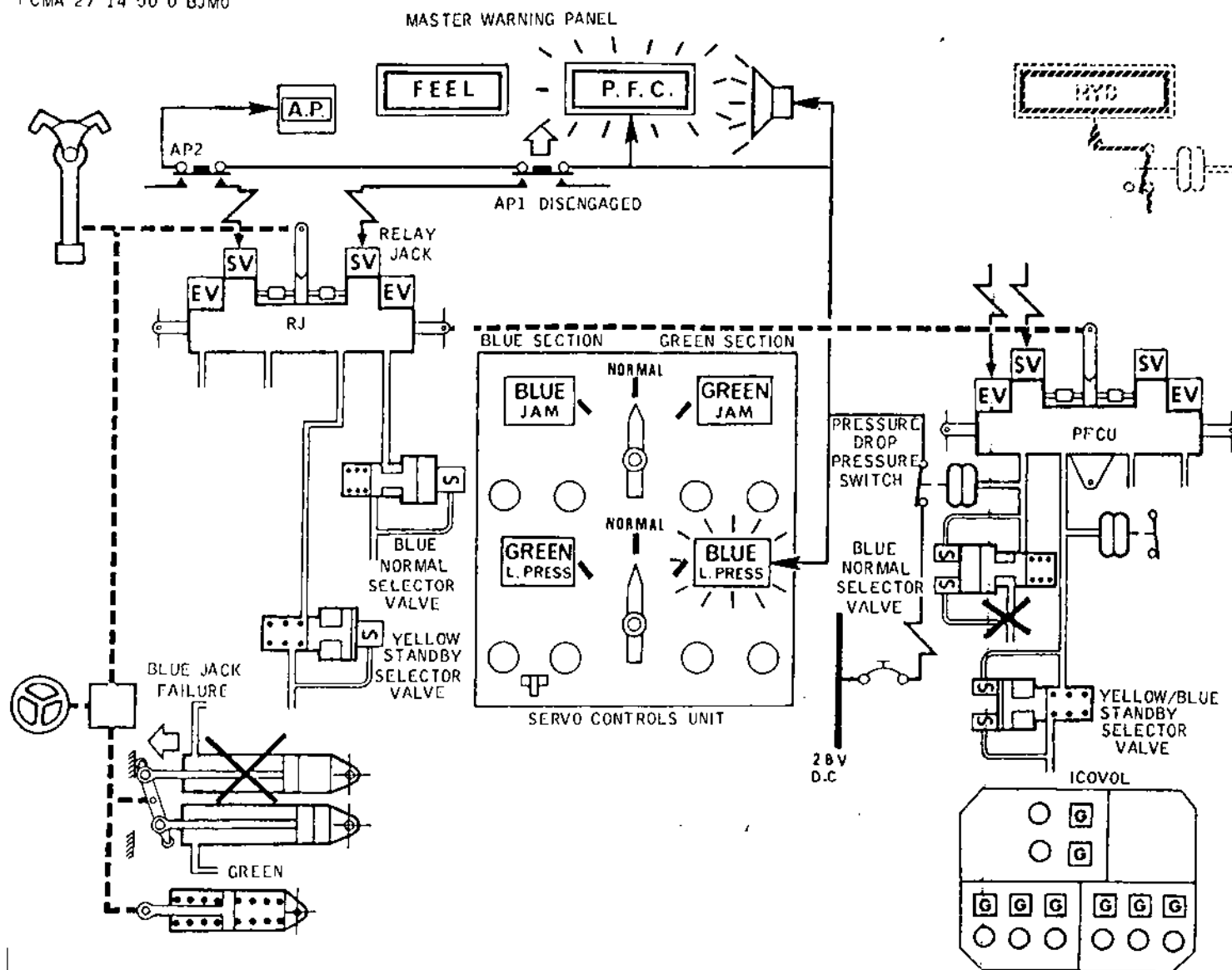
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CMA 27 14 00 0 BJMO



Monitoring and Indicating - Blue Low Pressure  
Figure 017

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EFFECTIVITY: ALL

BA

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## MAINTENANCE MANUAL

Corrective Action : (Ref. Fig. 018 )

NOTE : The electrical selectors should always be turned towards the illuminated warning.

R Set YELLOW/BLUE on the SERVO CONTROLS unit.

The BLUE LOW PRESS caption extinguishes.

R The Green indicator lights under GREEN ONLY illuminate  
R signalling the closing of the Blue system selector valve.

R The Green indicator lights YELLOW-BLUE illuminate signalling  
R the opening of the Yellow/Blue system selector valve.

R Cancel the warnings by pressing the caption lights.

Results :

R The servo controls re-function on both cylinders.

Only the Green jacks on the artificial feel are available.

R The green indicator lights on the SERVO CONTROLS unit  
remain illuminated indicating permanent standby Yellow/Blue  
hydraulic operation on one cylinder.

R Manually reselect the Blue electrical mode after resetting  
R on the Flight Control Unit (PFCU control and monitoring  
panel).

R If required AP1 can be re-engaged.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- C. Green System Low Pressure, in Normal Flight with the Blue Electrical Mode (Ref. Fig. 019 )

Indications :

- R The GREEN LOW PRESS caption light on the SERVO CONTROLS unit illuminates.
- R On the master warning panel the PFC, and HYD warning lights illuminate and the gong sounds.

Results :

- R The servo controls operate on one cylinder only (Blue system).

Only the Blue jacks on the artificial feel are available.

Corrective Action :

- R Set YELLOW/GREEN on the SERVO CONTROLS unit.
- R The GREEN LOW PRESS caption light extinguishes.
- R The green indicator lights under BLUE ONLY illuminate signalling the closing of the Green system selector valve. The green lights under YELLOW-GREEN illuminate signalling the opening of the Yellow/Green system selector valves.
- R Cancel the warnings by pressing the caption lights.

Results :

- R The servo controls operate on both cylinders. Only the Blue jacks on the artificial feel are available.

The green indicator lights remain illuminated on the SERVO-CONTROLS unit indicating permanent standby Yellow/Green hydraulic operation on one cylinder.

EFFECTIVITY: ALL

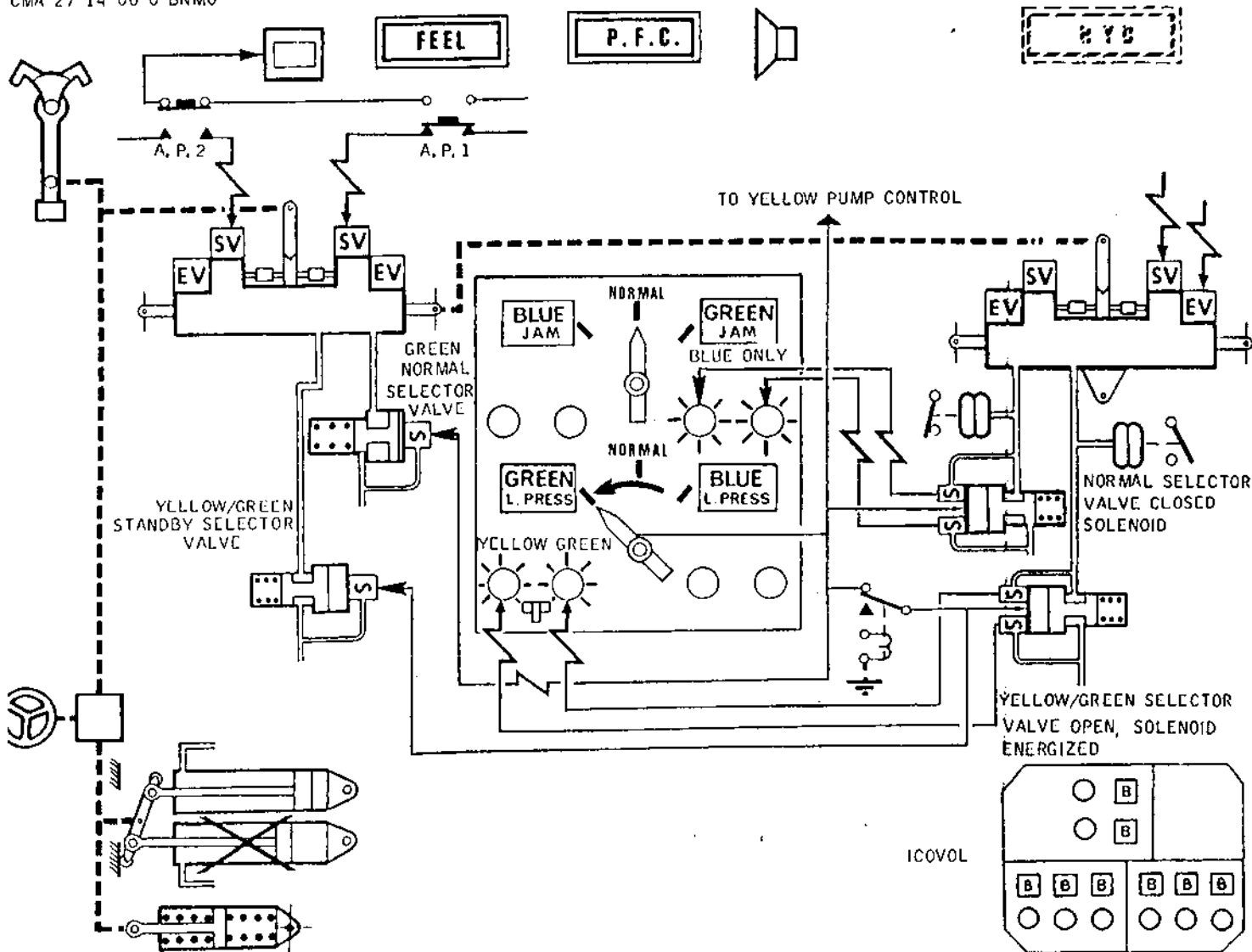
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Monitoring and Indicating  
Green Low Pressure in the Blue Electrical Mode  
Figure 019

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EFFECTIVITY: ALL

BA

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## MAINTENANCE MANUAL

- D. Yellow Tank Low 1st Level, Blue Electrical Mode, Yellow/Blue and Green Systems  
(Ref. Fig. 020 )

### Indications :

The BLUE LOW PRESS caption light on the SERVO CONTROLS unit illuminates, the two lower green indicator lights extinguish, as the 1st level relay has cut-off power to the Yellow/Blue selector valve.

The Flight Control Surface Position Indicator (ICOVOL) changes to 'G' as monitoring has opened the Green electro-valve, on the master warning panel the PFC and HYD warning lights illuminate, the gong sounds and AP1 disengages if it was engaged.

### Results :

The servo controls operate on one cylinder only in the Green electrical mode.

### Corrective Action :

Cancel the warnings by pressing the caption lights.

### Results :

The servo controls operate on one cylinder only in the Green electrical mode.

The BLUE LOW PRESS and GREEN ONLY caption lights remain illuminated.

In the event of a pressure drop on remaining cylinder (Green body) change-over to yellow pressure on this cylinder is automatic.

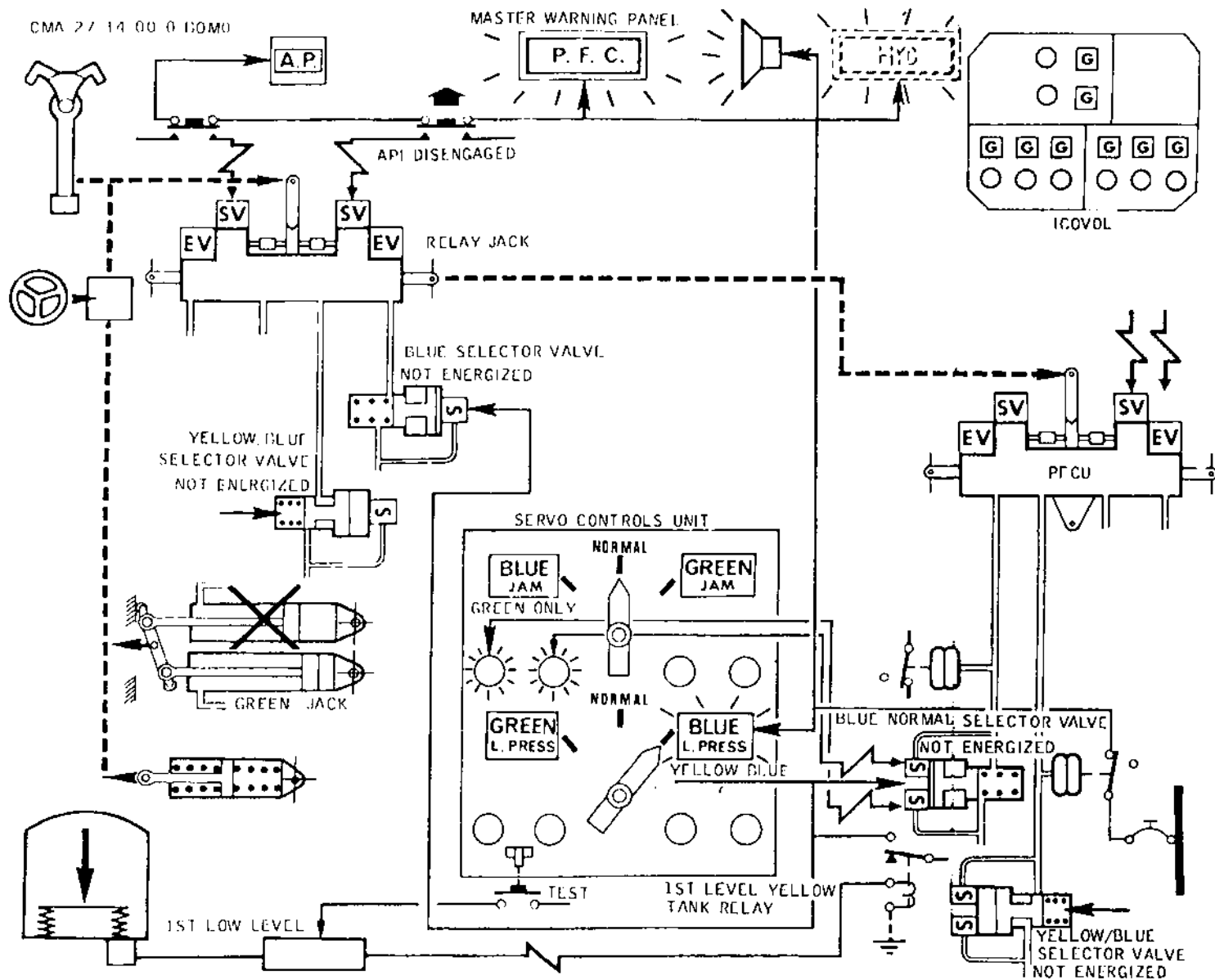
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Monitoring and Indicating Yellow Tank Low 1st  
Level

Figure 020

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R

EFFECTIVITY: ALL

BA



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## MAINTENANCE MANUAL

### E. PFCU Blue System Spool Valve Jamming (Ref. Fig. 021 )

#### Indications :

The BLUE JAM caption light on the SERVO CONTROLS unit illuminates.

On the master warning panel the PFC warning light illuminates and the gong sounds.

On ICOVOL indicator, the magnetic indicators for the elevons associated with the jammed PFCU changes over to 'G' (Green) and the corresponding red warning lights illuminate.

#### Results :

R

The monitoring system detecting a desynchronization of the elevons, changes the control channel, (from Blue channel to Green channel).

The system is designed in such a way that in the case of jamming an automatic change over to the mechanical mode is impossible. The Green channel thus remains in service.

#### Corrective Action :

High speed flight.

Confirm the Green mode for the elevons displaying 'G' on the ICOVOL indicator, at the Flight Control Unit (PFCU control and monitoring panel).

Cancel the warnings, the BLUE JAM caption light remains illuminated. The elevons affected by the fault operate in the Green electrical mode using the Blue and Green systems, but the elevons controlled by the jammed PFCU are uncontrollable and the follow mode protects the linkage.

The other elevons operate normally in the Blue electrical mode using the Blue and Green systems.

#### Approach Flight :

Set GREEN ONLY and cancel the warnings by pressing the captions lights.

The BLUE JAM caption light extinguishes and GREEN ONLY and BLUE LOW PRESS illuminate.

All the servo-controls operate on one cylinder only.

EFFECTIVITY: ALL

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R After this action, Yellow pressure will automatically  
R supply the Green body in the event of a Green pressure  
R drop.  
R Pilot will confirm automatic selection by placing selector  
R switch in Yellow/Green position.

EFFECTIVITY: ALL

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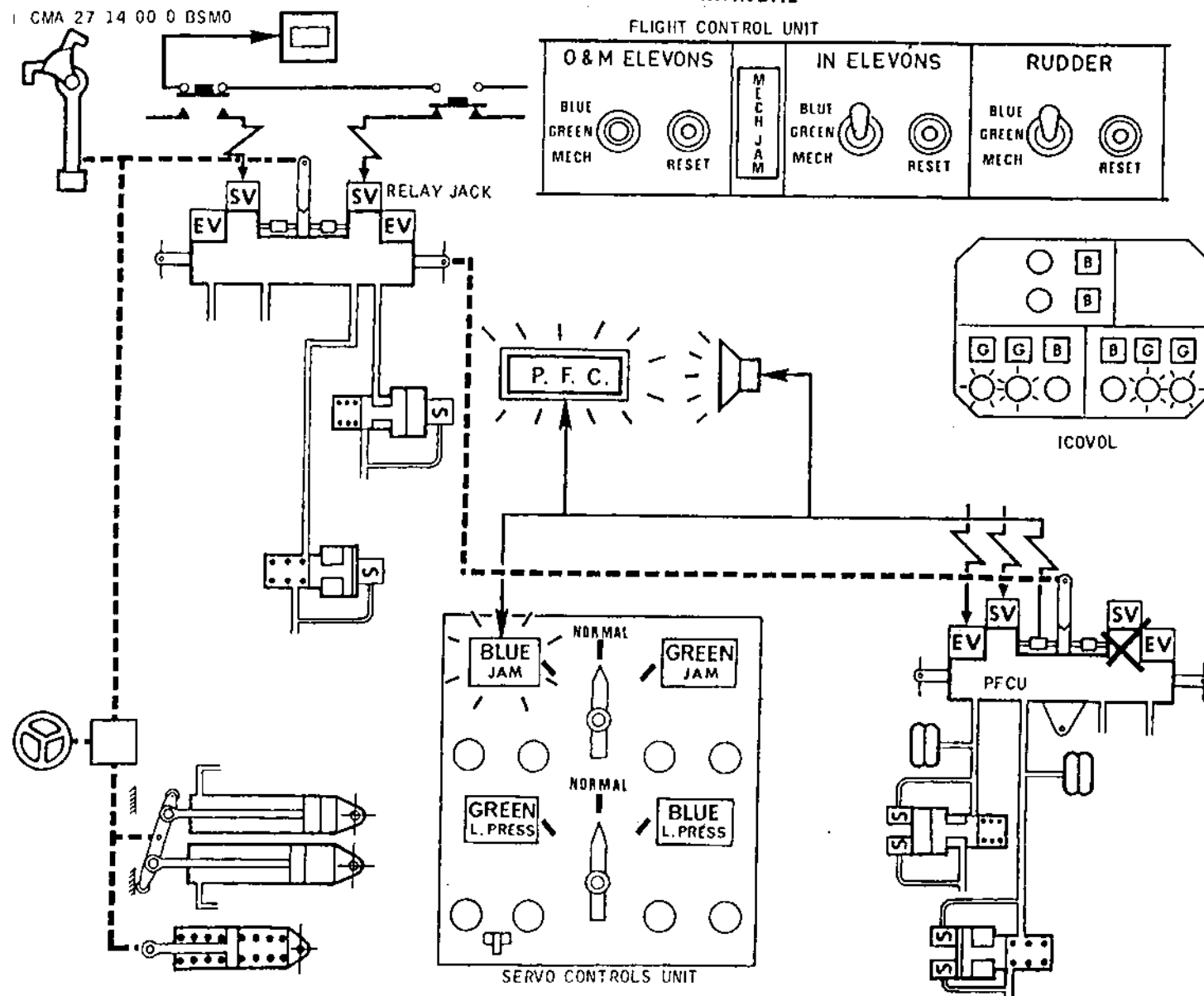
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1 CMA 27 14 00 0 BSMO



Monitoring and Indicating Blue Spool Valve  
Jamming/Spool Out or Middle Elevons  
Figure 021

**27-14-00**

EFFECTIVITY: ALL

R

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### F. Relay Jack Blue System Valve Jamming (Ref. Fig. 022 )

#### (1) Manual control

##### Indications :

On the master warning panel the PFC warning light illuminates and the gong sounds.

On the RELAY JACK unit, the BLUE JAM caption light and the indicator integral with the switch illuminate.

##### Results :

The Blue cylinder hydraulically locks the relay jack.

An electrical signal closes the Blue hydraulic supply selector valve and prohibits opening of the Yellow/Blue selector valve.

Cutting off the Blue system enables the relay jack to operate on only one Green cylinder.

##### Corrective Action :

On RELAY JACK unit, set the switch to GREEN ONLY which confirms closure of the Blue hydraulic selector valve and prohibits the opening of the Yellow/Blue selector valve. The BLUE JAM caption light and the indicator incorporated in the switch extinguish.

#### (2) Cruise flight with the switch in NORM, position AP1 engaged.

##### Indications :

The AP1 monitoring comparator causes the autopilot to trip out and change over to manual flight.

The AP warnings illuminate.

The result and corrective action are the same as for manual control.

It is possible to engage AP2.

#### (3) On approach flight, with switch in NORM, position AP1 and AP2 engaged.

##### Indications :

EFFECTIVITY: ALL

R

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## MAINTENANCE MANUAL

The monitoring comparator causes the AP1 to trip out.

The AP warnings illuminate.

Switchover to AP2.

The result and corrective action are the same as for manual control.

### 10. Electrical Power Supply

Hydraulic selection system control network is supplied from essential 28 VDC essential bus bars.

The following table gives the distribution of these bars in the various circuit breaker panels :

SERVICE	BUSBAR	C/B PANEL
Flight Control 1	28VDC A.ESS 3P	1-213
Flight Control 2	28VDC A.ESS 4P	3-213

EFFECTIVITY: ALL

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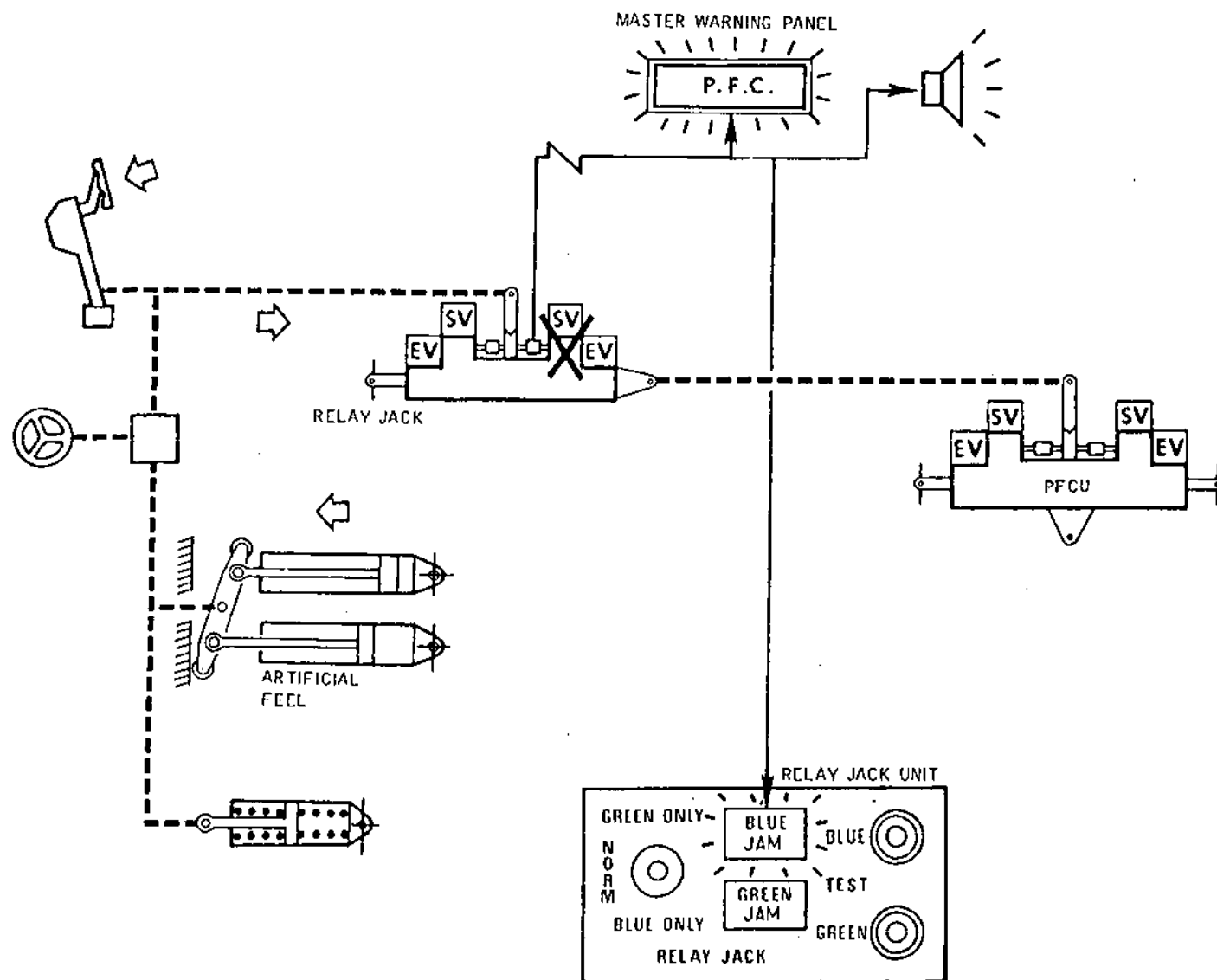
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CMA 27 14 00 0 BUMO



Monitoring and Indicating Relay Jack Blue Spool  
Valve Jamming  
Figure 022

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## MAINTENANCE MANUAL

### HYDRAULIC SYSTEM - TROUBLE SHOOTING

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN 24-00-00, SERVICING.

#### 1. General

- The following information is intended to enable faults found in flight or on the ground to be quickly rectified.

A. - This information is given in the form of Fault analysis synoptic charts.

The defect can be isolated with the aid of the trouble shooting procedures and traced through OK and NOT OK paths to the appropriate charts or other specified rectification action as may be necessary. If a defect occurs perform the appropriate rectification action, then repeat the operation at which the defect was encountered to ensure the operation is OK.

B. - Indications given between parantheses correspond with indications of a similar system, given just before the first parenthesis.

- Bracketed numbers in the procedures and charts indicate items on the component identification table 101 (at the end of trouble shooting. The table provides information, including component location required for rectification and references to Maintenance Manual sections dealing

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with this component.

- C. - The electrical wiring is assumed to be serviceable. However if the component fault is not found check the wiring in accordance with the Wiring Diagram Manual, reference of which is given in table 101.
- D. Possible fault analysis is divided in 5 parts :
  - Indication faults
  - Faults of PFCU hydraulic supply selection system
  - Faults of Relay Jack hydraulic supply selection system
  - Faults of PFCU spool valve jamming defection system.
  - Faults of Relay Jack spool valve jamming detection system.

### 2. Prepare

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Test Set - Electrical circuits - Flight Controls	31-56-100
Tool - Jamming Detector	CT1 P 28945 002
Tool - Jamming Detector	ST4 P 28545 002

- B. Take the precautions described in the previous WARNING paragraph
- C. Carry out Prepare paragraph operations described in 27-14-00, Adjustment/Test.
- D. At overhead panel, make certain that LIGHTS switch is in HI position.

### 3. Trouble shooting

NOTE I : SERVO CONTROLS unit and RELAY JACK unit, from which PFCU and Relay Jack hydraulic supply selection is controlled and indicated, are located on overhead panel.

NOTE II : Pressurization and depressurization shutting down operations shall be carried out as per :  
29-12-00, Servicing (Blue hydraulic system)  
29-11-00, Servicing (Green hydraulic system)  
29-21-00, Servicing (Yellow hydraulic system)

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## MAINTENANCE MANUAL

### A. Trouble shooting - Indication system faults

\*\*\*\*\*  
\* Aircraft electrical network energized; no hydraulic\*  
\* pressure ; BLUE L PRESS and GREEN L PRESS caption \*  
\* lights are illuminated on SERVO CONTROLS unit. \*  
\* PFC warning light (master warning panel) is \*  
\* illuminated and gong sounds \*

\*\*\*\*\*

OK	NOT OK--	BLUE L.PRESS and GREEN L PRESS caption lights are dimly illuminated or not at all. Ref chart 101
	NOT OK--	Either BLUE L. PRESS or GREEN L.PRESS caption light fails to illuminate Ref chart 102
	NOT OK--	PFC warning light does not illuminate and gong does not sound Ref 33-15-00, T/S

\*\*\*\*\*  
\* Press and release PFC warning light; it goes off. \*  
\* On SERVO CONTROLS unit, press T push button, close\*  
\* to BLUE JAM caption light, then release : \*  
\* Gong must sound; PFC warning light and BLUE JAM \*  
\* caption light must illuminate (the latter must go \*  
\* off when releasing push button). \*  
\* Press PFC warning light; it must go off. \*  
\* Press T push button, close to GREEN JAM caption \*  
\* light, and release : \*  
\* - Gong must sound, PFC warning light and GREEN JAM\*  
\* caption light must illuminate (the latter must go \*  
\* off when releasing T push button). \*

\*\*\*\*\*

OK	NOT OK--	***** * Gong does not sound, BLUE JAM (or GREEN JAM) * * caption light and PFC warning light do not * * illuminate. * * - Replace SERVO CONTROLS unit C291 [7] * *****
----	----------	---

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OK	NOT OK--	BLUE JAM and GREEN JAM caption lights illuminate, gong does not sound and PFC warning light does not illuminate. (Ref. 33-15-00, T/S)

\*\*\*\*\*

\* Press PFC warning light; it must go off. \*

\* On RELAY JACK unit, press BLUE-TEST push button \*

\* then release; \*

\* - Gong sounds, PFC warning light and BLUE JAM \*

\* caption light illuminate (the latter goes off \*

\* when releasing push button). \*

\* Press PFC warning light ; it must go off. \*

\* Press GREEN-TEST push-button then release ; \*

\* - Gong sounds, PFC warning light and GREEN JAM \*

\* caption light illuminate (the latter goes off \*

\* when releasing push-button). \*

\*\*\*\*\*

OK	NOT OK--	No indication (neither for test of BLUE JAM nor for test of GREEN JAM caption light). - On panel 1-213, replace circuit breaker C281 [1].
OK	NOT OK--	No indication during one of the two BLUE JAM or GREEN JAM caption light tests - Replace unit C298 [2].
OK	NOT OK--	Gong does not sound and PFC warning light does not illuminate (Ref. 33-15-00, T/S)
OK	NOT OK--	BLUE JAM (or GREEN JAM) caption light does not illuminate Replace caption light C305 (or C306) [3].

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\*\*\*\*\*  
\* Press PFC warning light; it must go off. \*  
\* On SERVO CONTROLS unit, place lower selector \*  
\* switch in BLUE L PRESS (GREEN L PRESS) position. \*  
\* - Gong must sound \*  
\* - The 2 green indicator lights under YELLOW BLUE \*  
\* (YELLOW GREEN) and the 2 green indicator lights \*  
\* under GREEN ONLY (BLUE ONLY) illuminate. \*  
\* PFC warning light illuminates (on master warning \*  
\* panel). \*  
\* - BLUE L PRESS and GREEN L PRESS warning lights \*  
\* are illuminated. \*  
\*\*\*\*\*

NOT OK--	Gong does not sound BLUE L PRESS (GREEN L PRESS) caption light goes off. PFC warning light does not illuminate Ref. Chart 103
NOT OK--	The 2 GREEN ONLY (BLUE ONLY) indicator lights do not illuminate Replace SERVO CONTROLS unit C291 [7]
NOT OK--	One YELLOW BLUE (YELLOW GREEN) indicator light does not illuminate Ref. Chart 104
NOT OK--	One GREEN ONLY (BLUE ONLY) indicator light does not illuminate Ref. Chart 105

\*\*\*\*\*  
\* End of indication system fault trouble shooting \*  
\*\*\*\*\*

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\*\*\*\*\*  
\* BLUE L. PRESS AND GREEN L. PRESS \*  
\* CAPTION LIGHTS ARE DIMLY ILLUMINA- \*  
\* TED OR NOT AT ALL \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On SERVO CONTROLS unit, press and release each T \*  
\* push button located under BLUE JAM and GREEN JAM \*  
\* caption lights. These caption lights illuminate \*  
\*\*\*\*\*  
\*\*\*\*\*

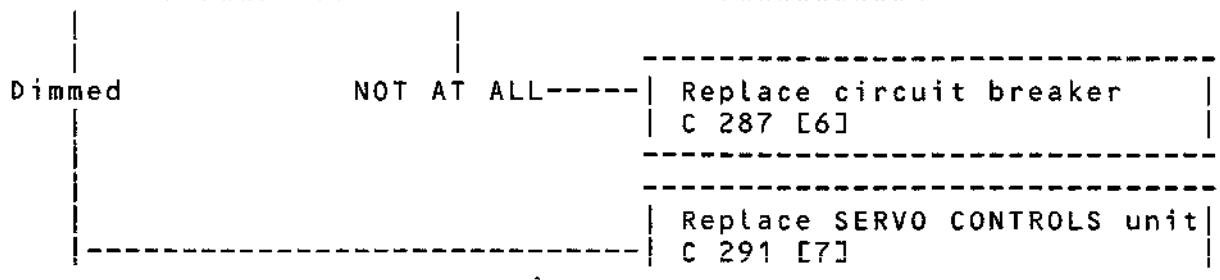


Chart 101

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* EITHER BLUE L.PRESS OR GREEN L.PRESS\*  
\* CAPTION LIGHT FAILS TO ILLUMINATE \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On SERVO CONTROLS unit place lower switch towards \*  
\* BLUE (or GREEN) L.PRESS caption light: \*  
\* BLUE (or GREEN) L.PRESS caption light illuminates.\*  
\*\*\*\*\*

YES	NO-----	Replace SERVO CONTROLS UNIT C 291 [7]
-----	---------	--

\*\*\*\*\*  
\* Place switch in NORMAL position \*  
\* - On panel 1-213, trip, safety and tag circuit \*  
\* breaker PFC IND (Map Ref. N 18) : C 287 \*  
\* - In zone 152 (or 151) (access:151 DB) disconnect \*  
\* connector C 292 A (or C290 A) on pressure switch \*  
\* C 292 (or C290). \*  
\* - On floating connector, shunt terminals A and C \*  
\* - Set circuit breaker PFC. IND. \*  
\* - BLUE L.PRESS (or GREEN L.PRESS) caption light \*  
\* illuminates \*  
\*\*\*\*\*

YES	NO-----	Replace SERVO CONTROLS unit C 291 [7]
		Replace pressure switch C 292 [8] (C 290) [9]

Chart 102

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* Gong does not sound \*  
\* BLUE L.PRESS (GREEN L.PRESS) \*  
\* caption light goes off \*  
\* PFC warning light does not \*  
\* illuminate \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On panel 1-213 trip, safety and tag circuit \*  
\* breaker PFC IND (C287) Map Ref N18 \*  
\* - In zone 152 (or 151) [access door 151DB] \*  
\* disconnect connector from pressure switch C 293 \*  
\* (C 289) \*  
\* - On disconnected connector, shunt terminals A \*  
\* and B \*  
\* - Set circuit breaker tripped above \*  
\* - Gong must sound, PFC warning light illuminates \*  
\* - BLUE L.PRESS (GREEN L.PRESS) caption light is \*  
\* off. \*  
\*\*\*\*\*

NO	YES-----	Replace pressure switch C 293 [16] (C 289 [17])
		Replace SERVO CONTROLS unit [7]

Chart 103

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\*\*\*\*\*  
\* One YELLOW BLUE (YELLOW GREEN) \*  
\* indicator light does not illuminate \*  
\*\*\*\*\*

\*\*\*\*\*  
\* Pressurize Yellow hydraulic system (Ref. 29-21-00,\*  
\* Servicing). \*  
\* - Elevons deflect upwards up to neutral position \*  
\* On panel 3-213, trip, safety and tag circuit \*  
\* breaker YELL BLUE FAIL [Map Ref : A10] (YELL GRN \*  
\* GRN FAIL [Map. Ref A 9]) \*  
\* - Elevons remain at neutral \*  
\* - Illuminated YELLOW BLUE (YELLOW GREEN) indicator\*  
\* light goes off. \*  
\*\*\*\*\*

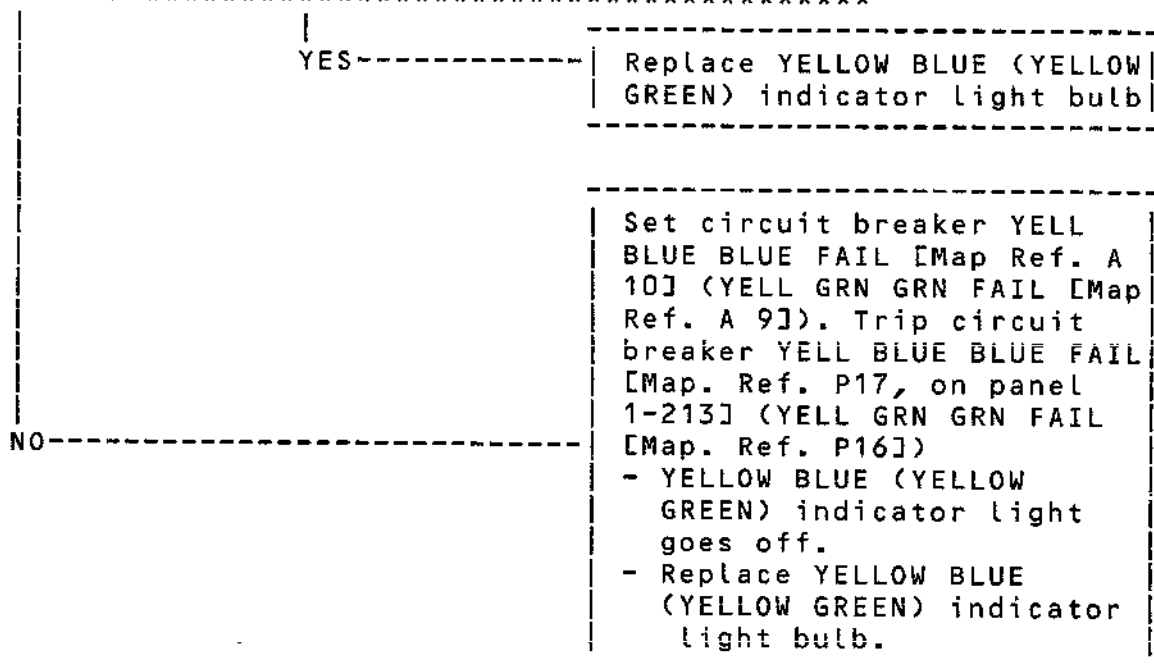


Chart 104

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# Concorde

## MAINTENANCE MANUAL

\*\*\*\*\*  
\* One GREEN ONLY (BLUE ONLY) indicator\*  
\* light does not illuminate \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On panel 1-213, trip, safety and tag circuit \*  
\* breaker YELL BLUE BLUE FAIL [Map. Ref. P17], (on \*  
\* panel 3-213, trip, safety and tag circuit breaker \*  
\* YELL GRN GRN FAIL [Map. Ref. A9]) and on panel \*  
\* 3-213, trip, safety and tag circuit breaker YELL \*  
\* GRN GRN FAIL [Map. Ref. A10] (and on panel 1-213, \*  
\* trip, safety and tag circuit breaker YELL BLUE BLUE \*  
\* FAIL [Map. Ref. P16]) \*  
\* Pressurize green hydraulic system [Ref. 29-11-00, \*  
\* Servicing] (Pressurize Blue hydraulic system [Ref. \*  
\* 29-12-00, Servicing]) \*  
\* - Elevons deflect up to neutral position \*  
\* On panel 1-213, set circuit breaker YELL BLUE BLUE \*  
\* FAIL [Map. Ref. P17] (on panel 3-213, set circuit \*  
\* breaker YELL GRN GRN FAIL [Map. Ref. A9]) \*  
\* - Elevons deflect downwards \*  
\*\*\*\*\*

1  
\*\*\*\*\*  
\* On panel 3-213, set circuit breaker YELL GRN GRN \*  
\* FAIL [Map. Ref. A10] (On panel 1-213, set circuit \*  
\* breaker YELL BLUE BLUE FAIL [Map. Ref. P16]) then \*  
\* on panel 1-213, trip, safety and tag circuit \*  
\* breaker YELL BLUE BLUE FAIL [Map. Ref. P17] (then \*  
\* on panel 3-213, trip, safety and tag circuit \*  
\* breaker YELL GRN GRN FAIL [Map. Ref. A9]) \*  
\* Elevons remain at low stop \*  
\* - Replace bulb of GREEN ONLY (BLUE ONLY) indicator \*  
\* light which did not illuminate \*  
\*\*\*\*\*

Chart 105

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## MAINTENANCE MANUAL

### B. Trouble Shooting - Faults of PFCU Hydraulic Supply Selector System

\*\*\*\*\*  
\* Only YELLOW hydraulic system is pressurized. \*  
\* On SERVO CONTROLS unit, lower selector switch is \*  
\* in BLUE L.PRESS position. \*  
\* - BLUE L.PRESS caption light is off \*  
\* - YELLOW BLUE and GREEN ONLY indicator lights are \*  
\* illuminated \*  
\* - Elevons are at neutral \*  
\*\*\*\*\*

OK	NOT OK--	Elevons remain at low stop - Replace selector valve C294 [14]
		BLUE L.PRESS caption light is not off Ref chart 110
		One green YELLOW BLUE indicator light is not illuminated Ref chart 111
		One green GREEN ONLY indicator light is not illuminated Ref Chart 112
		Neither of the two green GREEN ONLY indicator lights is illuminated - Replace SERVO CONTROLS unit C291 [7]

\*\*\*\*\*  
\* On SERVO CONTROLS unit, press YELLOW LEVEL T push-\*  
\* button and maintain pressed. \*  
\* - Gong sounds and PFC warning light illuminates \*  
\* - BLUE L.PRESS caption light is illuminated \*  
\* - YELLOW GREEN indicator lights are illuminated \*  
\* - YELLOW BLUE indicator lights are off \*  
\* - Elevons remain at neutral \*  
\*\*\*\*\*

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OK	NOT OK--	No indication - Replace SERVO CONTROLS unit C291 [7]
		BLUE L.PRESS caption light is not illuminated YELLOW BLUE indicator lights do not go off - Replace SERVO CONTROLS unit C291 [7]
		Elevons deflect downwards. The two YELLOW GREEN indicator lights do not go off - Replace SERVO CONTROLS unit C291 [7]

\*\*\*\*\*  
\* On SERVO CONTROLS unit, lower selector switch is \*  
\* in GREEN L.PRESS position ; push-button YELLOW \*  
\* LEVEL T push-button is held pressed \*  
\* - GREEN L.PRESS caption light goes off \*  
\* - GREEN ONLY indicator lights go off \*  
\* - BLUE ONLY indicator lights illuminate \*  
\* - Elevons remain in neutral position (YELLOW GREEN \*  
\* indicator lights remain illuminated and YELLOW \*  
\* BLUE indicator lights remain off). \*  
\*\*\*\*\*

OK	NOT OK--	GREEN L.PRESS caption light do not go off (YELLOW GREEN indicator lights go off and YELLOW BLUE indicator lights illuminate) - Replace SERVO CONTROLS unit C291 [7]
----	----------	--

\*\*\*\*\*  
\* On SERVO CONTROLS unit, YELLOW LEVEL T push-button\*  
\* is released and lower selector switch is in BLUE \*  
\* L.PRESS position \*  
\* - Gong sounds and PFC warning light illuminates \*  
\* - BLUE L.PRESS caption light goes off and GREEN L.\*  
\* PRESS caption light illuminates \*  
\* - YELLOW BLUE and GREEN ONLY indicator lights \*  
\* illuminate \*  
\* - YELLOW GREEN and BLUE ONLY indicator lights go \*  
\* off. \*  
\*\*\*\*\*

OK	NOT OK
----	--------

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## MAINTENANCE MANUAL

OK	NOT OK--	BLUE L.PRESS caption light does not go off, YELLOW BLUE indicator lights remain off and YELLOW GREEN indicator lights remain illuminated - Replace SERVO CONTROLS unit C291 [7]
----	----------	--

\*\*\*\*\*  
\* On SERVO CONTROLS unit, upper selector switch is \*  
\* in GREEN JAM position and lower selector switch is \*  
\* in NORMAL position \*  
\* - BLUE L.PRESS caption light illuminates \*  
\* - BLUE ONLY and YELLOW BLUE indicator lights illuminate \*  
\* - YELLOW GREEN and GREEN ONLY indicator lights are \*  
\* off \*  
\* - Elevons remain at neutral \*

OK	NOT OK--	YELLOW BLUE indicator lights do not illuminate Elevons deflect downwards - Replace SERVO CONTROLS unit C291 [7]
----	----------	---

\*\*\*\*\*  
\* On SERVO CONTROLS unit, upper selector switch is \*  
\* in NORMAL position and lower selector switch is in \*  
\* NORMAL position \*  
\* - Gong sounds and PFC warning light illuminates \*  
\* - YELLOW BLUE and BLUE ONLY indicator lights go \*  
\* off \*  
\* - Elevons deflect downwards \*

OK	NOT OK--	YELLOW BLUE and BLUE ONLY indicator lights remain illuminated Elevons remain at neutral - Replace SERVO CONTROLS unit C291 [7]
----	----------	---

\*\*\*\*\*  
\* On SERVO CONTROLS unit, lower selector switch is \*  
\* in GREEN L.PRESS position \*  
\* - GREEN L.PRESS caption light goes off \*  
\* - YELLOW GREEN and BLUE ONLY indicator lights \*  
\* illuminate \*  
\* - Elevons deflect up to neutral position \*

OK	NOT OK
----	--------

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OK	NOT OK--	Elevons remain at low stop - Replace selector valve C296 [15]
	NOT OF--	GREEN L.PRESS caption light is not off Ref chart 110
	NOT OK--	One green YELLOW GREEN indicator light is not illuminated Ref chart 111
	NOT OK--	One BLUE ONLY indicator light is not illuminated Ref chart 112
	NOT OK--	The two BLUE ONLY indicator lights are not illuminated - Replace SERVO CONTROLS unit C291 [7]

\*\*\*\*\*  
\* On SERVO CONTROLS unit, lower selector switch is \*  
\* placed in GREEN L.PRESS position, YELLOW LEVEL T \*  
\* push-button is held pressed \*  
\* - Gong sounds and PFC warning light, illuminates \*  
\* - On SERVO CONTROLS unit, GREEN L.PRESS caption \*  
\* light illuminates \*  
\* - YELLOW BLUE indicator lights illuminate \*  
\* - YELLOW GREEN indicator lights go off \*  
\* - Elevons remain at neutral \*  
\*\*\*\*\*

OK	NOT OK--	GREEN L.PRESS caption light does not illuminate YELLOW GREEN indicator lights do not go off - Replace SERVO CONTROLS unit C291 [7]
	NOT OK--	Elevons deflect downwards The 2 YELLOW BLUE indicator lights remain off - Replace SERVO CONTROLS unit C291 [7]

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* On SERVO CONTROLS unit, YELLOW LEVEL T push-button\*  
\* is held pressed and lower selector switch is in \*  
\* BLUE L.PRESS position \*  
\* - BLUE L.PRESS caption light goes off \*  
\* - GREEN ONLY indicator lights illuminate \*  
\* - BLUE ONLY indicator lights go off \*  
\* (YELLOW BLUE indicator lights remain illuminated\*  
\* and YELLOW GREEN indicator lights remain off). \*  
\*\*\*\*\*

			BLUE L.PRESS caption light does not go off
			YELLOW BLUE indicator lights go off.
OK	NOT OK--		YELLOW GREEN indicator lights illuminate.
			- Replace SERVO CONTROLS unit C291 [7]

\*\*\*\*\*  
\* On SERVO CONTROLS unit, YELLOW LEVEL T push-button\*  
\* is released and lower selector switch is placed in\*  
\* NORMAL position. Upper selector switch is placed \*  
\* in BLUE JAM position. \*  
\* - Gong sounds and PFC warning light illuminates \*  
\* - YELLOW GREEN and GREEN ONLY indicator lights \*  
\* illuminate \*  
\* - Elevons are at neutral position \*  
\* - BLUE L.PRESS and GREEN L.PRESS caption lights \*  
\* are illuminated. \*  
\*\*\*\*\*

			YELLOW GREEN indicator lights do not illuminate
OK	NOT OK--		Elevons deflect downwards.
			- Replace SERVO CONTROLS unit [7]

\*\*\*\*\*  
\* YELLOW hydraulic system is shut-down. \*  
\* On SERVO CONTROLS unit, upper selector switch is \*  
\* placed in NORMAL position and lower selector \*  
\* switch in GREEN L.PRESS position. \*  
\* - Gong sounds and PFC warning light is illuminated\*  
\* - On SERVO CONTROLS unit : \*  
\* GREEN L.PRESS caption light is illuminated and \*  
\* BLUE L.PRESS caption light is off. \*  
\* YELLOW BLUE indicator lights are off and YELLOW \*  
\* GREEN indicator lights illuminated. \*  
\* BLUE ONLY indicator lights are illuminated and \*  
\* GREEN ONLY indicator lights off. \*  
\* Elevons are at neutral position. \*  
\*\*\*\*\*

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## MAINTENANCE MANUAL

OK	NOT OK--	GREEN L.PRESS caption light is not illuminated. Ref Chart 113
	NOT OK--	BLUE L.PRESS caption light is not off Ref. Chart 114
	NOT OK--	Elevons remain at low stop and BLUE L.PRESS caption light is not off. Replace PFCU normal selector valve C 295 [18]
	NOT OK--	One BLUE ONLY indicator light is not illuminated Ref. Chart 112

\*\*\*\*\*  
 \* On SERVO CONTROLS unit, lower selector switch is \*  
 \* in BLUE L.PRESS position. Gong sounds and PFC \*  
 \* warning light illuminates. \*  
 \* On SERVO CONTROLS unit : \*  
 \* - GREEN L.PRESS caption light remains off and \*  
 \* BLUE L.PRESS caption light remains illuminated. \*  
 \* - YELLOW BLUE and GREEN ONLY indicator lights are \*  
 \* illuminated. \*  
 \* - YELLOW GREEN and BLUE ONLY indicator lights are \*  
 \* off. \*  
 \* Elevons are in neutral position. \*  
 \*\*\*\*\*

OK	NOT OK--	BLUE L.PRESS caption light is not illuminated Ref. Chart 113
	NOT OK--	GREEN L.PRESS caption light is not off Ref. Chart 114
	NOT OK--	Elevons remain in low position and GREEN L. PRESS caption light is not off. Replace PFCU normal selector valve C 297 [19]
	NOT OK--	One green GREEN ONLY indicator light is not illuminated. Ref. Chart 112

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* BLUE L.PRESS (GREEN L.PRESS) \*  
\* CAPTION LIGHT IS NOT OFF \*  
\*\*\*\*\*

\*\*\*\*\*  
\* On panel 1-213, trip circuit breaker PFC IND (Map \*  
\* Ref. N18) \*  
\* In zone 152 (access 151DB) disconnect connector \*  
\* on pressure switch C 293 (C289) \*  
\* - Set circuit breaker PFC IND \*  
\* .BLUE L.PRESS (GREEN L.PRESS) caption light \*  
\* remains off. \*  
\*\*\*\*\*

YES	NO-----	-----
		Replace SERVO CONTROLS unit
		[7]
		-----
		Replace pressure switch
		C 293 [16] (C289 [17])
		-----

Chart 110

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

```
*****-----
* ONE OF THE GREEN YELLOW-BLUE (OR *| GROUND EQUIPMENT REQUIRED |
* YELLOW-GREEN) INDICATOR LIGHTS IS *-----
* NOT ILLUMINATED *| DESCRIPTION PART NO |
*****-----
| VOLTMETRE 0-30 VDC |
*****-----
```

```
*****
* On panel 1-213, trip circuit breaker YEL/BLUE *
* BLUE FAIL (Map Ref. p17) [or YEL/GRN.GRN.FAIL(Map *
* Ref. P16)] *
* On panel 3-213, trip circuit breaker YELL/BLUE *
* BLUE FAIL (Map Ref.: A 10) [YELL/GRN. GRN FAIL *
* (Map Ref. A9)] *
* -In zone 152 (151) (access 151DB) disconnect the 2*
* connectors on selector valve C 294 (C296) *
* -Set circuit breakers tripped above. *
* -Check 28 VDC between terminal A(-) and B (+) of *
* each of the disconnected floating connectors *
*****
```

```
-----
| 28Volts | | Replace SERVO CONTROLS unit |
| | | C291 [7] |
| | | -----
| | | |
| | | Replace selector valve C294 |
| ----- | | [14] (C296 [15]) |
| | | -----
```

Chart 111

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## MAINTENANCE MANUAL

```
*****-----
* ONE OF THE GREEN GREEN ONLY (BLUE *| GROUND EQUIPMENT REQUIRED |
* ONLY) INDICATOR LIGHTS IS NOT *|-----
* ILLUMINATED *| DESCRIPTION PART NO |
*****-----
| VOLTMETRE 0-30 VDC |
*****-----
```

```
*****
* On panel 1-213, trip circuit breaker YEL/BLUE *
* BLUE FAIL (Map Ref. p17) [or YEL/GRN.GRN.FAIL(Map *
* Ref. P16)] *
* On panel 3-213, trip circuit breaker YEL/BLUE *
* BLUE FAIL (Map Ref.: A 10) [YEL/GRN. GRN FAIL *
* (Map Ref. A9)] *
* -In zone 152 (151) (access 151DB) disconnect both *
* connectors on selector valve C 295 (C297) *
* - Set circuit breakers tripped above. *
* -Check for 28VDC between terminal A (-) and B (+) *
* of each of the disconnected floating connectors *
*****
```

```
28Volts      0Volt-----| Replace SERVO CONTROLS unit|
|                                     C291 [7]|
|-----|
|                                     Replace selector valve C295|
|-----| [18] (C297 [19])|
|-----|
```

Chart 112

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* BLUE L.PRESS (GREEN L.PRESS) \*  
\* CAPTION LIGHT IS NOT ILLUMINATED \*  
\*\*\*\*\*  
\*\*\*\*\*  
\* On panel 1-213, trip circuit breaker PFC IND (Map \*  
\* Ref. N18) \*  
\* - In zone 152 (151) (access 151 DB) disconnect \*  
\* connector on pressure switch C 293 (C289) \*  
\* - On disconnected floating connector, shunt termi-\*  
\* nals A and B \*  
\* - Set circuit breaker tripped above. \*  
\* - BLUE L.PRESS (GREEN L.PRESS) caption light \*  
\* illuminates: \*  
\*\*\*\*\*

NO

YES-----

Replace pressure switch  
C 293 [16] (C289 [17])

Replace SERVO CONTROLS unit  
[7]

Chart 113

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* GREEN L.PRESS (BLUE L.PRESS)CAPTION\*  
\* LIGHT IS NOT OFF \*  
\*\*\*\*\*  
\*\*\*\*\*  
\* On panel 1-213, trip circuit breaker PFC IND (Map \*  
\* Ref. N18) \*  
\* - In zone 151 (152) (access 151 DB) disconnect \*  
\* connector on pressure switch C 290 (C292) \*  
\* - Set circuit breaker tripped above. \*  
\* - GREEN L.PRESS (BLUE L.PRESS) caption light \*  
\* remains OFF \*  
\*\*\*\*\*

NO

YES-----

Replace pressure switch  
C290[9] (C 292 [8])

Replace SERVO CONTROLS unit  
C 291 [7]

Chart 114

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## MAINTENANCE MANUAL

### C. Trouble Shooting - Faults of Relay Jack Hydraulic Supply System

\*\*\*\*\*  
\* Only YELLOW hydraulic system is pressurized. \*  
\* On SERVO CONTROLS unit, upper selector switch is \*  
\* in NORMAL position and lower selector switch is in \*  
\* BLUE L.PRESS position. \*  
\* On RELAY JACK unit, switch is in NOR position. \*  
\* On actuation of Flight Controls (control column, \*  
\* control handwheel or rudder pedals) corresponding \*  
\* control surfaces (elevons or rudder) deflect ac- \*  
\* cordingly. \*  
\*\*\*\*\*

		-----	Corresponding control surfaces do not deflect	
OK	NOT OK--		Ref chart 150	
		-----		

\*\*\*\*\*  
\* On RELAY JACK unit, switch is in GREEN ONLY posi- \*  
\* tion. For small movements of Flight Controls the \*  
\* corresponding control surfaces do not deflect. \*  
\*\*\*\*\*

		-----	Corresponding control surfaces do not deflect	
OK	NOT OK--		Ref chart 151	
		-----		

\*\*\*\*\*  
\* On SERVO CONTROLS unit, YELLOW LEVEL T push-button \*  
\* is held pressed. \*  
\* On actuation of Flight Controls, the corresponding \*  
\* control surfaces deflect accordingly. \*  
\*\*\*\*\*

		-----	Corresponding control surfaces deflect accor-	
OK	NOT OK--		dingly. Ref chart 152	
		-----		

\*\*\*\*\*  
\* On SERVO CONTROLS unit, YELLOW LEVEL T push-button \*  
\* is held pressed and lower selector switch is in \*  
\* GREEN L.PRESS position. \*  
\* On actuation of Flight Controls, corresponding \*  
\* control surfaces deflect accordingly. \*  
\*\*\*\*\*

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## MAINTENANCE MANUAL

		-----
OK	NOT OK--	Replace SERVO CONTROLS unit C291 [7]
		-----

\*\*\*\*\*  
\* On SERVO CONTROLS unit, YELLOW LEVEL T push-button\*  
\* released ; lower selector switch placed in BLUE L.\*  
\* PRESS position. \*  
\* On actuation of Flight Controls, corresponding \*  
\* control surfaces do not deflect. \*  
\*\*\*\*\*

		-----
OK	NOT OK--	Corresponding control surfaces deflect accor- dingly. Ref chart 153
		-----

\*\*\*\*\*  
\* On SERVO CONTROLS unit, upper selector switch in \*  
\* NORMAL position and lower selector switch in GREEN\*  
\* L.PRESS position. \*  
\* On actuation of Flight Controls, corresponding \*  
\* control surfaces deflect accordingly. \*  
\*\*\*\*\*

		-----
OK	NOT OK--	Corresponding control surfaces do not deflect Replace SERVO CONTROLS unit C291 [7]
		-----

\*\*\*\*\*  
\* On RELAY JACK unit, switch placed in BLUE ONLY \*  
\* position. \*  
\* On actuation of Flight Controls, corresponding \*  
\* control surfaces do not deflect. \*  
\*\*\*\*\*

		-----
OK	NOT OK--	Corresponding control surfaces deflect Ref chart 154
		-----

\*\*\*\*\*  
\* On SERVO CONTROLS unit, YELLOW LEVEL T push-button\*  
\* held pressed. \*  
\* On actuation of Flight Controls, corresponding \*  
\* control surfaces deflect accordingly. \*  
\*\*\*\*\*

		-----
OK	NOT OK--	Corresponding control surfaces do not deflect Replace SERVO CONTROLS unit C291 [7]
		-----

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* YELLOW hydraulic system pressurization is shut \*  
\* down. BLUE and GREEN hydraulic systems are pressu-\*  
\* rized. \*  
\* On SERVO CONTROLS unit, upper selector switch pla-\*  
\* ced in NORMAL position and lower selector switch \*  
\* in GREEN L.PRESS position. \*  
\* On RELAY JACK unit, switch is in NOR position. \*  
\* On actuation of Flight Controls, corresponding \*  
\* control surfaces deflect accordingly. \*  
\*\*\*\*\*

		-----
		Corresponding control surfaces do not deflect
OK	NOT OK--	Ref chart 155
		-----

\*\*\*\*\*  
\* On SERVO CONTROLS unit, lower selector switch in \*  
\* BLUE L.PRESS position. \*  
\* On actuation of Flight Controls, corresponding \*  
\* control surfaces deflect accordingly. \*  
\*\*\*\*\*

		-----
		Corresponding control surfaces do not deflect
OK	NOT OK--	Ref chart 156
		-----

\*\*\*\*\*  
\* End of trouble shooting of Relay Jack hydraulic \*  
\* supply selection system. \*  
\*\*\*\*\*

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## MAINTENANCE MANUAL

```
*****
* CORRESPONDING CONTROL SURFACES DO * | GROUND EQUIPMENT REQUIRED |
* NOT DEFLECT * |
***** | DESCRIPTION PART NO |
***** | VOLTMETER 0-30 VDC |
*****
```

```
*****
* On panel 1-213, trip, safety and tag circuit brea-*
* ker RLY JACK HYD SEL IND & SUP (C281-Map Ref N17) *
* In zone 121 (access door 1SIDB), disconnect con- *
* nector from relay jack selector valve C300. *
* Set circuit breaker tripped above. *
* On connector C300A, check for 28VDC between termi-*
* nal A (+) and (-). *
*****
```

0 volts

28VDC-----

```
-----
| Replace relay jack selector |
| valve C300 [20] |
-----
```

```
*****
* On panel 1-213, trip circuit breakers : *
* RLY JACK HYD SEL IND & SUP (C281-Map Ref N17) *
* YELL/GRN GRN FAIL (C285-Map Ref P16) *
* YELL/BLUE BLUE FAIL (C286-Map Ref P17) *
* YELL L LEVEL (C288-Map Ref P18) *
* On panel 3-213, trip circuit breakers : *
* YELL L LEVEL (C282-Map Ref A8) *
* YELL/GRN GRN FAIL (C283-Map Ref A9) *
* YELL/BLUE BLUE FAIL (C284-Map Ref A10) *
* On shelf 10-216, remove RJ hydraulic supply selec-*
* tor unit C298 [2]. *
* Set the 7 circuit breakers tripped above. *
* Check for 28VDC between terminal 31 of connector *
* C298A and connector. *
*****
```

YES-----

```
-----
| Replace RJ hydraulic supply |
| selector unit C298 [2] |
-----
```

NO-----

```
-----
| Replace SERVO CONTROLS unit |
| C291 [7] |
-----
```

Chart 150

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## MAINTENANCE MANUAL

```
*****-----
* CORRESPONDING CONTROL SURFACES *| GROUND EQUIPMENT REQUIRED |
* DEFLECT ACCORDINGLY *|-----
*****| DESCRIPTION PART NO |
|-----
| VOLTMETER 0-30 VDC |
|-----
```

```
*****
* On panel 1-213, trip, safety and tag circuit brea-*
* ker RLY JACK HYD SEL IND & SUP (C281-Map Ref N17) *
* In zone 121 (access door 151DB), disconnect con- *
* nector from Relay Jack selector valve C300. *
* Set circuit breaker tripped above. *
* On connector C300A, check for 28VDC between termi-*
* nal A (+) and C (-). *
*****
```

28 volts

0 volt----

```
-----
| Replace Relay Jack selector |
| valve C300 [20] |
|-----
```

```
*****
* On panel 1-213, trip, safety and tag circuit brea-*
* kers : *
* RLY JACK HYD SEL IND & SUP (C281-Map Ref N17) *
* YELL/GRN GRN FAIL (C285-Map Ref P16) *
* YELL/BLUE BLUE FAIL (C286-Map Ref P17) *
* YELL L LEVEL (C288-Map Ref P18) *
* On panel 3-213, trip, safety and tag circuit brea-*
* kers : *
* YELL L LEVEL (C282-Map Ref A8) *
* YELL/GRN GRN FAIL (C283-Map Ref A9) *
* YELL/BLUE BLUE FAIL (C284-Map Ref A10) *
* On shelf 10-216, remove RJ hydraulic supply selec-*
* tor unit C298 [2] *
* Set the 7 circuit breakers tripped above. *
* Check for 28VDC between terminal 37 of connector *
* C298A and ground. *
*****
```

NO-----

```
-----
| Replace RJ switch C303 [4] |
|-----
```

YES-----

```
-----
| Replace RJ hydraulic supply |
| selector unit C298 [2] |
|-----
```

Chart 151

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## MAINTENANCE MANUAL

```
*****-----
* CORRESPONDING CONTROL SURFACES DO *| GROUND EQUIPMENT REQUIRED |
* NOT DEFLECT *|-----
*****| DESCRIPTION PART NO |
|-----
| VOLTMETER 0-30 VDC |
|-----
```

```
*****
* On panel 1-213, trip, safety and tag circuit brea-
* ker RLY JACK HYD SEL IND & SUP (C281-Map Ref N17) *
* In zone 121 (access door 121 DB) disconnect con- *
* nector from Relay Jack selector valve C301. *
* Set circuit breaker tripped above. *
* On connector C301A check for 28VDC between termi- *
* nal A(+) and (-) *
*****
```

0 volts

28 volts---

```
-----
| Replace Relay Jack selector |
| valve C301 [20] |
|-----
```

```
*****
* On panel 1-213, trip, safety and tag circuit brea-
* kers : *
* RLY JACK HYD SEL IND & SUP (C281-Map Ref N17) *
* YELL/GRN GRN FAIL (C285-Map Ref P16) *
* YELL/BLUE BLUE FAIL (C286-Map Ref P17) *
* YELL L LEVEL (C288-Map Ref P18) *
* On panel 3-213, trip, safety and tag circuit brea-
* kers : *
* YELL L LEVEL (C282-Map Ref A8) *
* YELL/GRN GRN FAIL (C283-Map Ref A9) *
* YELL/BLUE BLUE FAIL (C284-Map Ref A10) *
* On shelf 10-216, remove RJ hydraulic supply selec-
* tor unit C298 [2]. *
* Set the 7 circuit breakers tripped above. *
* Check for 28VDC between terminal 19 of connector *
* C298A and ground. *
* Check for 28 VDC between terminal 27 and ground. *
*****
```

NO

YES-----

```
-----
| Replace hydraulic supply |
| selector unit C298 [2] |
|-----
```

```
-----
| Replace SERVO CONTROLS unit |
| C291 [7] |
|-----
```

Chart 152

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

*****	-----
* CORRESPONDING CONTROL SURFACES	GROUND EQUIPMENT REQUIRED
* DEFLECT ACCORDINGLY	-----
*****	DESCRIPTION PART NO.
	-----
	VOLTMETER 0-30 VDC
	-----

\*\*\*\*\*  
 \* On panel 1-213, trip, safety and tag circuit brea-  
 \* ker RLY JACK HYD SEL IND & SUP (C281-Map Ref N17) \*  
 \* In zone 121 (access door 121DB) disconnect connec-  
 \* tor from Relay Jack selector valve C301. \*  
 \* Set circuit breaker tripped above. \*  
 \* Check for 28 VDC between terminal A(+) and (-) of \*  
 \* connector C301A. \*  
 \*\*\*\*\*

		-----
28 volts	0 volts--	Replace Relay Jack selector
		valve C301 [20]
		-----

\*\*\*\*\*  
 \* On panel 1-213, trip, safety and tag circuit brea-  
 \* kers : \*  
 \* RLY JACK HYD SEL IND & SUP (C281-Map Ref N17) \*  
 \* YELL/GRN GRN FAIL (C285-Map Ref P16) \*  
 \* YELL/BLUE BLUE FAIL (C286-Map Ref P17) \*  
 \* YELL L LEVEL (C288-Map Ref P18) \*  
 \* On panel 3-213, trip, safety and tag circuit brea-  
 \* kers : \*  
 \* YELL L LEVEL (C282-Map Ref A8) \*  
 \* YELL/GRN GRN FAIL (C283-Map Ref A9) \*  
 \* YELL/BLUE BLUE FAIL (C284-Map Ref A10) \*  
 \* On shelf 10-216, remove RJ hydraulic supply selec-  
 \* tor unit C298 [2]. \*  
 \* Set the 7 circuit breakers tripped above. \*  
 \* Check for 28 VDC between terminal 27 of connector \*  
 \* C298A and ground. \*  
 \*\*\*\*\*

		-----
	0 volts--	Replace RJ hydraulic supply
		selector unit C298 [2]
		-----
28 volts-----		Replace SERVO CONTROLS unit
		C291 [7]
		-----

Chart 153

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# Concorde

## MAINTENANCE MANUAL

*****		
* CORRESPONDING CONTROL SURFACES	*	GROUND EQUIPMENT REQUIRED
* DEFLECT	*	
*****		
	DESCRIPTION	PART NO.
	VOLTMETER 0-30 VDC	
*****		

\*\*\*\*\*  
\* On panel 1-213, trip, safety and tag circuit brea-  
\* kers :  
\* RLY JACK HYD SEL IND & SUP (C281-Map Ref N17)  
\* YELL/GRN GRN FAIL (C285-Map Ref P16)  
\* YELL/BLUE BLUE FAIL (C286-Map Ref P17)  
\* YELL L LEVEL (C288-Map Ref P18)  
\* On panel 3-213, trip, safety and tag circuit brea-  
\* kers :  
\* YELL L LEVEL (C282-Map Ref A8)  
\* YELL/GRN GRN FAIL (C283-Map Ref A9)  
\* YELL/BLUE BLUE FAIL (C284-Map Ref A10)  
\* On shelf 10-216, remove RJ hydraulic supply selec-  
\* tor unit C298 [2].  
\* Set the 7 circuit breakers tripped above.  
\* Check for 28 VDC between terminal 35 of connector \*  
\* C298A and ground.  
\*\*\*\*\*

		YES-----	Replace RJ hydraulic supply
			selector unit C298 [2]
		NO-----	Replace Relay Jack switch
			C303 [4]

Chart 154

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

```
*****-----
* CORRESPONDING CONTROL SURFACES DO *| GROUND EQUIPMENT REQUIRED |
* NOT DEFLECT *|-----
*****| DESCRIPTION PART NO. |
| VOLTmeter 0-30 VDC |
*****|-----
```

```
*****
* On panel 1-213, trip, safety and tag circuit brea-
* ker RLY JACK HYD SEL IND & SUP (C281-Map Ref N17) *
* In zone 121 (access door 121DB), disconnect con- *
* nector from RJ selector valve C299. *
* Set circuit breaker tripped above. *
* On connector C299A, check for 28 VDC between ter- *
* minal A(+) and C(-). *
*****
```

```

| 0 volts | 28 volts---| Replace RJ selector valve |
|         |         | C299 [20] |
|         |         |-----|
```

```
*****
* On panel 1-213, trip circuit breakers : *
* RLY JACK HYD SEL IND & SUP (C281-Map Ref N17) *
* YELL/GRN GRN FAIL (C285-Map Ref P16) *
* YELL/BLUE BLUE FAIL (C286-Map Ref P17) *
* YELL L LEVEL (C288-Map Ref P18) *
* On panel 3-213, trip circuit breakers : *
* YELL L LEVEL (C282-Map Ref A8) *
* YELL/GRN GRN FAIL (C283-Map Ref A9) *
* YELL/BLUE BLUE FAIL (C284-Map Ref A10) *
* On shelf 10-216, remove RJ hydraulic supply selec-
* tor unit C298 [2]. Set the 7 circuit breakers *
* tripped above. Check for 28 VDC between terminal *
* 37 of connector C298A and ground. *
*****
```

```

| 0 volts | 28 volts---| Replace switch C303 [4] |
|         |         |-----|
```

```
*****
* On connector C298A check for 28 VDC between terminal 31 a
* On connector C298A check for 28 VDC between terminal 31 and *
* ground *
*****
```

```

|         | 0 volts---| Replace unit C298 [2] |
|         |         |-----|
| 28 volts-----| Replace unit C291 [7] |
|         |         |-----|
```

Chart 155

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# Concorde

## MAINTENANCE MANUAL

```
*****-----
* CORRESPONDING CONTROL SURFACES DO *| GROUND EQUIPMENT REQUIRED |
* NOT DEFLECT *|-----
*****| DESCRIPTION PART NO. |
|-----
| VOLTMETER 0-30 VDC |
|-----
```

```
*****
* On panel 1-213, trip circuit breaker RLY JACK HYD *
* SEL IND & SUP (C281-Map Ref N16) *
* In zone 121, (access door 121FB) disconnect con- *
* nector from RJ selector valve C302. *
* Set circuit breaker tripped above. *
* Check for 28 VDC between terminal A(+) and C(-) of *
* connector C302A. *
*****
```

```

|
| 0 volts
|
|
| 28 volts---| Replace RJ selector valve |
|             | valve C302 [20] |
|-----
```

```
*****
* On panel 1-213, trip circuit breakers : *
* RLY JACK HYD SEL IND & SUP (C281-Map Ref N17) *
* YELL/GRN GRN FAIL (C285-Map Ref P16) *
* YELL/BLUE BLUE FAIL (C286-Map Ref P17) *
* YELL L LEVEL (C288-Map Ref P18) *
* On panel 3-213, trip circuit breakers : *
* YEEL L LEVEL (C282-Map Ref A8) *
* YELL/GRN GRN FAIL (C283-Map Ref A9) *
* YELL/BLUE BLUE FAIL (C284-Map Ref A10) *
* On shelf 10-216, remove RJ hydraulic supply selec- *
* tor unit C298 [2]. Set the 7 circuit breakers *
* tripped above. Check for 28 VDC between terminal *
* 35 of connector C298A and ground. *
*****
```

```

|
| 28 volts
|
|
| 0 volts---| Replace switch C303 [4] |
|-----
```

```
*****
* On connector C298A check for 28 VDC between terminal 27 and *
* ground *
*****
```

```

|
|
| 0 volts---| Replace unit C298 [2] |
|-----
|
| 28 volts-----| Replace unit C291 [7] |
|-----
```

Chart 156

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# Concorde

## MAINTENANCE MANUAL

### D. PFCU - Jam Warning Detection (Mod. 27C083).

In the event of a PFCU jam warning, i.e. jam warning indication with flying controls operating in correct sense and no control surface lag, with the incorporation of this modification it is possible to identify which PFCU is at fault. Identification of faulty PFCU is by use of a test socket in the LEFT HAND REAR EQUIPMENT, RACKING 7-244. To gain access to the test socket remove the rear LEFT HAND facia panel by means of 8 quick release fasteners. An AVO or similar meter must then be used by inserting one pin to earth (PIN V) and the other to each of the following pins in turn:

<u>PFCU</u>	<u>BLUE</u>	<u>GREEN</u>
R.H. OUTER ELEVON	PIN H	PIN S
R.H. MIDDLE ELEVON	PIN G	PIN R
R.H. INNER ELEVON	PIN F	PIN P
UPPER RUDDER	PIN D	PIN M
LOWER RUDDER	PIN E	PIN N
L.H. INNER ELEVON	PIN C	PIN L
L.H. MIDDLE ELEVON	PIN B	PIN K
L.H. OUTER ELEVON	PIN A	PIN J

A reading in excess of 20 volts identifies a faulty PFCU. All pins must be checked to establish which one or more of the eight PFCUs is at fault. On completion of AVO test, gain access to faulty PFCU jam switches by removing appropriate fairing.

PANEL 553 JB giving access to P.F.C.U. L.H. OUTER ELEVON  
PANEL 552 JB giving access to P.F.C.U. L.H. MIDDLE ELEVON  
PANEL 551 JB giving access to P.F.C.U. L.H. INNER ELEVON  
PANEL 651 JB giving access to P.F.C.U. R.H. INNER ELEVON  
PANEL 652 JB giving access to P.F.C.U. R.H. MIDDLE ELEVON  
PANEL 653 JB giving access to P.F.C.U. R.H. OUTER ELEVON  
PANEL 352 CR giving access to P.F.C.U. UPPER RUDDER  
PANEL 351 CR giving access to P.F.C.U. LOWER RUDDER

For the affected PFCU, use tool ST4 P285-45-2 (HZAT 2740) on spring box and microswitch assembly, exercise spring box in both directions several times to remove stiction. If exercising of the spring box is not successful in removal of stiction (i.e. jam warning remains) refer to Concorde M.E.L 05-02-11 Ref. No.4(d) or 4(e) for alleviation. If exercising of spring box is successful in removal of PFCU jam warning, function flying controls I.A.W. 27-00-00 P/B 300 to confirm this.

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```
*****
* Aircraft electrical network energized; on SERVO *
* CONTROLS unit, both switches are in NORMAL position *
* Blue and Green hydraulic systems are pressurized. *
* Flight Controls are set in mechanical mode. *
* On SERVO CONTROLS unit, no caption and indicator *
* light is illuminated. *
*****
```

```
*****
* When moving control column, no indicator or
* caption light illuminates on SERVO CONTROLS unit
*****
```

```
*****
* When deflecting rudder pedals, no indicator or *
* caption light illuminates on SERVO CONTROLS unit. *
*****
```

```
*****
* Connect Flight Controls electrical circuits test
* set, Ref: 31-56-100 (Ref. 27-37-00, A/T) and carry
* out test series No. 1 and test series No. 2.
*
*     These two test series are conclusive
*****
```

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466
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## MAINTENANCE MANUAL

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\*\*\*\*\*  
\* On panel 1-213, trip circuit breakers AUDIO WARN. \*  
\* SYS SUP 1 (Map Ref. M 21) and MWS SUP 1 (Map Ref. \*  
\* N 21). On panel 5-213, trip circuit breakers AUDIO\*  
\* WARN SYS SUP 2 (Map Ref. C17) and MWS SUP 2 (Map \*  
\* Ref. D 15). Stop pressurization of Green and Blue \*  
\* hydraulic systems. \*  
\* Remove fairing 553 JB to gain access to LH outer \*  
\* elevon PFCU. (Power Flight Control Unit). \*  
\* On PFCU cut lockwire of screws attaching protecti-\*  
\* ve plate. Remove screws and protective plate. \*  
\* Install tool ST4P 285-45-002 on Blue spring box \*  
\* and microswitch assembly (rear of PFCU) then \*  
\* turn handle of tool in clockwise direction. \*  
\* . BLUE JAM caption light illuminates. \*  
\*\*\*\*\*

OK	NOT OK--	BLUE JAM caption light does not illuminate Ref chart 143
----	----------	---

\*\*\*\*\*  
\* Turn tool operating handle in counter-clockwise \*  
\* direction and remove tool : \*  
\* -On SERVO CONTROLS UNIT, place upper switch in \*  
\* BLUE JAM position then in NORMAL position. \*  
\* -BLUE JAM caption light goes off. \*  
\*\*\*\*\*

OK	NOT OK--	BLUE JAM caption light does not go off -Replace SERVO CONTROLS UNIT C 291[7]
----	----------	---

\*\*\*\*\*  
\* Install tool ST4 P 284-45-002 on Green spring box \*  
\* and microswitch assembly (front of LH outer elevon\*  
\* PFCU) \*  
\* Turn handle of tool in clockwise direction. \*  
\* .GREEN JAM caption light illuminates \*  
\*\*\*\*\*

OK	NOT OK--	GREEN JAM caption light does not illuminate Ref chart 144
----	----------	--

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## MAINTENANCE MANUAL

||  
\*\*\*\*\*  
\* Turn handle of tool in counter-clockwise direction\*  
\* and remove tool. \*  
\* On SERVO CONTROLS UNIT, place upper switch in \*  
\* GREEN JAM position then in NORMAL position \*  
\* -GREEN JAM caption light goes off \*  
\*\*\*\*\*

		GREEN JAM caption light does not go off.
OK	NOT OK--	-Replace SERVO CONTROLS UNIT C 291 [7]

\*\*\*\*\*  
\* Position and attach protective plate of LH outer \*  
\* elevon PFCU input lever. Wirelock screws. Install \*  
\* Fairing 553 JB. \*  
\* Remove Fairing 552 JB to gain access to LH middle \*  
\* elevon PFCU \*  
\* Cut lockwire and remove attachment screws of \*  
\* input lever protective plate. Remove the latter. \*  
\* Install tool ST4 P 285-45-002 on Blue spring box \*  
\* and microswitch assembly (rear of PFCU). \*  
\* Turn handle of tool in clockwise direction \*  
\* -BLUE JAM caption light illuminates. \*  
\*\*\*\*\*

		BLUE JAM caption light does not illuminate.
		Trip circuit breakers listed in 27-34-52, R/I.
		On PFCU, disconnect connector C 103 A.
OK	NOT OK--	On connector C 103 A of PFCU C 103 check
		circuit continuity between terminals Y and Z.
		If discontinuity, replace PFCU C 103 [21]

\*\*\*\*\*  
\* Remove tool ST4P 285-45-002 \*  
\* On SERVO CONTROLS unit, place upper switch in BLUE\*  
\* JAM position then in NORMAL position; BLUE JAM \*  
\* caption light goes off. \*  
\* Install tool on Green spring box and microswitch \*  
\* assembly (Front of PFCU) and turn handle in \*  
\* clockwise direction. \*  
\* -GREEN JAM caption light illuminates. \*  
\*\*\*\*\*

OK	NOT OK

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## MAINTENANCE MANUAL

OK

NOT OK--

GREEN JAM caption light does not illuminate.  
Trip circuit breakers listed in 27-34-52, R/I  
On PFCU disconnect connector C 103 A  
On connector C103A of PFCU C 103 check  
circuit continuity between terminals G and H.  
If discontinuity, replace PFCU C 103 [21].

\*\*\*\*\*

\* Remove tool ST4P 285-45-002 \*  
\* -On SERVO CONTROLS unit, place upper switch in \*  
\* GREEN JAM position then in NORMAL position \*  
\* GREEN JAM caption light goes off. \*  
\* -Attach protective plate of PFCU input lever, \*  
\* wirelock screws; position and attach fairing 552JB \*  
\* -Remove Fairing 551JB to gain access to LH inner \*  
\* elevon PFCU. \*  
\* Cut lockwire and remove attachment screws and \*  
\* input lever protective plate. \*  
\* -Install tool ST4P 285-45-002 on Blue spring box \*  
\* and microswitch assembly (rear of PFCU) \*  
\* -Turn handle of tool in clockwise direction \*  
\* -BLUE JAM caption light illuminates \*

\*\*\*\*\*

OK

NOT OK--

BLUE JAM caption light does not illuminate  
Ref chart 145

\*\*\*\*\*

\* Remove tool. \*  
\*-On SERVO CONTROLS unit, place upper switch in BLUE \*  
\* JAM position then in NORMAL position; BLUE JAM \*  
\* caption light goes off. \*  
\*-Install tool on Green spring box and microswitch \*  
\* assembly (front of PFCU) \*  
\* Turn handle of tool in clockwise direction \*  
\* - GREEN JAM caption light illuminates. \*

\*\*\*\*\*

OK

NOT OK--

GREEN JAM caption light does not illuminate  
Ref chart 146

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## MAINTENANCE MANUAL

||  
\*\*\*\*\*  
\* Remove tool. \*  
\* -On SERVO CONTROLS unit, place upper switch in \*  
\* GREEN JAM position then in NORMAL position: \*  
\* GREEN JAM caption light goes off. \*  
\* -Attach protective plate of PFCU input lever. \*  
\* Wirelock screws; install Fairing 551 JB. \*  
\* Remove Fairing 651 JB to gain access to RH inner \*  
\* elevon PFCU. \*  
\* -Cut lockwire and remove screws attaching input \*  
\* lever protective plate, remove the latter. \*  
\* -Install tool on Blue spring box and microswitch \*  
\* assembly (rear of PFCU) \*  
\* -Turn handle of tool in clockwise direction \*  
\* -BLUE JAM caption light illuminates \*  
\*\*\*\*\*

OK	NOT OK--	BLUE JAM caption light does not illuminate Trip circuit breakers listed in 27-34-53, R/I On PFCU disconnect connector C 106 A. On connector C 106 A of PFCU C 106, check circuit continuity between terminals f and N If discontinuity, replace PFCU C 106 [22]
----	----------	--

\*\*\*\*\*  
\* Remove tool. \*  
\* -On SERVO CONTROLS unit, place upper switch in BLUE \*  
\* JAM position then in NORMAL position: \*  
\* BLUE JAM caption light goes off \*  
\* -Install tool on Green spring box and microswitch \*  
\* assembly (front of PFCU) \*  
\* -Turn handle of tool in clockwise direction \*  
\* -GREEN JAM caption light illuminates \*  
\*\*\*\*\*

OK	NOT OK--	GREEN JAM caption light does not illuminate Trip circuit breakers listed in 27-34-53, R/I On PFCU disconnect connector C 106 A On connector C 106 A of PFCU C 106, check circuit continuity between terminals e and M If discontinuity, replace PFCU C 106 [22]
----	----------	--

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* Remove tool. \*  
\* -On SERVO CONTROLS unit, place upper switch in \*  
\* GREEN JAM position then in NORMAL position: \*  
\* GREEN JAM caption light goes off. \*  
\* -Install protective plate of PFCU input lever. \*  
\* Wirelock screws; position and attach Fairing 651JB\*  
\* -Remove Fairing 652 JB to gain access to RH middle\*  
\* elevon PFCU. \*  
\* -Cut lockwire and remove screws attaching input \*  
\* lever protective plate; remove the latter. \*  
\* -Install tool ST4P 285-45-002 on Blue spring box \*  
\* and microswitch assembly (rear of PFCU) \*  
\* -Turn handle of tool in clockwise direction. \*  
\* -BLUE JAM caption light illuminates. \*  
\*\*\*\*\*

||  
OK  
||

NOT OK--

-----  
BLUE JAM caption light does not illuminate.  
-Trip circuit breakers listed in 27-34-52, R/I  
-On PFCU disconnect connector C 104 A.  
-On connector C104A of PFCU C104 check  
circuit continuity between terminals Y and Z  
If discontinuity, replace PFCU C 104 [21]  
-----

\*\*\*\*\*  
\* Remove tool. \*  
\* -On SERVO CONTROLS unit, place upper switch in \*  
\* BLUE JAM position then in NORMAL position: \*  
\* BLUE JAM caption light goes off. \*  
\* -Install tool on Green spring box and microswitch \*  
\* assembly (front of PFCU) \*  
\* -Turn handle of tool in clockwise direction. \*  
\* -GREEN JAM caption light illuminates. \*  
\*\*\*\*\*

||  
OK  
||

NOT OK--

-----  
GREEN JAM caption light does not illuminate.  
-Trip circuit breakers listed in 27-34-52, R/I  
-On PFCU disconnect connector C 104 A.  
-On connector C 104 A of PFCU C 104, check  
circuit continuity between terminals G and H.  
If discontinuity, replace PFCU C 104 [21]  
-----

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* Remove tool. \*  
\* -On SERVO CONTROLS unit, place upper switch in \*  
\* GREEN JAM position then in NORMAL position: \*  
\* GREEN JAM caption light goes off. \*  
\* -Install PFCU input lever protective plate. \*  
\* wirelock screws; position and attach fairing 652JB\*  
\* -Remove fairing 653 JB to gain access to RH outer \*  
\* elevon PFCU. \*  
\* -Cut lockwire and remove screws attaching input \*  
\* lever protective plate; remove the latter. \*  
\* -Install tool on Blue spring box and microswitch \*  
\* assembly (rear of PFCU) \*  
\* Turn handle of tool in clockwise direction \*  
\* -BLUE JAM caption light illuminates \*  
\*\*\*\*\*

||  
OK  
||

NOT OK--

-----  
BLUE JAM caption light does not illuminate.  
-Trip circuit breakers listed in 27-34-52, R/I  
-On PFCU disconnect connector C 103 A.  
-On connector C 103 A of PFCU C 103, check  
circuit continuity between terminals Z and Y  
If discontinuity, replace PFCU C 103 [21]  
-----

\*\*\*\*\*  
\* Disassemble and remove tool. \*  
\* -On SERVO CONTROLS unit, place upper switch in \*  
\* BLUE JAM position then in NORMAL position: \*  
\* BLUE JAM caption light goes off. \*  
\* -Install tool on Green spring box and microswitch \*  
\* assembly (front of PFCU) \*  
\* -Turn handle of tool in clockwise direction. \*  
\* -GREEN JAM caption light illuminates. \*  
\*\*\*\*\*

||  
OK  
||

NOT OK--

-----  
GREEN JAM caption light does not illuminate.  
-Trip circuit breakers listed in 27-34-52, R/I  
-On PFCU disconnect connector C 103 A.  
-On connector C 103 A of PFCU check  
circuit continuity between terminals G and H.  
If discontinuity, replace PFCU C 103 [21]  
-----

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* Disassemble and remove tool. \*  
\* -On SERVO CONTROLS unit, place upper switch in \*  
\* GREEN JAM position then in NORMAL position: \*  
\* GREEN JAM caption light goes off. \*  
\* -Install PFCU input lever protective plate. \*  
\* Wirelock screws; position and attach fairing 653JB\*  
\* -Remove fairing 351CL to gain access to lower \*  
\* rudder PFCU. \*  
\* -Cut lockwire and remove screws attaching input \*  
\* lever protective plate; remove the latter. \*  
\* -Install tool on Blue spring box and microswitch \*  
\* assembly (rear of PFCU) \*  
\* -Turn handle of tool in clockwise direction \*  
\* -BLUE JAM caption light illuminates \*  
\*\*\*\*\*

||  
OK  
||

||  
NOT OK--  
||

-----  
| BLUE JAM caption light does not illuminate |  
Ref chart 147

\*\*\*\*\*  
\* Remove tool. \*  
\* -On SERVO CONTROLS unit, place upper switch in \*  
\* BLUE JAM position then in NORMAL position: \*  
\* BLUE JAM caption light goes off. \*  
\* -Install tool on Green spring box and microswitch \*  
\* assembly (front of PFCU) \*  
\* -Turn handle of tool in clockwise direction. \*  
\* -GREEN JAM caption light illuminates. \*  
\*\*\*\*\*

||  
OK  
||

||  
NOT OK--  
||

-----  
| GREEN JAM caption light does not illuminate |  
Ref chart 148

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

||  
\*\*\*\*\*  
\* Remove tool. \*  
\* -On SERVO CONTROLS unit, place upper switch in \*  
\* GREEN JAM position then in NORMAL position: \*  
\* GREEN JAM caption light goes off. \*  
\* -Install PFCU input lever protective plate. \*  
\* Wirelock screws; position and attach fairing 351CL \*  
\* -Remove fairing 352CR to gain access to upper \*  
\* rudder PFCU. \*  
\* -Cut lockwire and remove screws attaching input \*  
\* lever protective plate; remove the latter. \*  
\* -Install tool on Blue spring vox and microswitch \*  
\* assembly (rear of PFCU) \*  
\* -Turn handle of tool in clockwise direction \*  
\* -BLUE JAM caption light illuminates \*  
\*\*\*\*\*

		-----	Trip circuit breaker listed in 27-24-31, R/I
OK	NOT OK--	-----	-On PFCU disconnect connector C 78A.
		-----	-On connector C 78A of PFCU, check circuit
		-----	continuity between terminals J and X.
		-----	If discontinuity, replace PFCU C 78 [23]

\*\*\*\*\*  
\* Remove tool. \*  
\* -On SERVO CONTROLS unit, place upper switch in \*  
\* BLUE JAM position then in NORMAL position. \*  
\* -Install tool on Green spring box and microswitch \*  
\* assembly (front of PFCU) \*  
\* -Turn handle of tool in clockwise direction \*  
\* -GREEN JAM caption light illuminates \*  
\*\*\*\*\*

		-----	Trip circuit breaker listed in 27-24-31, R/I
OK	NOT OK--	-----	-On PFCU disconnect connector C 78A.
		-----	-On connector C 78A of PFCU, check circuit
		-----	continuity between terminals H and c
		-----	If discontinuity, replace PFCU C 78 [23]

\*\*\*\*\*  
\* End of trouble shooting of PFCU spool valve \*  
\* jamming detection system. \*  
\*\*\*\*\*

De-energize the aircraft electrical network-  
On SERVO CONTROLS unit, make certain that both selector switches  
are in NORMAL position.  
Make certain that PFCU Fairings are correctly attached.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

```

*****
RB  * BLUE JAM (GREEN JAM) CAPTION * | GROUND EQUIPMENT REQUIRED |
RB  * LIGHT IS ILLUMINATED          * |-----|
***** | DESCRIPTION          PART NO. |
***** |-----|
***** | MULTIMETER          |
***** |-----|

```

```

*****
RB  * Identify faulty PFCU(s) (Ref. 27-14-00, *
RB  * Page 132                                *
*****

```

```

RB      YES

```

```

*****
RB  * Move flying control surfaces over full range of *
RB  * movement.                                         *
RB  * Confirm correct operation and no control         *
RB  * surface lag.                                     *
*****

```

```

RB      YES      NO - - | Replace faulty PFCU(s) |

```

```

*****
RB  * Exercise specific PFCU Spring Box (Ref. 27-14-00 *
RB  * Page 132. Check jam light is illuminated        *
*****

```

```

RB      YES      NO - - | Move flying control surfaces
RB      |         | over full range of movement.
RB      |         | Confirm correct operation
RB      |         | and no control surface lag.
RB      |         | Confirm Blue Jam (Green Jam)
RB      |         | caption is not illuminated.

```

```

*****
RB  * More than one Jam indication on test socket. *
*****

```

RB Chart 140 (Sheet 1 of 2)

EFFECTIVITY: ALL	
BA	C794954

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## MAINTENANCE MANUAL

RB

NO

YES - - - - -

Replace faulty PFCUS

RB

RB

RB

RB

\*

RB

RB

RB

\*\*\*\*\*  
\* Remove floor panel 241 HF to gain access to \*  
\* terminal block UG1306. Disconnect and stow the \*  
\* appropriate jam light wires (Ref. 27-14-00 \*  
\* Page 143 Table 101). \*  
\* \*  
\* NOTE: If defective PFCU is an inner elevon only \*  
\* subsonic flight is permitted \*  
\* (Ref. MEL 01-27-01). \*  
\*\*\*\*\*

RB

YES

RB

RB

\*\*\*\*\*  
\* Confirm Blue Jam (Green Jam) caption \*  
\* is not illuminated. \*  
\*\*\*\*\*

RB

Chart 140 (Sheet 2 of 2)

EFFECTIVITY: ALL

BA

C794955

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## MAINTENANCE MANUAL

RB	PFCU	BLUE			GREEN		
RB		PIN	WIRE	TERM	PIN	WIRE	TERM
RB	1	2	3	4	5	6	7
RB	R.H. OUTER ELEVON	H	C376P	B9	S	C376R	B9
RB	R.H. MID ELEVON	G	C376K	B9	R	C376L	B9
RB	R.H. INNER ELEVON	F	C376F	B10	P	C376G	B10
RB	UPPER RUDDER	D	C114D	B7	M	C114C	B7
RB	LOWER RUDDER	E	C114G	B7	N	C114K	B7
RB	L.H. INNER ELEVON	C	C376D	B10	L	C376E	B10
RB	L.H. MID ELEVON	B	C376H	B8	K	C376J	B8
RB	L.H. OUTER ELEVON	A	C376M	B8	J	C376N	B8

RB  
RB

BLOCK UG 1306 DISCONNECT POINTS  
TABLE 101

EFFECTIVITY: ALL

BA

C794952

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# Concorde

## MAINTENANCE MANUAL

\*\*\*\*\*  
\*BLUE JAM CAPTION LIGHT DOES NOT \*  
\*ILLUMINATE. \*  
\*\*\*\*\*

GROUND EQUIPMENT REQUIRED

DESCRIPTION

PART NO.

MULTIMETER

\*\*\*\*\*  
\* On panel 1-213, trip circuit breaker PFCS ALL \*  
\* SURFACES MON GRN SUP (Map Ref. N13) \*  
\* On panel 5-213, trip circuit breaker PFCS ALL \*  
\* SURFACES MON BLUE SUPP (Map Ref. E12) \*  
\* On PFCU, disconnect connector C 101 A \*  
\* On connector C 101 A on PFCU, check circuit cont- \*  
\* inuity between terminals Y and Z. \*  
\*\*\*\*\*

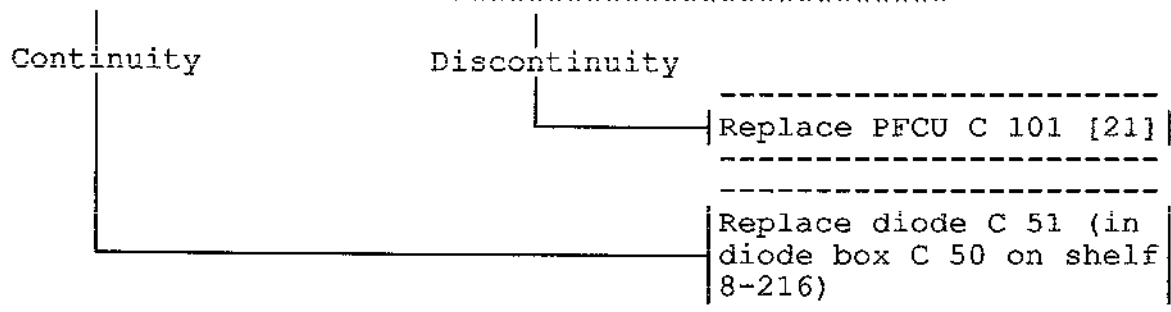


Chart 143

EFFECTIVITY: ALL

BA

C798200

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# Concorde

## MAINTENANCE MANUAL

*****	
* GREEN JAM CAPTION LIGHT DOES NOT	* GROUND EQUIPMENT REQUIRED
* ILLUMINATE.	*
*****	*****
DESCRIPTION	PART NO
MULTIMETER	

\*\*\*\*\*

\* On panel 1-213, trip circuit breaker PFCS ALL \*

\* SURFACES MON GRN SUP (Map Ref. N13) \*

\* On panel 5-213, trip circuit breaker PFCS ALL \*

\* SURFACES MON GRN SUP (Map Ref. E12) \*

\* On PFCU, disconnect connector C 101 A \*

\* On connector C 101 A on PFCU, check circuit conti-\*

\* -nuity between terminals G and H. \*

\*\*\*\*\*

Continuity

Discontinuity

Replace PFCU C 101 [21]

Replace diode C 52 (in  
diode box C 50 on shelf  
8-216)

Chart 144

EFFECTIVITY: ALL

BA

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# Concorde

## MAINTENANCE MANUAL

*****	
* BLUE JAM CAPTION LIGHT DOES NOT	* GROUND EQUIPMENT REQUIRED
* ILLUMINATE.	*
*****	DESCRIPTION
	PART NO
	MULTIMETER
*****	
* On panel 1-213, trip circuit breaker PFCS ALL	*
* SURFACES MON GRN SUP (Map Ref. N13)	*
* On panel 5-213, trip circuit breaker PFCS ALL	*
* SURFACES MON BLUE SUP (Map Ref. E12)	*
* On PFCU, disconnect connector C 105 A	*
* On connector C 105 A on PFCU, check circuit	*
* continuity between terminals f and N	*
*****	
Continuity	Discontinuity
	-----
	Replace PFCU C 105 [22]
	Replace diode C 60 (in diode box C 50 on shelf 8-216)

Chart 145

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

*****	
* GREEN JAM CAPTION LIGHT DOES NOT	* GROUND EQUIPMENT REQUIRED
* ILLUMINATE.	*
*****	
DESCRIPTION	PART NO
MULTIMETER	
*****	

\*\*\*\*\*

\* On panel 1-213, trip circuit breaker PFCS ALL \*

\* SURFACES MON GRN SUP (Map Ref. N13) \*

\* On panel 5-213, trip circuit breaker PFCS ALL \*

\* SURFACES MON BLUE SUP (Map Ref. E12) \*

\* On PFCU, disconnect connector C 105 A \*

\* On connector C 105 A on PFCU, check circuit conti-\*

\* -nuity between terminals e and M. \*

\*\*\*\*\*

Continuity

Discontinuity

-----| Replace PFCU C 105 [22] |

-----| Replace diode C 61 (in  
diode box C 50 on shelf  
8-216) |

Chart 146

EFFECTIVITY: ALL

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# MAINTENANCE MANUAL

* BLUE JAM CAPTION LIGHT DOES NOT	* GROUND EQUIPMENT REQUIRED
* ILLUMINATE.	-----
*****	DESCRIPTION PART NO
	-----
	MULTIMETER

```
* On panel 1-213, trip circuit breaker PFCS ALL      *
* SURFACES MON GRN SUP (Map Ref. N13)                 *
* On panel 5-213, trip circuit breaker PFCS ALL      *
* SURFACES MON BLUE SUP (Map Ref. E12)                *
* On PFCU, disconnect connector C79 A                 *
* On connector C 79 A on PFCU, check circuit          *
* continuity between terminals J and X                 *
```

Continuity	Discontinuity
	Replace PFCU C 79 [23]
	Replace diode C 64 (in diode box C 50 on shelf 8-216)

**Chart 147**

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

*****	
* GREEN JAM CAPTION LIGHT DOES NOT	* GROUND EQUIPMENT REQUIRED
* ILLUMINATE.	*
*****	*****
DESCRIPTION	PART NO
MULTIMETER	

\*\*\*\*\*  
\* On panel 1-213, trip circuit breaker PFCs ALL \*  
\* SURFACES MON GRN SUP (Map Ref. N13) \*  
\* On panel 5-213, trip circuit breaker PFCs ALL \*  
\* SURFACES MON GRN SUP (Map Ref. E12) \*  
\* On PFCU, disconnect connector C 78 A \*  
\* On connector C 78 A on PFCU, check circuit conti- \*  
\* -nuity between terminals c and H. \*  
\*\*\*\*\*

Continuity

Discontinuity

-----| Replace PFCU C 78 [23] |

-----| Replace diode C 65 (in  
diode box C 50 on shelf  
8-216) |

Chart 148

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

RB F. Trouble Shooting - Faults of RELAY JACK Spool Valve Jamming Detection System

```
*****
* Aircraft electrical network is energized. *
* On SERVO CONTROLS unit, both switches are in *
* NORMAL position. *
* On RELAY JACK unit, switch is placed in NORM posit-*
* ion. *
* Blue and Green hydraulic systems are pressurized *
* - Flight Controls are set in mechanical mode. *
* - Move control column : *
* - No caption light illuminates on RELAY JACK *
* unit. *
*****
```

OK	NOT OK--	BLUE JAM (GREEN JAM) caption light illuminates. Ref chart 160
----	----------	--

```
*****
* Move control handwheel *
* - No caption light illuminates on RELAY JACK unit. *
*****
```

OK	NOT OK--	BLUE JAM (GREEN JAM) caption light illuminates. Ref chart 160
----	----------	--

```
*****
* Deflect rudder pedals *
* - No caption light illuminates on RELAY JACK unit. *
*****
```

OK	NOT OK--	BLUE JAM (GREEN JAM) caption light illuminates. Ref chart 160
----	----------	--

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

\*\*\*\*\*  
\* Stop pressurization of Blue and Green hydraulic \*  
\* systems. \*  
\* On panel 1-213, trip circuit breakers : \*  
\* AUDIO WARN SYS SUP 1 (Map Ref. M 21)- PFC IND \*  
\* (Map Ref. N 18) and MWS SUP 1 (Map Ref. N 21) \*  
\* On panel 3-213, trip circuit breakers : \*  
\* AUDIO WARN SYS SUP 2 (Map Ref. C 17) and MWS SUP 2 \*  
\* (Map Ref. D 15) \*  
\* Open floor panel 213DF : \*  
\* On spring box of Relay Jack (C 6 (pitch)) Blue \*  
\* spool valve install and operate tool CT1 P289 45 \*  
\* 002. Wait 2 seconds approximately then remove \*  
\* tool. \*  
\* - On RELAY JACK unit, BLUE JAM caption light is \*  
\* illuminated. \*

\*\*\*\*\*  
| | |-----|  
| | | BLUE JAM caption light is not illuminated |  
OK NOT OK--| Ref chart 161 |  
| | |-----|

\*\*\*\*\*  
\* On RELAY JACK unit place switch in GREEN ONLY \*  
\* position then in NORM position. \*  
\* BLUE JAM caption light goes off. \*

\*\*\*\*\*  
| | |-----|  
| | | BLUE JAM caption light does not go off. |  
OK NOT OK--| Ref chart 162 |  
| | |-----|

\*\*\*\*\*  
\* With floor panel 213DF open : \*  
\* - On spring box of RJ C 10 (Yaw) Blue spool valve \*  
\* install and operate tool CT1 P289 45 002. \*  
\* Wait 2 seconds then remove tool. \*  
\* - On RELAY JACK unit, BLUE JAM caption light is \*  
\* illuminated. \*

\*\*\*\*\*  
| | |-----|  
| | | BLUE JAM caption light is not illuminated. |  
OK NOT OK--| Ref chart 161 |  
| | |-----|

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

\*\*\*\*\*  
\* On RELAY JACK unit, place switch in GREEN ONLY \*  
\* position then in NORM position. \*  
\* - BLUE JAM caption light goes off. \*  
\*\*\*\*\*

OK	NOT OK--	BLUE JAM caption light does not go off. Ref chart 162
----	----------	--

\*\*\*\*\*  
\* On spring box of RJ C 8 (roll) blue spool valve \*  
\* install and operate tool CT1 P289 45 002. \*  
\* Wait 2 seconds then remove tool. \*  
\* On RELAY JACK unit, BLUE JAM caption light is illu-\*  
\* minated. \*  
\*\*\*\*\*

OK	NOT OK--	BLUE JAM caption light is not illuminated. Ref chart 161
----	----------	---

\*\*\*\*\*  
\* On RELAY JACK unit, place switch in GREEN ONLY \*  
\* position then in NORM position. \*  
\* - BLUE JAM caption light goes off. \*  
\*\*\*\*\*

OK	NOT OK--	BLUE JAM caption light does not go off. Ref chart 162
----	----------	--

\*\*\*\*\*  
\* Close floor panel 213 DF. Open access door 121FB. \*  
\* - On spring box of RJ C 6 (pitch) green spool valve\*  
\* install and operate tool CT1 P289 45 002. \*  
\* Wait 2 seconds then remove tool. \*  
\* - On RELAY JACK unit, GREEN JAM caption light is \*  
\* illuminated. \*  
\*\*\*\*\*

OK	NOT OK--	GREEN JAM caption light is not illuminated. Ref chart 163
----	----------	--

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

\*\*\*\*\*  
\* On RELAY JACK unit, place switch in BLUE ONLY \*  
\* position then in NORMAL position. \*  
\* - GREEN JAM caption light goes off. \*  
\*\*\*\*\*

OK	NOT OK--	GREEN JAM caption light does not go off. Ref chart 164
----	----------	---

\*\*\*\*\*  
\* On spring box of RJ C 10 (yaw) green spool valve \*  
\* install and operate tool CT1 P289 45 002. \*  
\* Wait 2 seconds then remove tool. \*  
\* - On RELAY JACK unit, GREEN JAM caption light is \*  
\* illuminated. \*  
\*\*\*\*\*

OK	NOT OK--	GREEN JAM caption light is not illuminated. Ref chart 163
----	----------	--

\*\*\*\*\*  
\* On RELAY JACK unit, place switch in BLUE ONLY \*  
\* position then in NORM position. \*  
\* - GREEN JAM caption light goes off. \*  
\*\*\*\*\*

OK	NOT OK--	GREEN JAM caption light does not go off. Ref chart 164
----	----------	---

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

```
*****
* On spring box of RJ C 8 (roll) green spool valve *
* install and operate tool CT1 P289 45 002. Wait *
* 2 seconds then remove tool. *
* - On RELAY JACK unit, GREEN JAM caption light is *
* illuminated. *
```

\*\*\*\*\*

		GREEN JAM caption light is not illuminated.	
OK	NOT OK--	Ref chart 163	

```
*****
* On RELAY JACK unit, place switch in BLUE ONLY *
* position then in NORM position. *
* - GREEN JAM caption light goes off. *
```

\*\*\*\*\*

		GREEN JAM caption light does not go off.	
OK	NOT OK--	Ref chart 164	

```
*****
* On instrument panel glareshield, on AFCS control *
* unit engage and hold AP1 switch. *
* On spring box of RJ C10 (zone 121) green spool val-*
* ve install and operate tool CT1 P289 45 002. Wait *
* 2 seconds and remove tool. Release AP1 switch *
* - On RELAY JACK unit, GREEN JAM caption light is *
* illuminated. *
```

\*\*\*\*\*

OK	NOT OK		

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

|| |  
OK NOT OK--| Replace AFCS control unit C 1 [25] |  
||

\*\*\*\*\*  
\* On RELAY JACK unit, place switch in BLUE ONLY \*  
\* position then in NORMAL position : GREEN JAM \*  
\* caption light goes off. \*  
\* On AFCS control unit (instrument panel glareshield)\*  
\* engage and hold both AP1 and AP2 switches. \*  
\* On spring box of RJ C 10 (zone 121) (yaw) green \*  
\* spool valve install and operate tool CT1 P289 \*  
\* 45 002. Wait 2 seconds then remove tool. \*  
\* Release both AP1 and AP2 switches. \*  
\* - On RELAY JACK unit, GREEN JAM caption light is \*  
\* illuminated. \*  
\*\*\*\*\*

|| |  
OK NOT OK--| Replace AFCS control unit C 1 [25] |  
||

\*\*\*\*\*  
\* On RELAY JACK unit, place switch in BLUE ONLY \*  
\* position then in NORM position ; GREEN JAM caption \*  
\* light goes off. \*  
\* On AFCS control unit, engage and hold AP2 switch. \*  
\* On spring box of RJ C 10 (yaw) (zone 121) green \*  
\* spool valve, install and operate tool CT1 P289 45 \*  
\* 002. Wait 2 seconds then remove tool. Release \*  
\* AP2 switch. \*  
\* - On RELAY JACK unit, BLUE JAM caption light is \*  
\* illuminated. \*  
\*\*\*\*\*

|| |  
OK NOT OK--| Replace AFCS control unit C 1 [25] |  
||

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* On RELAY JACK unit, place switch in GREEN ONLY \*  
\* position then in NORM position ; BLUE JAM caption \*  
\* light goes off. \*  
\* On AFCS control unit, engage and hold AP1 switch. \*  
\* From flight compartment and through floor panel \*  
\* 213DF install and operate tool CT1 P289 45 002 \*  
\* on spring box of RJ C 10 (yaw) blue spool valve. \*  
\* Wait 2 seconds then remove tool. \*  
\* Release AP1 switch. \*  
\* - On RELAY JACK unit, GREEN JAM caption light is \*  
\* illuminated. \*  
\*\*\*\*\*

OK	NOT OK--	Replace AFCS control unit C 1 [25]
----	----------	------------------------------------

\*\*\*\*\*  
\* On RELAY JACK unit, place switch in BLUE ONLY \*  
\* position then in NORM position : GREEN JAM caption \*  
\* light goes off. \*  
\* On AFCS control unit, engage and hold both AP1 and \*  
\* AP2 switches. \*  
\* On spring box of RJ C 10 (yaw) blue spool valve \*  
\* install and operate tool CT1 P289 45 002. Wait \*  
\* 2 seconds then remove tool. Release AP1 and AP2 \*  
\* switches. \*  
\* - On RELAY JACK unit, GREEN JAM caption light is \*  
\* illuminated. \*  
\*\*\*\*\*

OK	NOT OK--	Replace AFCS control unit C 1 [25]
----	----------	------------------------------------

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* On RELAY JACK unit, place switch in BLUE ONLY \*  
\* position then in NORM position : GREEN JAM caption \*  
\* light goes off. \*  
\* On AFCS control unit, engage and hold AP2 switch. \*  
\* On spring box of RJ C 10 (yaw) Blue spool valve \*  
\* install and operate tool CT1 P289 45 002. Wait \*  
\* 2 seconds and remove tool. Release AP2 switch. \*  
\* On RELAY JACK unit, BLUE JAM caption light is illu-\*  
\* minated. \*  
\*\*\*\*\*

||  
OK  
||

NOT OK--| Replace AFCS control unit C 1 [25] |

\*\*\*\*\*  
\* On RELAY JACK unit, place switch in GREEN ONLY \*  
\* position then in NORM position : BLUE JAM caption \*  
\* light and warning light on end of switch go off. \*  
\* Connect Flight Controls electrical circuits test \*  
\* set 31-56-100 (Ref 27-37-00, A/T) and carry out \*  
\* Test No. 1 to Test No. 6 of test series No. 3. \*  
\* These 6 tests are conclusive. \*  
\*\*\*\*\*

NOT OK--| One (or several) test(s) is(are) not conclusive |  
Ref 27-10-10, T/S |

End of trouble shooting of faults of Relay Jack spool valve  
jamming detection system.

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\*\*\*\*\*  
 \* BLUE JAM (GREEN JAM) CAPTION LIGHT \* | GROUND EQUIPMENT REQUIRED |  
 \* ILLUMINATES. \* |

DESCRIPTION	PART NO.
MULTIMETER	
FLIGHT CONTROLS -	
ELECTRICAL CIRCUITS -	
TEST SET	31-56-100

\*\*\*\*\*  
 \* On panel 1-213, trip circuit breaker RELAY JACK \*  
 \* HYD SEL IND & SUP (Map Ref. N 17) ; BLUE JAM (GREEN \*  
 \* JAM) caption light goes off. \*  
 \* - Move control column, control wheel or rudder \*  
 \* pedals \*  
 \* - Elevons (or rudders) deflect accordingly \*  
 \*\*\*\*\*

YES	NO-----	Replace RJ C 6 (pitch) [26] or C8 (roll) [27] or C10 (yaw) [28]
-----	---------	---

\*\*\*\*\*  
 \* On panel 1-213, set circuit breaker RELAY JACK HYD \*  
 \* SEL IND & SUP (Map Ref. N 17) \*  
 \* - When setting circuit breaker, BLUE JAM (GREEN \*  
 \* JAM) caption light illuminates. \*  
 \*\*\*\*\*

NO	YES--	On panel 1-213, trip circuit breaker RELAY JACK HYD SEL IND & SUP (Map Ref. N 17) ; caption light goes off. Open floor panel 213DF to gain access to pitch and yaw RJs, or floor panel 213 EF to gain access to roll RJ. On pitch, or roll, or yaw RJ check circuit continuity between terminals R and K of each of the 2 connectors.
----	-------	---

Discontinuity

Continuity

Chart 160 (Sheet 1 of 2)

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Discontinuity	Continuity	Replace RJ C 6 (Pitch)[26] or C 8 (roll) [27] or C 10 (Yaw) [28]
		-----
		Replace unit C 298 [2]
*****		
* Connect Flight Controls Electrical circuits * * test set 31-56-100 (Ref 27-37-00, A/T) and * * carry out from test No.1 to test No.6 inclu- * * sive of test series No.3 * * These 6 tests are conclusive. * *****		
NO-----	YES	One, at least, of these tests is not conclusive (Ref: 27-10-00, T/S)
*****		
* On panel 1-213, trip circuit breaker RELAY JACK * * HYD SEL IND & SUP (Map Ref. N 17) * * Open floor panel 213 DF to gain access to pitch * * and yaw RJs, or floor panel 213 EF to gain * * access to roll RJ. * * On RJ C 6 (pitch) or C 8 (roll) or C 10 (yaw) * * disconnect connector C6A if BLUE JAM caption * * light is illuminated or connector CGB if GREEN * * JAM caption light is illuminated. * * Connect multimeter (switched to ohms range) * * between terminals R and K of RJ connector. * * Slowly move control column or control wheel * * or deflect rudder pedals. Keep multimeter dial * * in view. * * Multimeter indicates zero ohm for a moment * * during operation of Flight Control. * *****		
YES-----		Replace RJ C 6 (pitch)[26] or C 8 (roll)[27] or c 10 (yaw)[28].

Chart 160 (Sheet 2 of 2)

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## MAINTENANCE MANUAL

```

*****-----
* BLUE JAM CAPTION LIGHT IS NOT *| GROUND EQUIPMENT REQUIRED |
* ILLUMINATED. *|-----
* *| DESCRIPTION PART NO. |
*****-----
*| MULTIMETER |
*****-----

```

```

*****
* On spring box of RJ C6 (pitch) or C8 (roll) or C10 *
* (yaw) blue spool valve install and operate tool *
* CT1 P289 45 002. Maintain pressure on tool. *
* - On panel 1-213, trip circuit breaker RELAY JACK *
* HYD SEL IND & SUP (Map Ref. N 17) *
* Disconnect connector C6A or C8A or C10A. *
* With multimeter (switched to ohms range) check *
* circuit continuity between terminals R and K of *
* connector on RJ. *
*****

```

```

*****
| | |-----
Continuity | Discontinuity--| Replace RJ C6 (pitch) [26] |
| | | or C8 (roll) [27] or C10 |
| | | (yaw) [28]. |
| | |-----

```

```

*****
* Connect connector C6A or C8A or C10A on RJ. *
* On shelf 10-216, remove unit C 298 [2] *
* On panel 1-213, set circuit breaker RELAY JACK HYD *
* SEL IND & SUP (Map Ref. N 17) *
* With multimeter (switched to 28VDC voltmeter) check *
* for 28VDC between ground and terminal 6 *
* of connector C298A. *
* There is 28VDC between ground and terminal 6 *
*****

```

```

*****
| | |-----
NO | YES-----| Replace unit C 298 [2] |
| | |-----
| | |-----
| | | Replace AFCS control unit |
| | | C1 [25] |
| | |-----

```

Chart 161

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* BLUE JAM CAPTION LIGHT DOES \* | GROUND EQUIPMENT REQUIRED |  
\* NOT GO OFF. \*  
\* \* | DESCRIPTION PART NO. |  
\*\*\*\*\*  
| VOLTMETER 0-30VDC |  
\*\*\*\*\*

\*\*\*\*\*  
\* On panel 1-213 trip circuit breaker RELAY JACK HYD \*  
\* SEL IND & SUP (Map Ref. N 17) \*  
\* On shelf 10-216, remove unit C 298 [2] \*  
\* Set circuit breaker tripped above. \*  
\* Connect voltmeter between ground and terminal 36 \*  
\* of aircraft connector C 298A \*  
\* Voltmeter indicates : \*  
\*\*\*\*\*

0 Volt	28 Volts----	Replace unit C 303 [4]
-----		Replace unit C 298 [2]

Chart 162

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

```

*****-----
* GREEN JAM CAPTION LIGHT IS NOT *| GROUND EQUIPMENT REQUIRED |
* ILLUMINATED *-----
* *| DESCRIPTION PART NO. |
*****-----
*| MULTIMETER |
*****-----

```

```

*****
* On spring box of RJ C 6 (pitch) or C 8 (roll) or *
* C 10 (yaw) Green spool valve, install and operate *
* tool CT1 P289 45 002. Maintain pressure on tool. *
* On panel 1-213 trip circuit breaker RELAY JACK HYD *
* SEL IND & SUP (Map Ref. N 17) *
* Disconnect connector C6B or C8B or C10B. *
* With multimeter (switched to ohm range) check *
* circuit continuity between terminals R and K of *
* connector on RJ. *
*****

```

Continuity	Discontinuity--	Replace RJ C 6 (pitch) [26] or C 8 (roll) [27] or C 10 (yaw) [28]
------------	-----------------	---

```

*****
* Connect connector C 6B or C 8B or C 10B on RJ. *
* On shelf 10-216, remove unit C 298 [2] *
* On panel 1-213, set circuit breaker RELAY JACK HYD *
* SEL IND & SUP (Map Ref. N 17) *
* With multimeter (switched to voltmeter) check for *
* 28VDC between ground and terminal 1 *
* of connector C 298A. *
* There is 28VDC between ground and terminal 1 *
*****

```

NO	YES-----	Replace unit C 298 [2]
		Replace AFCS control unit C 1 [25]

Chart 163

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```

*****-----
* GREEN JAM CAPTION LIGHT DOES *| GROUND EQUIPMENT REQUIRED |
* NOT GO OFF. *|
* *| DESCRIPTION PART NO. |
*****-----
*| VOLTmeter 0-30VDC |
*****-----

```

```

*****
* On panel 1-213, trip circuit breaker RELAY JACK *
* HYD SEL IND & SUP (Map Ref. N 17) *
* On shelf 10-216, remove unit C 298 [2] *
* Set circuit breaker tripped above. *
* Connect voltmeter between ground and terminal 36 *
* of aircraft connector C 298A. *
* Voltmeter indicates : *
*****

```

```

| 0 Volt | 28 Volts----| Replace switch C 303 [4] |
|-----|-----|
|-----| Replace unit C 298 [2] |
|-----|-----|

```

Chart 164

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[1] Circuit breaker 28VDC	216AS	1-213	C281	Map Ref. N 17	24-50-00 R/I	27-34-02
[2] RJ hydraulic supply selector unit		10-216	C298	Electronics rack RH	27-34-72 R/I	27-34-02
[3] BLUE JAM caption light		4-211	C305	Overhead panel	27-34-74 R/I	27-34-02
GREEN JAM caption light		4-211	C306			
[4] Relay jack switch (Relay Jack Unit)		4-211	C303	Overhead panel	27-34-73 R/I	27-34-02
[5] Diode		4-211	C308	Overhead panel		91-13-54
Diode		4-211	C307	Overhead panel		
[6] Circuit breaker 28VDC		1-213	C287	Map Ref. N 18	24-50-00 R/I	27-34-01
[7] PFCU hydraulic supply selector unit (Servo controls unit)		4-211	C291	Overhead panel	27-34-71 R/I	27-34-01
[8] Pressure switch-Blue	151DB	152	C292	Equip. Bay F66/F72	27-34-58 R/I	27-34-01
[9] Pressure switch-Green	151DB	151	C290	Equip. Bay F66/F72	27-34-58 R/I	27-34-01
[10] Circuit breaker 28VDC		3-213	C284	Map Ref. A 10	24-50-00 R/I	27-34-01
[11] Circuit breaker 28VDC		3-213	C283	Map Ref. A 9	24-50-00 R/I	27-34-01
[12] Circuit breaker 28VDC		1-213	C286	Map Ref. P 17	24-50-00 R/I	27-34-01

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ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[13] Circuit breaker 28VDC		1-213	C285	Map Ref. P 16	24-50-00 R/I	27-34-01
[14] Valve-PFCU normal selector	151DB	152	C294	Equip. Bay F66/F72	27-34-54 R/I	27-34-01
[15] Valve-PFCU normal selector	151DB	152	C296	Equip. Bay F66/F72	27-34-54 R/I	27-34-01
[16] Pressure switch-Y/B	151DB	152	C293	Equip. Bay F66/F72	27-34-58 R/I	27-34-01
[17] Pressure switch-Y/G	151DB	151	C289	Equip. Bay F66/F72	27-34-58 R/I	27-34-01
[18] Valve-PFCU normal selector	151DB	152	C295	Equip. Bay F66/F72	27-34-51 R/I	27-34-01
[19] Valve-PFCU normal selector	151DB	151	C297	Equip. Bay F66/F72	27-34-51 R/I	27-34-01
[20] Valve-Relay jack selector	121FB	2-121	C299 C300 C301 C302	Equip. Bay F1/F8	27-34-15 R/I	27-34-02
[21] Power flight control unit	553JB	553	C101	Under LH wing	27-34-52 R/I	27-34-01
	653JB	653	C102	Under RH wing		
	552JB	552	C103	Under LH wing		
	652JB	652	C104	Under RH wing		
[22] Power flight control unit	551JB	551	C105	Under LH wing	27-34-53 R/I	27-34-01
	651JB	651	C106	Under RH wing		
[23] Power Flight control unit	352CR	352	C 78	Vertical	27-24-31 R/I	27-34-01
	351CL	351	C 79	stabilizer		

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ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[24] Static Monitoring Change over unit	216AS	8-216	C 56	Electronics rack RH	27-37-12 R/I	27-34-01
[25] AFCS control unit		5-211	C 1	Instrument Panel Glare-shield	22-11-11 R/I	27-34-02
[26] Relay jack	121FB	121	C 6	Equip. Bay F1/F8	27-34-14 R/I	27-34-02
[27] Relay jack	121FB	121	C 8	Equip. Bay F1/F8	27-14-12 R/I	27-34-02
[28] Relay jack	121FB	121	C 10	Equip. Bay F1/F8	27-34-12	27-34-02

Component Identification  
Table 101

#### 4. Close-Up

- A. Carry out close up operations described in 27-14-00, Adjustment/Test.
- B. Check that fairings, access doors and panels which have been removed or opened are installed and correctly attached.

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### HYDRAULIC SYSTEM - ADJUSTMENT/TEST

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN 24-00-00, SERVICING.

#### 1. General

The purpose of the following procedure is to check the selection system of the relay jack and PFCU various hydraulic supplies and the associated indicating system.

#### 2. Operational Test

##### A. Equipment and Materials

##### B. Prepare

(1) Take the precautions described in the previous WARNING paragraph.

(2) Carry out operations to place droop nose in up position.

(3) On overhead panel :

(a) On Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in OFF-INV position, and O & M ELEVONS, IN ELEVONS and RUDDER selector

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switches in MECH position.

- (b) On SERVO CONTROLS unit, place both selector switches in NORMAL position.
- (c) On RELAY JACK unit, place BLUE ONLY - NORM - GREEN ONLY switch in NORM position.
- (4) Make certain that trim controls are set to zero.
- (5) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFCs INV GRN FAIL IND	1-213	1C 73	M15
AUDIO WARN SYS SUP1		W 371	M21
PFCs ALL SURFACES MON.GRN. SUP		1C 54	N13
RELAY JACK HYD SEL IND & SUP		C 281	N17
P.F.C. IND		C 287	N18
M.W.S. SUP1		W 252	N21
YEL/GRN GRN FAIL		C 285	P16
YEL/BLUE BLUE FAIL		C 286	P17
YELL L.L.		C 288	P18
FLT CONT POSN IND CONT		C 83	R11
FLT CONT POSN IND 26 V 400 Hz SUP	2-213	C 84	B 4
YELL/GRN GRN FAIL		C 283	A 9
YELL/BLUE BLUE FAIL		C 284	A10
AUDIO WARN SYS SUP2	5-213	W 372	C17
M.W.S. SUP2		W 251	D15
PFCs ALL SURFACES MON.BLUE SUP		2C 54	E12
PFCs INV BLUE FAIL IND		2C 73	E11

- (6) Set the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT & NAV BUS 14XS	2-213	X 355	H 2

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- (7) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).
- Gong must sound
  - On SERVO CONTROLS unit, on overhead panel, BLUE L.PRESS and GREEN L.PRESS caption lights must illuminate
  - On IC0VOL indicator (Flight Control Surface Position Indicator), located on First Officer's instrument panel, the 8 magnetic indicators must display M
  - On master warning panel (overhead panel) PFC and HYD warning lights must illuminate (do not take illumination of other warning lights on this panel into account).
  - On Flight Control Unit, MECH JAM warning light must illuminate.
- (8) On panel 3-213, trip, safety and tag circuit breaker YELL.L.LEVEL (Map.Ref.A8).

### C. Test

Note 1: Disregard aural and visual warnings which are not mentioned.

Note 2 : Each time a paragraph reads :  
..."Master warning must be activated"...  
the following must be understood :

- Gong sounds and PFC warning light illuminates on master warning panel
- Press and release PFC warning light to cancel master warning.

#### (1) At overhead panel :

- (a) On master warning panel, press and release PFC warning light
  - PFC warning light must go off.
- (b) On SERVO CONTROLS unit ; press and release T push-button close to BLUE JAM caption light.
  - Master warning must be activated.
  - BLUE JAM caption light must illuminate then go off.
- (c) On SERVO CONTROLS unit, press and release T push-button close to GREEN JAM caption light
  - Master warning must be activated.
  - GREEN JAM caption light must illuminate

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then go off.

- (d) On RELAY JACK unit press and release TEST-BLUE push-button
- Master warning must be activated
  - BLUE JAM caption light must illuminate then go off.
- (e) On RELAY JACK unit, press and release TEST-GREEN push-button
- Master warning must be activated
  - GREEN JAM caption light must illuminate then go off.
- (f) On SERVO CONTROLS unit, place lower selector switch in BLUE L.PRESS position (no hydraulic system pressurized)
- Master warning must be activated
  - On SERVO CONTROLS unit, Green indicator lights under YELLOW BLUE and GREEN ONLY must illuminate.
- (g) On SERVO CONTROLS unit place lower selector switch in GREEN L.PRESS position (no hydraulic system pressurized)
- Master warning must be activated
  - On SERVO CONTROLS unit, Green indicator lights under YELLOW GREEN and BLUE ONLY must illuminate ; indicator lights under YELLOW BLUE and GREEN ONLY must go off.
- (h) On SERVO CONTROLS unit, place lower selector switch in NORMAL position.
- All green indicator lights must be off.
- (2) Pressurize yellow hydraulic system (Ref. 29-11-00, Servicing)
- Elevons must not deflect.
- (3) On SERVO CONTROLS unit, place lower selector switch in BLUE L.PRESS position
- Elevons must deflect up to neutral position.
  - On SERVO CONTROLS unit
    - . BLUE L.PRESS caption light must go off.

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- . The two green indicator lights under
  - . YELLOW BLUE and the two green indicator lights under GREEN ONLY must illuminate.
- (4) Move flight control (control handwheel control column or rudder pedals)
- Corresponding control surfaces (elevons or rudders) must deflect accordingly (check on IC0VOL)
- (5) On RELAY JACK unit, overhead panel, place switch in GREEN ONLY position.
- No result is observed after this action.
- (6) Try to move flight control
- A strong resistance must be felt (do not try to overcome this resistance)
  - Corresponding control surfaces must not deflect.
- (7) On SERVO CONTROLS unit, press YELLOW LEVEL T push-button and maintain pressed
- Master warning must be activated.
  - On SERVO CONTROLS unit :
    - . BLUE L.PRESS caption light must illuminate
    - . indicator lights under YELLOW GREEN must illuminate
    - . indicator lights under YELLOW BLUE must go off.
- (8) Move flight control
- Corresponding control surfaces must deflect accordingly.
- (9) On SERVO CONTROLS unit, place lower selector switch in GREEN L.PRESS position and maintain YELLOW LEVEL T push-button pressed :
- GREEN L.PRESS caption light must go off.
  - GREEN ONLY indicator lights must go off.
  - BLUE ONLY indicator lights must illuminate.
- (10) Move flight control
- Corresponding control surfaces must deflect accordingly.
- (11) On SERVO CONTROLS unit, release YELLOW LEVEL T push-

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button then place lower selector switch in BLUE L.PRESS position

- Master warning must be activated
- On SERVO CONTROLS unit :
  - . BLUE L.PRESS caption light must go off
  - . GREEN L.PRESS caption light must illuminate
  - . YELLOW BLUE and GREEN ONLY indicator lights must illuminate
  - . YELLOW GREEN and BLUE ONLY indicator lights must go off.

(12) Try to move flight control

- A strong resistance must be felt (do not try to overcome this resistance).
- Corresponding control surfaces must not deflect.

(13) On RELAY JACK unit, place switch in NORM position

(14) On SERVO CONTROLS unit, place upper selector switch in GREEN JAM position, then lower selector switch in NORMAL position

- Master warning is activated
- On SERVO CONTROLS unit :
  - . BLUE L.PRESS caption light must illuminate
  - . YELLOW BLUE and BLUE ONLY indicator lights must illuminate
  - . YELLOW GREEN indicator lights must remain off.

(15) Move flight control

- Corresponding control surfaces must deflect accordingly.

(16) On SERVO CONTROLS unit, place upper selector switch in NORM position

- Master warning must be activated
- YELLOW BLUE and BLUE ONLY indicator lights must go off.
- Elevon must deflect downwards.

(17) On SERVO CONTROLS unit, place lower selector switch in GREEN L.PRESS position

- GREEN L.PRESS caption light must go off
- YELLOW GREEN and BLUE only indicator lights

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must illuminate

- Elevons must deflect to neutral position

(18) Move flight control

- Corresponding control surfaces must deflect accordingly.

(19) On RELAY JACK unit, place switch in BLUE ONLY position

- No result is observed after this action.

(20) Try to move flight control

- A strong resistance must be felt (do not try to overcome this resistance)
- Corresponding control surfaces must not deflect

(21) On SERVO CONTROLS unit, press YELLOW LEVEL T push-button and maintain pressed

- Master warning must be activated
- On SERVO CONTROLS unit :
  - . GREEN L.PRESS caption light must illuminate
  - . YELLOW BLUE indicator lights must illuminate
  - . YELLOW GREEN indicator lights must go off.

(22) Move flight control (YELLOW LEVEL T push-button pressed)

- Corresponding control surfaces must deflect accordingly

(23) On SERVO CONTROLS unit, place lower selector switch in BLUE L.PRESS position (YELLOW LEVEL T push-button pressed)

- BLUE L.PRESS caption light must go off
- GREEN ONLY indicator lights must illuminate
- BLUE ONLY indicator lights must go off

(24) Move flight control

- Corresponding control surfaces must deflect accordingly

(25) On SERVO CONTROLS unit release YELLOW LEVEL T push-button, then place lower selector switch in GREEN L. PRESS position

- Master warning must be activated

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- On SERVO CONTROLS unit
  - . BLUE L.PRESS caption light must illuminate
  - . GREEN L.PRESS caption light must go off
  - . BLUE ONLY and YELLOW GREEN indicator lights must illuminate
  - . YELLOW BLUE and GREEN ONLY indicator lights must go off.
  
- (26) Try to move flight control
  - A strong resistance must be felt (do not try to overcome this resistance)
  - Corresponding control surfaces must not deflect.
  
- (27) On RELAY JACK unit, place switch in NORMAL position.
  - No result is observed after this action
  
- (28) On SERVO CONTROLS unit, place upper selector switch in BLUE JAM position
  - YELLOW GREEN and GREEN ONLY indicator lights must illuminate
  
- (29) On SERVO CONTROLS unit, place lower selector switch in NORMAL position
  - Master warning must be activated
  - On SERVO CONTROLS unit :
    - . GREEN L.PRESS caption light must illuminate
    - . YELLOW GREEN and BLUE ONLY indicator lights must go off.
  
- (30) Move flight control
  - Corresponding control surfaces must deflect accordingly
  
- (31) On SERVO CONTROLS unit, place upper selector switch in NORMAL position and lower selector switch in GREEN L/ PRESS position, then shut down pressurization of yellow hydraulic system (Ref. 29-21-00, Servicing).
  - Master warning must be activated
  - On SERVO CONTROLS unit :
    - . BLUE ONLY indicator light must illuminate
    - . GREEN ONLY indicator lights must go off
    - . elevons must deflect downwards.
  
- (32) Pressurize Blue and Green hydraulic systems (Ref. (Ref. 29-12-00 and 29-11-00, Servicing)

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- On SERVO CONTROLS unit, BLUE L. PRESS caption light must go off
- Elevons must deflect up to neutral position

(33) Move flight control

- Corresponding control surfaces must deflect accordingly.

(34) On SERVO CONTROLS unit place lower selector switch in BLUE L.PRESS

- Master warning must be activated
- On SERVO CONTROLS unit :
  - . GREEN L.PRESS caption light must go off
  - . BLUE L.PRESS caption light must illuminate
  - . YELLOW BLUE and GREEN ONLY indicator lights must illuminate
  - . YELLOW GREEN and BLUE ONLY indicator lights must go off

(35) Move flight control

- Corresponding control surfaces must deflect accordingly.

(36) On SERVO CONTROLS unit place lower selector switch in NORMAL position

### D. Close-Up

- (1) Shut down pressurization of hydraulic systems.
- (2) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).
- (3) On overhead panel, on Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position.
- (4) On panel 2-213, trip, safety and tag the following circuit breaker :  
FLT CONT & NAV BUS 14XS (X355, Map Ref. H2)
- (5) On panel 1-213, set circuit breaker YELL L.L (Map. Ref. P18)

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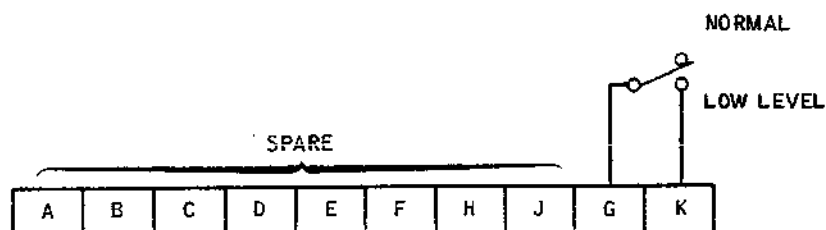
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### 3. Functional Test

#### A. Equipment and Materials

A test connector made up as per the following diagram, will be connected to plug D 48 A (on yellow tank)  
(Ref. Fig. 501 )



CMA 27 14 00 5 AAM0

- Test Connector

Figure 501

#### B. Prepare

- (1) Take the precautions described in the previous warning paragraph
- (2) Open door 153BB to gain access to yellow tank.
- (3) Prior to energizing the A/C electrical network, disconnect connector D 48 A from yellow tank then connect test connector on connector D 48 A, with switch in NORMAL position
- (4) Make certain that nose wheel steering safety key is

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removed from its location

- (5) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing)
- (6) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
NOSE V/C WEIGHT SW A SYS SUP	1-213	G 291	M16
RH V/C WEIGHT SW A SYS SUP		G 295	M18
LH V/C WEIGHT SW B SYS SUP	3-213	G 293	B 8
NOSE V/C WEIGHT SW B SYS SUP		G 296	D 8
NOSE WHEEL STEERING CONT	13-215	G 91	D 8
NOSE WHEEL STEERING IND	15-215	G 92	B 6
NOSE WHEEL STEERING SUP	15-216	G 93	A18

- (7) At overhead panel, on Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in OFF INV position

### C. Test

- (1) At overhead panel, on SERVO CONTROLS unit, place lower selector switch in GREEN L.PRESS position
  - On this unit, indicator lights under YELLOW GREEN and BLUE ONLY must illuminate (GREEN L. PRESS caption lights are illuminated)
- (2) Pressurize yellow hydraulic system (Ref. 29-21-00, Servicing.)
  - On SERVO CONTROLS unit, GREEN L.PRESS caption light must go off
  - Elevons must deflect up to neutral position (check on ICOVOL indicator)
- (3) In zone 153, on test connector, place switch in LOW LEVEL position
  - Gong must sound
  - PFC warning light must illuminate (press and release warning light ; it must go off)

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- On SERVO CONTROLS unit :
    - . GREEN L.PRESS caption light must illuminate
    - . Green indicator lights under YELLOW BLUE must illuminate and indicator lights under YELLOW GREEN must go off
  - On First Officer's instrument panel, NOSE WHEEL caption light must illuminate
  - STEERING warning lights (located on both sides of glareshield) must illuminate.
- (4) On SERVO CONTROLS unit, place lower selector switch in BLUE L.PRESS position
- On SERVO CONTROLS unit,
    - . BLUE L.PRESS caption light must go off
    - . GREEN ONLY indicator lights must illuminate and BLUE ONLY indicator lights must go off
- (5) In zone 153, on test connector, place switch in NORMAL position
- On SERVO CONTROLS unit
    - . YELLOW GREEN indicator lights must illuminate
- (6) On First Officer's instrument panel, on Nose Wheel steering test indicator, press and release RESET push-button
- On this unit NOSE WHEEL caption light must go off
  - STEERING warning lights must go off
- (7) In zone 153, on test connector, place switch in LOW LEVEL position
- On SERVO CONTROLS unit, YELLOW GREEN indicator lights must go off
  - NOSE WHEEL caption light and the two STEERING warning lights must illuminate
- (8) On test connector, place switch in NORMAL position
- On SERVO CONTROLS unit, YELLOW GREEN indicator lights must illuminate
- (9) Repeat step (6) above
- Results must be identical
- (10) On SERVO CONTROLS unit, place lower selector switch in NORMAL position
- Gong must sound
  - On master warning panel PFC warning light must illuminate (press and release warning light ;

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- it must go off)
  - On SERVO CONTROLS unit
    - . BLUE L.PRESS caption light must illuminate
    - . GREEN ONLY indicator lights must go off.
- (11) On panel 1-213, trip, safety and tag YELL L.LEVEL circuit breaker (Map. Ref P18)
- (12) On panel 3-213, trip, safety and tag YELL L.LEVEL circuit breaker (Map. Ref A 8)
  - YELLOW GREEN and YELLOW BLUE indicator lights must go off
- (13) Set circuit breakers tripped in steps (11) and (12)
  - Elevons must deflect downwards
- (14) On SERVO CONTROLS unit, place lower selector switch in BLUE L.PRESS position
  - BLUE L.PRESS caption light must go off
  - GREEN ONLY and YELLOW BLUE indicator lights must illuminate
- (15) In zone 153, on test connector, place switch in LOW LEVEL position
  - Gong must sound
  - PFC warning light must illuminate (press and release warning light ; it must go off)
  - On SERVO CONTROLS unit
    - . BLUE LOW PRESS caption light must illuminate
    - . YELLOW GREEN indicator lights must illuminate
    - . YELLOW BLUE indicator lights must go off.
    - . NOSE WHEEL caption light and the two STEERING warning lights must illuminate.
- (16) On SERVO CONTROLS unit, place lower selector switch in GREEN L.PRESS position
  - GREEN L.PRESS caption light must go off
  - BLUE ONLY indicator lights must illuminate
  - GREEN ONLY indicator lights must go off.
- (17) On test connector, place switch in NORMAL position
  - YELLOW BLUE indicator lights must illuminate
- (18) On First Officer's instrument panel, on Nose Wheel steering test indicator, press and release RESET push-button
  - On this unit, NOSE WHEEL caption light must go

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- off
  - the two STEERING warning lights must go off
- (19) On test connector, place switch in LOW LEVEL position
- On SERVO CONTROLS unit, YELLOW/BLUE indicator lights must go off
  - NOSE WHEEL caption light and the two STEERING warning lights must illuminate
- (20) Disconnect test connector from connector D48 A
- On SERVO CONTROLS unit YELLOW BLUE indicator lights must illuminate
- (21) Repeat operation (18) above
- Results must be identical
- (22) On panels 1-213 and 3-213, trip circuit breakers YELL-L.LEVEL  
(Map. Ref. P18 and A 8 respectively)
- (23) Set circuit breakers mentioned above :
- Indicator lights and caption lights on SERVO CONTROLS unit must be as follows ;
    - . GREEN L.PRESS caption light ; illuminated
    - . BLUE L.PRESS caption light ; off
    - . YELLOW BLUE and GREEN ONLY indicator lights ; illuminated
    - . YELLOW GREEN and BLUE ONLY ; off.

### D. Close Up

- (1) Shut down pressurization of yellow hydraulic system  
(Ref. 29-21-00, Servicing)
- (2) On SERVO CONTROLS unit, place lower selector switch in NORMAL position
- (3) De-energize the aircraft electrical network and disconnect electrical ground power unit.
- (4) In zone 153, connect connector D48 A on yellow hydraulic tank
- (5) Carry out tests described in 29-32-00, Adjustment/Test
- (6) Close access door 153BB

After SB 27-041

For A/C 001-007,

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### 4. System test

#### A. General

This test is intended to detect a possible hydraulic fluid transfer from one system to another in the event of cracks in one of the PFCU's or RJ's.

RB It can also detect a transfer of hydraulic fluid  
RB across P.F.C.U or R.J. shuttle valves.

#### B. Equipment and Materials

DESCRIPTION	PART NO.
- Blanking Plugs/Caps (for hydraulic Line) Connected to PFCU's and RJ's	
- Blanking Plugs/Caps for Pressure and Return lines Unions on PFCU's and RJ's	
- Hose for Recovery of Hydraulic Fluid	
- Container for Recovery of Hydraulic Fluid	

#### C. Test For Detection of Hydraulic Fluid Transfer from Blue System to Green or Yellow System

##### (1) Prepare

- (a) Take the precautions described in the previous Warning paragraph.
- (b) Set Flight Controls in Blue electrical mode (Ref. 27-00-00, Servicing). Do not pressurize Green hydraulic system.
- (c) At Flight Engineer's station, on AIR INTAKE panel, place RAMP/SPILL MASTER switches No 3 and 4 in MAN position and hydraulic selectors switches No 3 and 4 in Yellow position.

##### (2) Test

- (a) Maintain Blue hydraulic system pressurized for 10 minutes approximately and operate the three flight controls (control column, control handwheel and rudder pedals) to stabilize

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hydraulic fluid temperature throughout system.

- (b) Record hydraulic fluid level in Blue hydraulic tank.
  - (c) Depressurize Green and Yellow hydraulic tank (Ref. 29-13-00, Servicing).
  - (d) Maintain Blue hydraulic system pressurized for approximately 15 minutes.
  - (e) Pressurize Green and Yellow hydraulic tanks (Ref. 29-13-00, Servicing) then record level of Blue hydraulic tank.
  - (f) Compare last record with that carried out above in (b).
    - If level drop of Blue hydraulic tank is less than 0.25 US Gal. (0.21 UK Gal.) hydraulic fluid transfer is permissible.
    - If level drop of Blue hydraulic tank is equal to or greater than 0.25 US Gal. (0.21 UK Gal.) carry out test described in E below.
- (3) Close-Up (If pressure drop is less than 0.25 US Gal. (0.21 UK Gal.))
- (a) Shut down pressurization of Blue hydraulic system (Ref. 29-12-00, Servicing).
  - (b) Carry out "Close-Up" operations of procedure to set Flight Controls in Blue electrical mode. (Ref. 27-00-00, Servicing).

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### D. Test for Detection of Hydraulic Fluid Transfer from Green System to Blue or Yellow System.

#### (1) Prepare

- (a) Take the precautions described in the previous Warning paragraph.
- (b) Set Flight Controls in Green electrical mode (Ref. 27-00-00, Servicing). Do not pressurize Blue hydraulic system.
- (c) At Flight Engineer's station, on AIR INTAKE panel, place RAMP/SPILL MASTER switches No 1 and 2 in MAN position and hydraulic selector switches No 1 and 2 in YELLOW position.

#### (2) Test

- (a) Maintain Green hydraulic system pressurized for 10 minutes approximately and operate the three flight controls (control column, control handwheel and rudder pedals) to stabilize hydraulic fluid temperature throughout system.
- (b) Record hydraulic fluid level in Green hydraulic tank.
- (c) Depressurize Blue and Yellow hydraulic tanks (Ref. 29-13-00, Servicing).
- (d) Maintain Green hydraulic system pressurized for approximately 15 minutes.
- (e) Pressurize Blue and Yellow hydraulic tanks (Ref. 29-13-00, Servicing) then record level of Green hydraulic tank.
- (f) Compare last record with that carried out above in (b).
  - If level drop of Green hydraulic tank is less than 0.25 US Gal. (0.21 UK Gal.) hydraulic fluid transfer is permissible.
  - If level drop is equal to or greater than 0.25 US Gal. (0.21 UK Gal.) carry out test described in E. below.

#### (3) Close-Up

- (a) Shut down pressurization of Green hydraulic

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system (Ref. 29-11-00, Servicing).

- (b) Carry out "Close-Up" operations of procedure to set Flight Controls in Green electrical mode (Ref. 27-00-00, Servicing).

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- E. Test for Detection of Faulty Servo Controls (RJ's or PFCU's) during Transfer From Blue hydraulic System.

(1) Prepare

- (a) Shut down pressurization of Blue hydraulic system (Ref. 29-12-00, Servicing) and depressurize Blue hydraulic tank (Ref. 29-13-00, Servicing).

WARNING : NO HYDRAULIC SYSTEM SHALL BE PRESSURIZED. DISPLAY RELEVANT WARNING NOTICES.

- (b) Open access door 121DB.
- (c) On each of the three RJ's disconnect Blue system pressure and return lines.
- (d) Blank disconnected lines ; blank pressure and return unions remaining on RJ's.
- (e) Pressurize Blue hydraulic system (Ref. 29-12-00, Servicing).
- (f) At Flight Engineer's station, on AIR INTAKE panel, place RAMP/SPILL MASTER switches No 3 and 4 in MAN position and hydraulic selector switches No 3 and 4 in YELLOW position.
- (g) Record hydraulic fluid level in Blue hydraulic tank.
- (h) At overhead panel, on Flight Control Unit, place O & M ELEVONS, IN ELEVONS and RUDDER switches in MECH position then in BLUE position. Press and release push button near each of the three switches mentioned above.

- On ICOVOL (Flight Control Surface Position) (First Officer's instrument panel) the eight magnetic indicators display B.

(2) Test

- (a) Maintain Blue hydraulic system pressurized for 15 minutes approximately. Record hydraulic fluid level in Blue hydraulic tank.

(a1) If level drop is negligible, carry out test G. below.

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- (a2) If level drop in Blue Hydraulic tank is equal to or greater than 0.25 US Gal. (0.21 UK Gal.) carry out test I. below.

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- F. Test for Detection of Faulty Servo Controls (RJ's or PFCU's) during Transfer from Green hydraulic System.

(1) Prepare

- (a) Shut down pressurization of Green hydraulic system (Ref. 29-11-00, Servicing) and depressurize Green hydraulic tank (Ref. 29-13-00, Servicing).

WARNING : NO HYDRAULIC SYSTEM SHALL BE PRESSURIZED. DISPLAY RELEVANT WARNING NOTICES.

- (b) Open access door 121DB.
- (c) On each of the three RJ's disconnect Green system pressure and return lines.
- (d) Blank disconnected lines ; blank pressure and return unions on RJ's.
- (e) Pressurize Green hydraulic system (Ref. 29-12-00, Servicing).
- (f) At Flight Engineer's station, on AIR INTAKE panel, place RAMP/SPILL MASTER switches No 1 and 2 in MAN position and hydraulic selector switches No 1 and 2 in YELLOW position.
- (g) Record hydraulic fluid level in Green hydraulic tank.
- (h) Set Flight Controls in Green electrical mode (Ref. 27-00-00, Servicing). Do not pressurize Blue hydraulic system.

(2) Test

- (a) Maintain Green hydraulic system pressurized for approximately 15 seconds. Record hydraulic fluid level in Green hydraulic tank.
- (a1) If level drop of Green hydraulic tank is negligible, carry out test H. below.
- (a2) If level drop of Green hydraulic tank is equal to or greater than 0.25 US Gal. (0.21 UK Gal.) carry out Test L. below.

- G. Test for Detection of RJ (Roll, Yaw or Pitch) Causing Hydraulic Fluid Transfer from Blue System

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### (1) Prepare

- (a) Shut down pressurization of Blue hydraulic system (Ref. 29-12-00, Servicing) and depressurize Blue hydraulic tank (Ref. 29-13-00, Servicing).

WARNING : NO HYDRAULIC SYSTEM SHALL BE PRESSURIZED. DISPLAY RELEVANT WARNING NOTICES.

- (b) At overhead panel, on Flight Control Unit, place BLUE INVERTER switch in PWR OFF position.

- (c) For each Relay Jack.

- (c1) Remove blanking caps from Blue system return and pressure lines. Remove blanking caps from pressure and return unions on RJ's.
- (c2) Connect hydraulic lines on Relay jacks (Ref. 20-23-12).
- (c3) Disconnect Green system return and pressure lines, Yellow system return line and the two Yellow system pressure lines.
- (c4) Blank disconnected lines.
- (c5) Connect hydraulic fluid recovery hoses to RJ unions. The other end of each hose is placed in a fluid recovery container.
- (c6) Pressurize Blue hydraulic system (Ref. 29-12-00, Servicing).
- (c7) At overhead panel, on Flight Control Unit, place BLUE INVERTER switch in ON position, then the three O & M ELEVONS, IN ELEVONS and RUDDER switches in BLUE position.
- (c8) Press and release each RESET push button located on RH side of each of the three switches mentioned above.

- On ICOVOL indicator (First Officer's instrument panel) the eight magnetic indicators must display B.

### (2) Test

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- (a) Check for hydraulic fluid in one of the three fluid recovery containers.

- Replace relay jack responsible for presence of hydraulic fluid in container (Ref. 27-14-12, Roll ; 27-24-12, Yaw ; 27-34-14, Pitch).

### (3) Close-Up

- (a) Shut down pressurization of Blue hydraulic system (Ref. 29-12-00, Servicing).
- (b) Disconnect fluid recovery hoses and remove fluid recovery containers.
- (c) Connect Green hydraulic system pressure and return lines on RJ's corresponding unions (Ref. 20-23-12).
- (d) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (e) Pressurize Yellow hydraulic system (Ref. 29-21-00, Servicing).
- (f) Operate control column, handwheel and rudder pedals in order to stabilize hydraulic fluid temperature between 30 and 70°C (86 and 158°F).
- (g) Wait for three minutes approximately, then check for hydraulic leakage at line/RJ unions.
- (h) At overhead panel, on SERVO CONTROLS unit place upper selector switch in BLUE L. PRESS position.
- (i) Repeat steps (f) and (g) above.
- (j) At overhead panel, on SERVO CONTROLS unit place UPPER selector switch in GREEN L. PRESS position.
- (k) Repeat steps (f) and (g) above.
- (l) At overhead panel, on SERVO CONTROLS unit, place upper selector switch in NORMAL position.
- (m) If required top up hydraulic tanks (Ref. 12-12-29).
- (n) Shut down pressurization of Yellow hydraulic system.

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- (o) Carry out "Close-Up" operations of procedure to set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (p) Close access door 121DB.

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### H. Test for Detection of RJ (Roll, Yaw or Pitch) Causing Hydraulic Fluid Transfer from Green System.

#### (1) Prepare

- (a) Shut down pressurization of Green hydraulic system (Ref. 29-11-00, Servicing) and depressurize Green hydraulic tank (Ref. 29-13-00, Servicing).

WARNING : NO HYDRAULIC SYSTEM SHALL BE PRESSURIZED. DISPLAY RELEVANT WARNING NOTICES.

- (b) At overhead panel, on Flight Control Unit, place GREEN INVERTER switch in PWR OFF position.
- (c) For each Relay Jack.
  - (c1) Remove blanking caps from Green system return and pressure lines. Remove blanking caps from pressure and return unions on RJ's.
  - (c2) Connect hydraulic lines to Relay jacks (Ref. 20-23-12).
  - (c3) Disconnect Blue system return and pressure lines, Yellow system return line and the two Yellow system pressure lines.
  - (c4) Blank disconnected lines.
  - (c5) Connect hydraulic fluid recovery hoses to RJ unions. The other end of each hose is placed in a fluid recovery container.
  - (c6) Pressurize Green hydraulic system (Ref. 29-11-00, Servicing).
  - (c7) At overhead panel, on Flight Control Unit, place GREEN INVERTER switch in ON position, then the O & M ELEVONS, IN ELEVONS and RUDDER switches in GREEN position.
  - (c8) Press and release each RESET push button located on RH side of each of the three switches mentioned above.

- On IC0VOL indicator (First Officer's instrument panel) the eight magnetic indicators must display G.

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### (2) Test

- (a) Check for hydraulic fluid in one of the three fluid recovery containers.
  - Replace relay jack responsible for presence of hydraulic fluid in container (Ref. 27-14-12, Roll ; 27-24-12, Yaw ; 27-34-14, Pitch).

### (3) Close-Up

- (a) Shut down pressurization of Green hydraulic system (Ref. 29-11-00, Servicing).
- (b) Disconnect fluid recovery hoses and remove fluid recovery containers.
- (c) Connect Blue hydraulic system pressure and return lines to RJ's corresponding unions (Ref. 20-23-12).
- (d) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (e) Pressurize Yellow hydraulic system (Ref. 29-21-00, Servicing).
- (f) Operate control column, handwheel and rudder pedals in order to stabilize hydraulic fluid temperature between 30 and 70°C (86 and 158°F).
- (g) Wait for three minutes approximately, then check for hydraulic leakage at line (RJ unions).
- (h) At overhead panel, on SERVO CONTROLS unit place upper selector switch in BLUE L. PRESS position.
- (i) Repeat steps (f) and (g) above.
- (j) At overhead panel, on SERVO CONTROLS unit place upper selector switch in GREEN L. PRESS position.
- (k) Repeat steps (f) and (g) above.
- (l) At overhead panel, on SERVO CONTROLS unit, place upper selector switch in NORMAL position.
- (m) If required top up hydraulic tanks (Ref. 12-12-29).

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(n) Close access door 121DB.

### I. Test for Detection of PFCU Causing Hydraulic Fluid Transfer from Blue System

NOTE : For ease of access, detection of faulty PFCU shall be carried out on elevon PFCU's first (paragraph J) then, if necessary, on rudder PFCU's (paragraph K).

#### (1) Prepare

(a) Shut down pressurization of Blue hydraulic system (Ref. 29-12-00, Servicing). Depressurize Blue hydraulic tank (Ref. 29-13-00, Servicing).

(b) At overhead panel, on Flight Control Unit, place BLUE INVERTER switch in PWR OFF position.

WARNING : NO HYDRAULIC SYSTEM SHALL BE PRESSURIZED. DISPLAY RELEVANT WARNING NOTICES.

(c) On Relay jack return and pressure lines, remove blanking caps, then connect these lines to corresponding unions on Relay jacks (Ref. 20-23-12).

### J. Test for Detection of Faulty Elevon PFCU

#### (1) Prepare

(a) Open access doors 551JB, 552JB, 553JB, 651JB, 652JB, and 653JB.

(b) On each of the six PFCU's, at telescopic tube/shuttle valve assy, disconnect ;

(b1) the two Yellow pressure lines

(b2) the two Yellow return lines

(b3) the Green pressure line

(b4) the Green return line

(c) Blank disconnected lines.

(d) Connect hydraulic fluid recovery hoses on PFCU unions. The other end of each hose is placed in a fluid recovery container.

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- (e) Carry out procedure to set Flight Controls in Blue electrical mode (Ref. 27-00-00, Servicing). Do not pressurize Green hydraulic system.
- (2) Test
- (a) For the six elevon PFCU's, check for hydraulic fluid in the hydraulic fluid containers.
    - Replace PFCU responsible for presence of hydraulic fluid in container (Ref. 27-34-52 for outer and middle elevon PFCU 27-34-53 for inner PFCU).
- (3) Close-Up
- (a) Shut down pressurization of Blue hydraulic system (Ref. 29-12-00, Servicing) and depressurize Blue hydraulic tank (Ref. 29-13-00, Servicing).
  - (b) Disconnect hydraulic fluid recovery hoses and remove recovery containers.
  - (c) Remove blanking caps from Yellow and Green return and pressure lines. Connect these lines to each PFCU (Ref. 20-23-12).
  - (d) If no fluid flow has been noted, carry out paragraph K. below.
  - (e) Carry out procedure to set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
  - (f) Pressurize Yellow hydraulic system (Ref. 29-21-00, Servicing).
  - (g) Operate control column, handwheel and rudder pedals to stabilize hydraulic fluid temperature between 30 and 70°C (86 and 158°F).
  - (h) Wait three minutes approximately and check for hydraulic leakage at PFCU and RJ/line unions.
  - (i) At overhead panel, on SERVO CONTROLS unit, place upper selector switch in BLUE L. PRESS position.
  - (j) Repeat steps (g) and (h) above.
  - (k) At overhead panel, on SERVO CONTROLS unit, place upper selector switch in GREEN L. PRESS position.

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- (l) Repeat steps (g) and (h) above.
- (m) At overhead panel, on SERVO CONTROLS unit, place upper selector switch in NORMAL position.
- (n) If required, top up hydraulic tanks (Ref. 12-12-29).
- (o) Shut down pressurization of Yellow hydraulic system.
- (p) Carry out "Close Up" operation of procedure to set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (q) Close access doors 551JB, 552JB, 553JB, 651JB, 652JB, 653JB and 121DB.

### K. Test For Detection of Faulty Rudder PFCU

#### (1) Prepare

- (a) Open access doors 351CL and 352CR.
- (b) On each of the two rudder PFCU's, at telescopic tube shuttle valve assy, disconnect
  - the two Yellow pressure lines
  - the two Yellow return lines
  - the Green pressure line
  - the Green return line
- (c) Blank disconnected lines
- (d) Connect hydraulic fluid recovery hoses to PFCU unions. The other end of hoses is placed in a fluid recovery container.
- (e) Carry out procedure to set Flight Controls in Blue electrical mode (Ref. 27-00-00, Servicing). Do not pressurize Green hydraulic system.

#### (2) Test

- (a) Check for hydraulic fluid in recovery containers under the two rudder PFCU's
  - Replace PFCU responsible for presence of hydraulic fluid in container (Ref. 27-24-31, Removal/Installation).

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### (3) Close-Up

- (a) Shut down pressurization of Blue hydraulic system (Ref. 29-12-00, Servicing). Depressurize Blue hydraulic tank (Ref. 29-13-00, Servicing).
- (b) Disconnect hydraulic fluid recovery hose and remove recovery container.
- (c) Remove blanking caps from pressure and return lines. Connect lines to PFCU's (Ref. Maintenance Manual, 20-23-12).
- (d) Repeat steps (e) to (q) described above in paragraph J.(3) (Test for detection of faulty elevator PFCU).
- (e) Close access doors 351CL and 352CR.

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- L. Test for Detection of PFCU Causing Hydraulic Fluid Transfer from Green System

NOTE : For ease of access, detection of faulty PFCU will be carried out on elevon PFCU's first (paragraph M.) then, if necessary, on rudder PFCU's (paragraph N.)

(1) Prepare

- (a) Shut down pressurization of Green hydraulic system (Ref. 29-11-00, Servicing). Depressurize Green hydraulic tank (Ref. 29-13-00, Servicing).
- (b) At overhead panel, on Flight Control Unit, place GREEN INVERTER switch in PWR OFF position.

WARNING : NO HYDRAULIC SYSTEM SHALL BE PRESSURIZED. DISPLAY RELEVANT WARNING NOTICES.

- (c) On Relay jack return and delivery lines, remove blanking caps, then connect these lines to corresponding unions on Relay jacks (Ref. 20-23-12).
- (d) Close access door 151DB.

- M. Test for Detection of Faulty Elevon PFCU

(1) Prepare

- (a) Open access doors 551JB, 552JB, 553JB, 651JB, 652JB and 653JB.
- (b) On each of the 6 PFCU's, at telescopic tube shuttle valve assy, disconnect ;
  - (b1) the two Yellow pressure lines
  - (b2) the two Yellow return lines
  - (b3) the Blue pressure line
  - (b4) the Blue return line
- (c) Blank disconnected lines
- (d) Connect hydraulic fluid recovery hoses to PFCU unions. The other end of each hose is placed in a fluid recovery container.

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- (e) Carry out procedure to set Flight Controls in Green electrical mode (Ref. 27-00-00, Servicing). Do not pressurize Blue Hydraulic system.

### (2) Test

- (a) For the 6 elevon PFCU's, check for hydraulic in the hydraulic fluid containers.
  - Replace PFCU responsible for presence of hydraulic fluid in container (Ref. 27-34-52 for outer and middle elevon PFCU 27-34-53 for inner PFCU).

### (3) Close-Up

- (a) Shut down pressurization of Green hydraulic system (Ref. 29-11-00, Servicing) and depressurize Green hydraulic tank (Ref. 29-13-00, Servicing).
- (b) Disconnect hydraulic fluid recovery hoses and remove recovery containers.
- (c) Remove blanking caps from Yellow and Blue return and pressure lines. Connect these lines to each PFCU (Ref. 20-23-12).
- (d) If no fluid flow has been noted, carry out paragraph N. below.
- (e) Carry out procedure to set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (f) Pressurize Yellow hydraulic system (Ref. 29-21-00, Servicing).
- (g) Operate control column, handwheel and rudder pedals to stabilize hydraulic fluid temperature between 30 and 70°C (86 and 158°F).
- (h) Wait three minutes approximately and check for hydraulic leakage at PFCU and RJ/line unions.
- (i) At overhead panel, on SERVO CONTROLS unit, place upper selector switch in BLUE L. PRESS position.
- (j) Repeat steps (g) and (h) above.
- (k) At overhead panel, on SERVO CONTROLS unit, place upper selector switch in GREEN L. PRESS position.

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- (l) Repeat steps (g) and (h) above.
- (m) At overhead panel, on SERVO CONTROLS unit, place upper selector switch in NORMAL position.
- (n) If required, top up hydraulic tanks (Ref. 12-12-29).
- (o) Shut down pressurization of Yellow hydraulic system.
- (p) Carry out "Close-Up" operations of procedure to set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (q) Close access doors 551JB, 552JB, 553JB, 651JB, 652JB, 653JB and 121DB.

### N. Test for Detection of Faulty rudder PFCU

#### (1) Prepare

- (a) Open access doors 351CL and 352CR.
- (b) On each of the two rudder PFCU's, at telescopic tube shuttle valve assy, disconnect
  - the two Yellow pressure lines
  - the two Yellow return lines
  - the Blue pressure line
  - the Blue return line
- (c) Blank disconnected lines
- (d) Connect hydraulic fluid recovery hoses to PFCU unions. The other end of hoses is placed in fluid recovery containers.
- (e) Carry out procedure to set Flight Controls in Green electrical mode (Ref. 27-00-00, Servicing). Do not pressurize Blue hydraulic system.

#### (2) Test

- (a) Check for hydraulic fluid in recovery containers.
  - Replace PFCU responsible for presence of hydraulic fluid in container (Ref. 27-34-31, Removal/Installation).

#### (3) Close-Up

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- (a) Shut down pressurization of Green hydraulic system (Ref. 29-12-00, Servicing). Depressurize Green hydraulic tank (Ref. 29-13-00, Servicing).
- (b) Disconnect hydraulic fluid recovery hoses and remove recovery containers.
- (c) Remove blanking caps from pressure and return lines. Connect lines to PFCU's (Ref. 20-23-12).
- (d) Repeat steps (e) to (q) described above in paragraph M.(3) (Test for detection of faulty elevon PFCU).
- (e) Close access doors 351CL and 352CR.

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**END OF THIS  
SECTION**

**NEXT**

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## MAINTENANCE MANUAL

### RELAY JACK - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The Relay jack is mounted on a chassis located between frame 5 and 7. Access is obtained through panel 121FB. Its purpose is to transmit flight control orders :

- In autopilot mode to the mechanical linkage and the electrical control resolvers.
- In manual flight to the mechanical linkage.

#### 2. Relay Jack Removal

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Zero Rigging Device - Relay Chassis	E925019000
Rigging Pin - Synchro Pack	D925252000
Circuit Breaker Safety Clips	
Access Platform 3.672 m (12 ft.)	
Lockwire Dia. 0.032 inch (0.8 mm)	

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DESCRIPTION	PART NO.
-------------	----------

Corrosion Resistant Steel

### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RELAY JACK HYD SEL IND & SUP	1-213	C 281	N17
AP/FD SYS 1 CONT		1C 17	Q13
AP/FD SYS 1 SUP	2-213	1C 20	C 5
AP/FD SYS 2 CONT	5-213	2C 17	A11
AP/FD COMP 1 SUP	13-213	1C 18	A 5
AP/FD SYS 2 SUP	13-216	2C 20	A17
AP/FD COMP 2 SUP		2C 18	F18

- (3) Make certain that trim controls are in zero position.
- (4) Open access door 151DB beneath the fuselage and depressurize the Green, Blue and Yellow hydraulic systems.
- (5) Open door 153BB, depressurize Green, Blue and Yellow hydraulic tanks.
- (6) Remove access panels 121GB, 121FB and insert rigging pin D925252001 in the roll synchro pack.

**WARNING :** DISPLAY WARNING NOTICES, ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURI-

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### ZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT, PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

(7) Open floor panel 213EF.

C. Remove  
(Ref. Fig. 401 )

NOTE : To remove or install attachment bolts, it is necessary to press the plunger located on head of bolt in order to free the locking system balls.

- (1) On relay chassis, remove mounting base of equipment E925019000.
- (2) Remove AP force limiter (1) (Ref. 27-11-19, Removal/Installation).
- (3) Remove the bonding strips from the relay jack.
- (4) Using appropriate wrench, maintain adapters screwed in Relay jack ; Unscrew and disconnect the hydraulic lines and blank off the ports.

WARNING : WHEN A HOSE WITH A BEND RADIUS IS REMOVED FROM AN INSTALLATION, CARE SHALL BE TAKEN NOT TO STRAIGHTEN THE HOSE FROM ITS ACQUIRED SHAPE.  
IF REQUIRED FOR RE-INSTALLATION IT SHALL BE FITTED AS NEAR AS POSSIBLE TO THIS SHAPE WITHOUT ANY UNDUE FORMING.

- (5) Disconnect electrical connectors from the relay jack.
- (6) Remove cotter and unscrew nut (3); remove washers (4) and (5), and bolt (6) attaching link rod (2).
- (7) Remove screws (12), recover washers (11) and lift attach bracket (13).
- (8) Remove cotter and unscrew nut (15) from the rear attachment point of the relay jack. Remove washers (16) and (17).
- (9) Remove cotter and unscrew nut (10) from the front attachment point. Remove washers (8) and (9).

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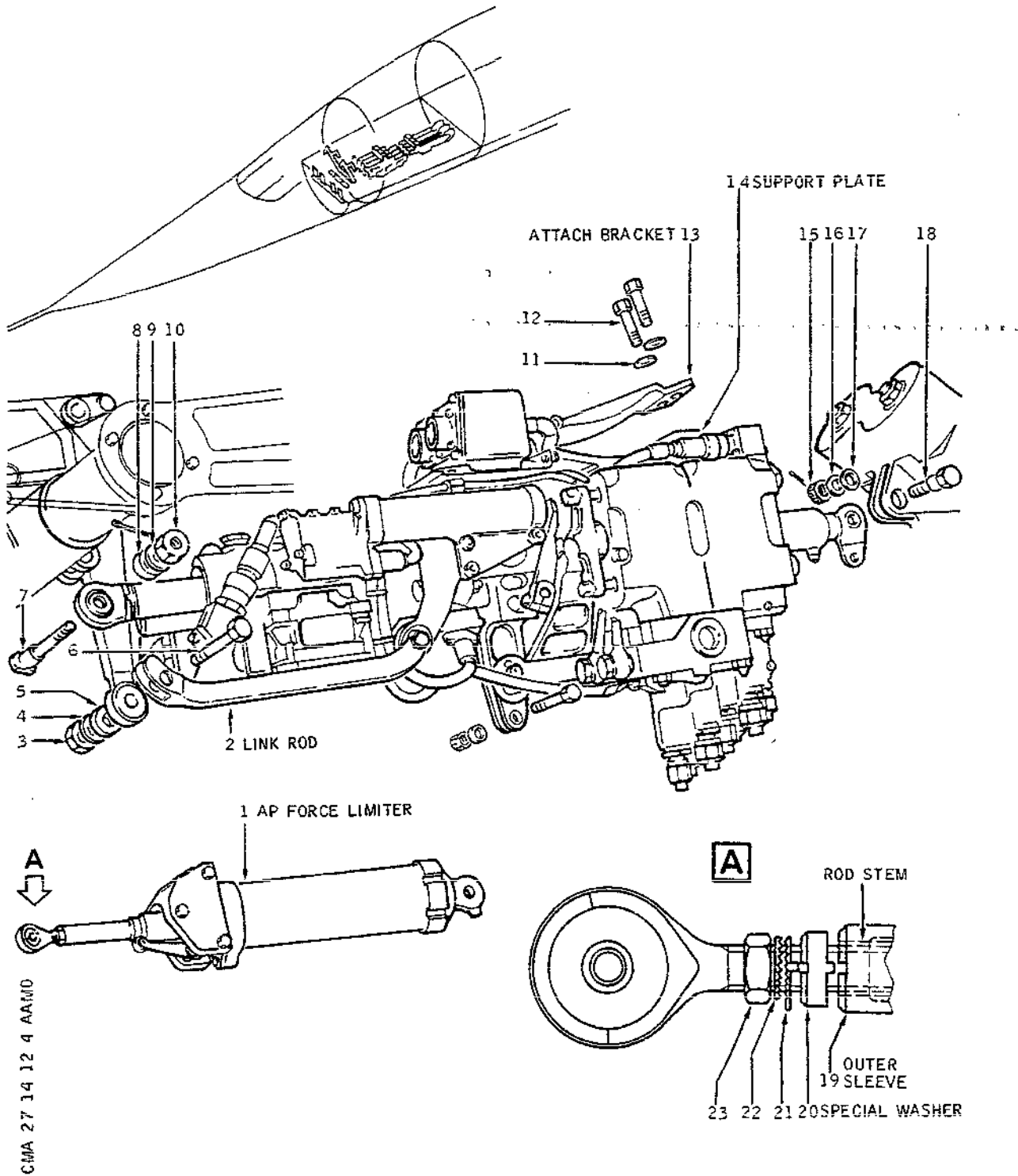
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Relay Jack  
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(10) Support the relay jack and remove special bolts (7) and (18) from the attachment points.

(11) Pivot and remove the relay jack from its mounting.

CAUTION : HANDLE THE RELAY JACK CAREFULLY AND BY ITS ATTACHMENT FITTINGS ONLY. WEIGHT = 18.1 KG (40 lb)

### D. Preparation of Replacement Component

(1) Measure the distance between the attachment points of the removed relay jack.

(2) Adjust the attachment points of the replacement relay jack to the same distance as those of the removed relay jack, by pulling or pushing piston.

### E. Install

(1) Lift attach bracket (13), install carefully relay jack.

(2) Install bolts (7) and (18) and washers (8) and (9)

(a) Tighten nut (10). Torque to between 45 and 50 lbf.in. (0.50 and 0.55 m.daN).  
Safety with cotter.

(b) Install washers (16) and (17) : tighten nut (15)  
Safety with cotter.

(3) Lower attach bracket (13), install washers (11) and tighten bolts (12).  
Torque to between 75 and 85 lbf.in. (0.85 and 0.96 m.daN)  
Safety with lockwire (Ref. 20-21-13)

(4) Engage link rod (2) install bolt (6) washers (4) (5) tighten nut (3).  
Torque to between 12 and 15 lbf.in. (0.13 and 0.16 m.daN). Safety with cotter.

(5) Connect hydraulic lines :

(a) Maintain adapters screwed in Relay jack using appropriate wrench.

(b) Torque hydraulic line union nuts to the following values :

Blue hydraulic pressure : 1.51 to 1.63 m.daN  
(11.1372 to 12.0223 lbf. ft.)

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Blue return line	: 1.92 to 2.15 m.daN (14.1612 to 15.8576 lbf. ft.)
Green hydraulic pressure	: 1.51 to 1.63 m.daN (11.1372 to 12.0223 lbf. ft.)
Green return line	: 1.92 to 2.15 m.daN (14.1612 to 15.8576 lbf. ft.)
Yellow/Green pressure	: 2.43 to 2.76 m.daN (17.9228 to 20.3567 lbf. ft.)
Yellow return line	: 2.43 to 2.76 m.daN (17.9228 to 20.3567 lbf. ft.)
Yellow/Blue pressure	: 2.43 to 2.76 m.daN (17.9228 to 20.3567 lbf. ft.)

RB  
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RB

- (6) Connect electrical connectors. Connects bonding strips to relay jack and carry out bonding check. Resistance to be not greater than 50 milli-ohms.
- (7) Install AP force limiter (1) (Ref. 27-11-19, Removal/Installation).
- (8) On relay chassis, install mounting base of equipment E925019000.
- (9) Install equipment E925019010 without inserting pin on roll control.
- (10) Remove warning notices.
- (11) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (12) Install equipment E925019013 on equipment E925019010 and on the jam detection strut by means of pins E925019105. Make certain that pins can be inserted easily. If not, adjust length of AP force limiter as follows :
  - (a) Cut and remove lockwire, loosen nut (23), disengage washers (21 and 22).
  - (b) Maintain special washer (20) inserted in groove on outer sleeve (19) and on rod stem.
  - (c) Manually turn both sleeve and rod stem in order to lengthen or shorten AP force limiter until

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pin D925019105 can be inserted and removed easily.

- (d) Make certain that special washer (20) is inserted in groove on stem rod and outer sleeve (19).
  - (e) Engage lock washer (21), tab in groove on front face of special washer (20).
  - (f) Engage the second lock washer (22).
  - (g) Tighten nut (23).  
Torque to between 80 and 90 lbf.in. (0.9 and 1 m.daN). Wirelock.
- (13) Check adjustment of relay jack sensor (Ref. 22-13-61, Adjustment/Test).
  - (14) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
  - (15) Remove equipment E925019000 and pin D925252001 from synchro pack.
  - (16) Remove safety clips and tags and set circuit breakers.

### F. Tests

- (1) Carry out an operational test (Ref. 27-11-00, Adjustment/Test), visually check for free operation of the relay jack throughout full travel. Check that clearance between relay jack body and chassis beam is within the following limits :  
Nominal clearance : 3 mm (0.1181 in.)  
Minimum clearance : 1 mm (0.0394 in.)  
Check assembly for absence of leaks.
- (2) Carry out a test in AP; TURN knob on AFCS DATUM ADJUST UNIT (Ref. 22-13-00, Adjustment/Test).
- (3) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Top up, if necessary, hydraulic tanks (Ref. 12-12-29).

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- (3) Make certain that no trace of hydraulic fluid remains.
- (4) Install floor panels (213EF).
- (5) Close access doors and panels (121GB, 121FB, 153BB and 151DB).
- (6) Remove access platform.

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### 3. Green or Blue Electrovalve Removal

NOTE : Only the Green electrovalve can be removed "in situ" ;  
due to difficulty of access the Blue electrovalve removal cannot be performed.

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 3.672 (12 ft.)	
Lockwire Dia 0.5 mm (0.020 in.) Corrosion Resistant Steel	
Warning Notices	

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Open door 151DB, depressurize Green, Blue and Yellow hydraulic systems (Ref. 29-11-00, 29-12-00, and 29-21-00, Servicing).
- (3) Open door 153BB, depressurize Green, Blue and Yellow hydraulic tanks (Ref. 29-13-00, Servicing).
- (4) On centre glareshield, on AFCS control unit, make certain that AP1 and AP2 switches are not engaged.
- (5) Remove access panels 121FB, 121GB.

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 and 3  
PROHIBITING PRESSURIZATION OF BLUE, GREEN  
AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC  
GROUND POWER UNIT.  
DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S  
STATION PROHIBITING USE OF GROUND PRESSURI-  
ZING SYSTEM ELECTRIC PUMPS.  
IF A HYDRAULIC GROUND POWER UNIT IS CONNEC-  
TED, DISPLAY A WARNING NOTICE, ON THIS UNIT,  
PROHIBITING PRESSURIZATION OF THE AIRCRAFT  
HYDRAULIC SYSTEMS.

#### C. Remove (Ref. Fig. 402 )

- (1) Disconnect electrical connector.

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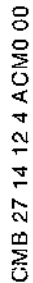
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- (a) Remove straps and clamps attaching electrical leads.
- (b) Remove clamp block (35) securing junction box (40), nut (37), washer (36).
- (c) Cut and remove lockwire, remove screws (38), separate the two sections of the junction box (40), then disconnect plug connector. Discard gasket (39).

- (2) Cut and remove lockwire, remove screws (34) then electrovalve with seal kit (33) or coaxial seals.

CAUTION: TAKE ALL NECESSARY PRECAUTIONS TO AVOID CONTAMINATION OF HYDRAULIC FLUID.

### D. Preparation of Replacement Component

- RB (1) If fitted, the transit protective plate is to be  
RB removed from the electrovalve seal face.
- RB (2) Check that the four replacement seal kits are  
RB correctly installed. Before fitting the seal  
RB assemblies into the electrovalve counterbore, a trial  
RB installation of the copper backing rings should be  
RB accomplished. If they do not fit into the counterbore  
RB the copper backing rings should be lightly dressed  
RB using a fine file until they do.
- RB (3) The order of assembly is O ring (31) first, then  
RB copper backing ring (32) with the concave surface  
RB facing the seal and finally the alloy spacer (30).  
RB Under pressure the O ring would distort, the light  
RB alloy spacer retains it concentrically in the  
RB counterbore and ensures seal loading is face to face,  
RB the copper backing ring precludes feathering of the O  
RB ring during its service life.

### E. Install

- R (1) Position electrovalve and secure with screws (34).  
R

CAUTION: WHEN POSITIONING ELECTROVALVE, TAKE CARE THAT SEALS ARE NOT DISTURBED FROM COUNTERBORES.

Safety screws in pairs with lockwire (Ref. 20-21-23).

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- R (2) Connect electrical connector.
- (a) Install a new gasket(39).
  - (b) Connect the two halves of connector then the two sections of junction box.  
Secure the two sections of junction box with screws (38). Safety screws with lockwire (Ref. 20-21-13).
  - (c) Attach junction box with clamp block (35), washer (36) and nut (37).
  - (d) Tighten electrical lead clamps and replace straps.
- R (3) Pressurize Green, Blue and Yellow hydraulic tanks (Ref. 29-13-00, Servicing).

### F. Tests

- (1) Proceed with an Operational Test (Ref. 27-11-00, Adjustment/Test).
- (2) Carry out a test in AP: TURN knob on AFCS DATUM ADJUST UNIT (Ref. 22-13-00, Adjustment/Test)
- (3) Upon completion of tests, carefully check electrovalve for external leaks.
- (4) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access doors and panels.
- (3) Remove warning notices and access platform.

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### RELAY JACK - ADJUSTMENT/TEST

#### 1. Functional Test of Jamming Microswitches

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Tool - jamming detector	CT1 P28945002
Ground Service Telephone	

##### B. Prepare

- (1) This Test is carried out without hydraulic pressure :  
Depressurize Blue, Green and Yellow hydraulic systems  
(Ref. 29-12-00, Servicing; 29-11-00, Servicing ;  
29-21-00, Servicing).
- (2) To gain access to jamming microswitch. Green side, open  
access door 121 FB.
- (3) To gain access to jamming microswitch, Blue side, open  
floor panel 213 DF.
- (4) On overhead panel.
  - (a) On Flight Control Unit, make certain that BLUE  
INVERTER and GREEN INVERTER switches are in PWR  
OFF position and that O & M ELEVONS, IN ELEVONS  
and RUDDER switches are in MECH position.
  - (b) On SERVO CONTROLS unit, make certain that both  
switches are in NORMAL position.
  - (c) On RELAY JACK unit, make certain that control  
switch is in NORM position.
- (5) Make certain that the following circuit breakers are  
set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
AUDIO WARN SYS SUP 1	1-213	W 371	M21
RELAY JACK HYD SEL IND & SUP	1-213	C 281	N17

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
MWS SUP 1	1-213	W 252	N21
AUDIO WARN SYS SUP 2	5-213	W 372	C17
MWS SUP 2	5-213	W 251	D15
ROOF PNL LT TEST SUP	15-216	L1002	D13
(6) At centre section of glare shield, on AFCS control unit, make certain that AP1 and AP2 switches are not in engaged position.			
(7) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).			
- Gong must sound			
- On overhead panel, PFC warning light must illuminate on master warning panel.			
<u>NOTE</u> : Do not take visual or aural warnings that are not mentioned into account.			
(8) Press and release PFC warning light			
- It must go off.			
(9) On RELAY JACK unit, press and release BLUE JAM-TEST push-button.			
- Gong must sound.			
- On RELAY JACK unit, BLUE JAM caption light must illuminate then go off.			
- On overhead panel on master warning panel, PFC warning light must illuminate.			
(10) Press and release PFC warning light ;			
- it must go off.			
(11) On RELAY JACK unit, press and release GREEN JAM-TEST push-button.			
- Gong must sound.			
- On RELAY JACK unit, GREEN JAM caption light must illuminate then go off.			
- On overhead panel, on master warning panel, PFC warn-			

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ing light must illuminate.

(12) Press and release PFC warning light

- It must go off.

### C. Test

(1) For carrying out jamming test of the Blue spool valve, install jamming detector tool on spring box of Relay Jack C8. (Access to the latter is gained in Flight Compartment).

(2) Slowly compress tool handles up to stop, and maintain in this position.

- Gong must sound.
- On overhead panel, on RELAY JACK unit, BLUE JAM caption light must illuminate.
- On Master warning panel, PFC warning light must illuminate.

(3) On RELAY JACK unit, place control switch in GREEN ONLY position.

- BLUE JAM caption light must go off.

(4) Press and release PFC warning light

- It must go off.

(5) On RELAY JACK unit, place control switch in NORM position.

- Same results as in (2) above.

(6) Release tool handles and remove tool.

- No change in indications described in (2) above.

(7) On RELAY JACK unit, place control switch in GREEN ONLY position then in NORM position.

- BLUE JAM caption light must go off and remain off.

(8) Press and release PFC warning light

- It must go off.

(9) For carrying out Test of Green spool valve, install jamming detector tool on spring box of LH relay jack

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C8. (Access to the latter is gained in zone 121).

- (10) Carry out again steps (2) (3) (4) (5) (6) (7) and (8) placing switch in BLUE ONLY position instead of GREEN ONLY.

- Results must be identical except that GREEN JAM caption light must illuminate on RELAY JACK unit instead of BLUE JAM caption light

### D. Close-Up

- (1) De-energize the aircraft electrical network and disconnect electrical ground power unit.
- (2) Install floor panel 213 DF.
- (3) Close access door 121 FB.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### RELAY JACK - INSPECTION/CHECK

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The purpose of the procedure described in this topic is to check :

- Relay jacks for external hydraulic leakage.
- Relay jacks for internal hydraulic leakage between cylinders.
- Permissible load on end of input lever to initiate relay jack forward and rearward movement.
- General condition of relay jack components and attachments by visual inspection.
- Fail safe springbox, on relay jack locking system.

#### 2. Relay Jack External Hydraulic Leakage

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Warning Notice	
Access Platform 12 ft. (3.67 m)	

##### B. Prepare

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- (1) Open access doors 121FB and 121GB.
- (2) Observe the safety precautions described in the previous WARNING paragraph.
- (3) Set flight controls in Blue electrical mode (Ref. 27-00-00, Servicing).
- (4) Check that pitch, roll and yaw trim controls are in zero position.

### C. Check

- (1) Check on Flight Engineer's HYDRAULIC MANAGEMENT panel that hydraulic fluid temperature is in 30°C to 70°C range (86°F and 158°F).  
To attain required temperature, operate elevons several times, as required.
- (2) Engage autopilot No.1 (Ref. 22-10-00, Servicing, para 2).
- (3) Place a warning notice in flight compartment prohibiting operation of flight controls.
- (4) Wait 3 minutes for any external leakage to establish and proceed to measure it.
- (5) Permitted leakage from the relay jack is 4 drops per minute.
- (6) Disengage AP1 and engage AP2 (Ref. 22-10-00, Servicing, para 4) and measure amount of leakage, as for AP1.

### D. Close-Up

- (1) Disengage AP2 (Ref. 22-10-00, Servicing).
- (2) Shut down pressurization of Blue and Green hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in electrical mode).
- (3) Close access doors 121FB and 121GB.
- (4) Remove warning notice.
- (5) Remove access platform.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### 3. Internal Hydraulic Leakage Between Relay Jack Cylinders

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 12 ft. (3.67 m)	
Rigging Pins, Synchro Pack	D925252000
Ground Power Unit, Hydraulic Power and Preliminary Testing (2 units)	EMH39HE
Flowmeters, 1 per Hydraulic System (2 meters)	
The flowmeters must have the following characteristics : flow rate range 0 to 25 litres/min. 96% precision in flow rate range 0.4 to 1 litre/min.	

#### B. Prepare

- (1) Open access doors 121FB and 121GB.
- (2) Observe the safety precautions described in the previous WARNING paragraph.
- (3) Set flight controls in electrical mode (Ref. 27-00-00, Servicing).

NOTE : Fit flowmeters described in the Equipment and Materials paragraph to ground power unit.

- (4) Check that pitch, roll and yaw trim controls are in zero position.

#### C. Check

- (1) Check on Flight Engineer's HYDRAULIC MANAGEMENT panel that hydraulic fluid temperature is within range 30°C to 70°C (86°F and 158°F).  
To attain required temperature operate elevons several times as required.
- (2) Immobilize roll, pitch, and yaw resolvers with rigging pins D925252001, D925252002, D925252003.

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- (3) Disconnect link rod connecting load limiting mechanism to roll cable tension regulator.  
  
NOTE : To remove attachment bolts it is necessary to press plunger located on bolt head in order to release locking balls.
- (4) Wait 2 minutes, then note flow rate per minute on flowmeters QB and QG.
- (5) Disconnect AP force limiter from roll relay jack input lever.
- (6) Manually move roll relay jack input lever slowly towards front of aircraft. With relay jack at stop position, maintain control lever in fully open position.
- (7) Note QB1 and QG1 flow rate.
- (8) The difference in flow rate between QB1 - QB and QG1 - QG must be less than 1 litre per minute.
- (9) Connect AP force limiter to relay jack input lever. Install bolt, washers, nut.  
Torque to between 0.30 and 0.36 mdaN (27 and 32 lbf. in.).  
Safety with cotter pin.
- (10) Connect Link rod between load limiting mechanism and cable tension regulator.  
Install bolt, washers, nut.  
Torque to between 0.50 and 0.55 mdaN (45 and 50 lbf. in.).  
Safety with cotter pin.
- (11) Remove rigging pins D925252001, D925252002, D925252003 from resolvers.

### D. Close-Up

- (1) Shut down pressurization of Blue and Green hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in electrical mode).
- (2) Close access doors 121FB and 121GB.
- (3) Remove access platform.

EFFECTIVITY: ALL

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### 4. Permissible Load on End of Relay Jack Input Lever

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Spring Scale, 0 to 20 N (0 to 4.48 lbf.)	
Access Platform 12 ft. (3.67 m)	
Rigging Pins, Synchro Pack	D925252000

#### B. Prepare

- (1) Open access door 121FB.
- (2) Observe the safety precautions described in the previous WARNING paragraph.
- (3) Set flight controls in electrical mode (Ref. 27-00-00, Servicing).
- (4) Check that pitch, roll and yaw trim controls are in zero position.

#### C. Force Measurement

- (1) Operate elevons several times.
- (2) Immobilize roll, pitch and yaw resolvers with rigging pins D925252991, D925252002, D925252003.
- (3) Disconnect AP force limiter rod from roll relay jack input lever.

NOTE : To remove attachment bolts it is necessary to press plunger on bolt head in order to release locking balls.

- (4) Proceed to take measurements, under the following conditions :
  - Hydraulic fluid temperature :  
40°C ± 10°C (104°F ± 18°F)
  - Ambient temperature :  
20°C ± 15°C (68°F ± 27°F)
  - Force applied to end of lever, measured on spring scale :  
Less than 7.7N (1.73 lbf.) - permissible

EFFECTIVITY: ALL

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More than 13N (2.92 lbf.) - not permissible  
If the force is equal to or greater than 7.7N (1.73 lbf.) and equal to or less than 13N (2.92 lbf.) measure force again under the following conditions :

- Hydraulic fluid temperature :  
90°C ± 5°C (194°F ± 9°F)
- Ambient temperature :  
20°C ± 10°C (56°F ± 18°F)
- Force on end of lever :  
Equal to or less than 10N (2.25 lbf.) - permissible  
Greater than 10N (2.25 lbf.) - not permissible.

- (5) Connect AP force limiter rod to relay jack input lever. Install bolt, washers, nut.  
Torque to between 0.30 and 0.35 mdaN (27 and 32 lbf. in.).  
Safety with cotter pin.

- (6) Remove rigging pins : D925252001, D925252002, D925252003 from resolvers.

### D. Close-Up

- (1) Shut down pressurization of Blue and Green hydraulic systems (Ref. 27-00-00, Servicing Procedure to set Flight Controls in electrical mode).
- (2) Close access door 121FB.
- (3) Remove access platform.

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### 5. Visual Check of Relay Jacks

#### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Access Platform 12 ft. (3.67 m)

#### B. Prepare

- (1) Remove floor panel 213EF.  
Open access doors 121FB and 121GB.

#### C. Check

- (1) Relay jack and attachment points.

- (a) Apply force to both front and rear ends of jack to make certain that it is in working condition.
- (b) Visually inspect and check, by means of an inspection mirror, that the following items bear no trace of breakage, corrosion or cracks :
- Fork end-fitting on structure (front relay jack attachment)
  - End-fitting and body (front section of relay jack)
  - End-fitting and body (rear section of relay jack)
  - Fork end-fitting on load limiting mechanism.
- (c) Check by rotating body of jack that it is able to pivot several degrees.
- (d) Check through floor panel that relay jack fail safe bracket is not resting on transverse bar of structure.
- (e) Check safetying of :  
Relay jack front and rear attachments (self locking nut present and cotter pin fitted).

- (2) Feedback linkage

- (a) Visually inspect and check by means of inspection mirror that the following items bear no trace of breakage, corrosion or cracks :
- Front and rear sections of lever linking relay jack sensor to link rod

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- Lower and upper part of link rod
  - Forward and aft sections of link rod attachment on relay jack.
- (b) Check safetying of :
- Attachment on relay jack
  - Link rod
  - Lever linked to relay jack sensor.
- (3) Cable loom
- (a) Make certain that bonding strips are present and secured between :
- Front section of jack and aircraft structure (accessible through floor panel)
  - Rear section of jack and aircraft structure.
- (b) Make certain that electrical connectors are correctly locked :
- Connectors C8A, C8B, H and C.
- (c) Make certain that cable loom is in correct condition (No trace of rubbing, and correctly secured).
- (4) Control and Locking Lever
- (a) Check locking lever fork end-fitting and make certain that it shows no trace of damage, corrosion or cracks.
- (b) Check mechanical locking centering pin (nut and cotter pin).
- (c) Make certain that locking lever shows no trace of cracks or corrosion, and check that nut on central horizontal section of lever is present, and safetied.
- (5) Hydraulic System
- (a) Check flexible hose and unions for leakage, and for absence of any trace of cuts, breaks, rubbing or distortion.
- (b) Check exposed surfaces of relay jack piston (for cracks, peening, corrosion).
- (c) Check hydraulic pipe connections for leakage.
- (d) Check that safety disc located on side casing

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of each electrovalve is not out of position or has not been ejected. (The disc is a lighter colour than the electrovalve casing).

### D. Close-Up

- (1) Close floor panel 213EF.
- (2) Close access doors 121FB and 121GB.
- (3) Remove access platform.

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### 6. Check of Relay Jack Locking Mechanism Safety Springbox

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 12 ft. (3.67 m)	
Fail Safe Springbox	
Checking Tool - Relay Jack	CT3P289450002

#### B. Prepare

- (1) Open access door 121FB.

#### C. Check

- (1) Make certain that relay jacks are in mechanical mode.
- (2) Make certain that fail safe springbox is in correct operating condition, by :  
Positioning tool CT3 P289 45 002 on lower part of springbox, and exerting and alternately releasing an upward vertical thrust several times. This operation enables the extension and compression of springbox to be checked.

#### D. Close-Up

- (1) Close access door 121FB.
- (2) Remove access platform.

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## MAINTENANCE MANUAL

### ARTIFICIAL FEEL JACK (BLUE, ROLL) - SERVICING

**WARNING:** MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

This procedure is to render an artificial feel jack inoperable following an electro-valve failure, servo valve failure or for other operational reasons.

#### 2. De-activation of Artificial Feel Jack (Blue)

##### A. Equipment and Materials

	DESCRIPTION	PART NO.
	Blanking Plug	C27-133
RB	Blanking Plugs	AN 929-4S
RB	Blanking Plugs	AN 929-5S
	Circuit Breaker Safety Clips	B24715
	Lockwire Dia. 1 mm (0.041 in)	
	Corrosion Resistant Steel	
	Warning Notices	

##### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.

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- (2) Trip, safety and tag the following circuit breakers:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
ROLL ART FEEL COMP 1 SUP (Blue)	2-213	1C243	E3
HYD TANK COMPR CONT	15-215	M602	D8
HYD TANK AIR COMPR SUP	13-215	M601	G7
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M626	F22

- (3) Open access doors 151DB, and 153BB beneath the fuselage and depressurize the Green, Blue and Yellow hydraulic systems. Depressurize the Blue hydraulic tank. Close and safety tank depressurization valve with lockpin.

WARNING: DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS USED, DISPLAY A WARNING NOTICE ON THIS UNIT, PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (4) Open floor panel 213BF and remove access door 213BZ.

### C. Procedure A. (Ref. Fig. 001)

CAUTION: ENSURE THAT THE ARTIFICIAL FEEL JACK TO BE DE-ACTIVATED IS AGAINST MECHANICAL STOP.

NOTE: An alternative method for de-activation of artificial feel jack is shown in Procedure B.

- (1) Cut and remove wire locking. Disconnect artificial feel jack pressure pipe at hydraulic system manifold 5103.
- (2) Fit blanking plug C27-133 (located in the Flight Kit) to manifold. Connect the pressure pipe to blanking plug C27-133 and safety with lockwire.

EFFECTIVITY: ALL

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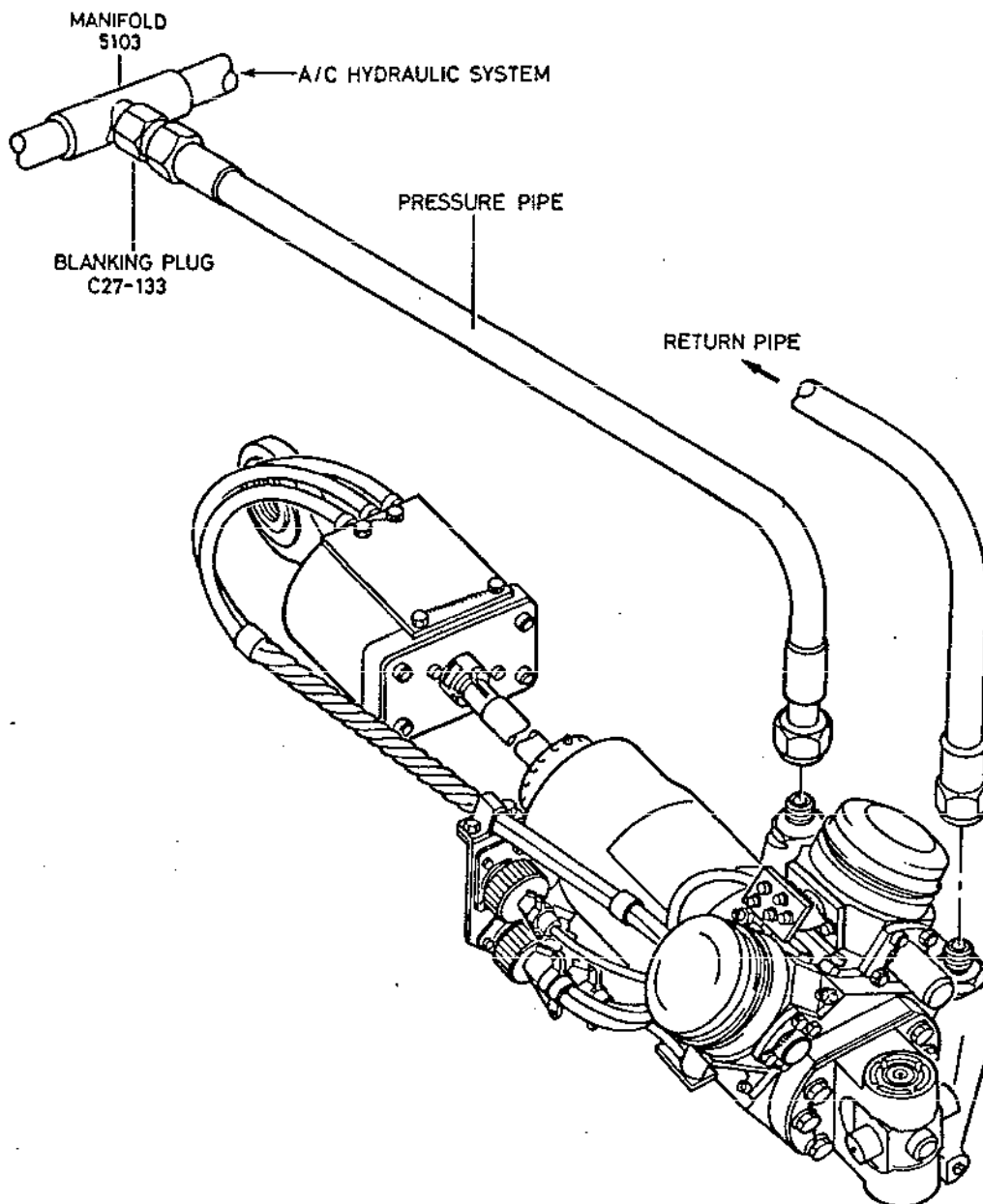
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De-activation of Artificial  
Feel Jack  
Fig. 001

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Procedure B. (Ref. Fig. 001)

CAUTION: ENSURE THAT THE ARTIFICIAL FEEL JACK TO BE  
DE-ACTIVATED IS AGAINST MECHANICAL STOP.

- (1) Cut and remove wire locking. Disconnect pressure and return pipes from artificial feel jack and hydraulic system manifolds 5103 and 5104 respectively. Retain the hydraulic pipes removed.

- RB (2) Fit blanking plugs AN 929-4S to artificial feel jack pressure port and manifold 5103. Fit blanking plugs  
RB AN 929-5S to artificial feel jack return port and manifold 5104. Wirelock all blanks.

### D. Test

- (1) Remove safety clips and tags, reset circuit breakers tripped in para. B.(2).
- (2) Establish interphone communication with ground crew.
- (3) Pressurize Blue hydraulic tank (Ref. 29-00-00, Servicing).
- (4) Set flight controls in mechanical mode (Ref. 27-00-00, Servicing).
- (5) At centre console, on ADC control panel:
  - (a) Place ADC1 switch in ON position.
  - (b) After approximately 30 seconds ADC1 blue TEST light is lit.
  - (c) Press and release ADC1 amber warning light:  
- the light must go off.

NOTE: During the test check for leaks around the blanking plug.

- (6) Operate the handwheel over the full range of movement. Check control surface deflection at the ICOVOL indicator.
- (7) On ADC control panel:
  - (a) Place ADC1 TEST selector switch in position 1.
  - (b) Press and release ADC1 amber warning light:  
- the light must go off.

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- (8) At overhead panel, on ARTIFICIAL FEEL engage switch unit, operate system 1 ROLL channel switch. Check that:
  - (a) The switch does not engage.
  - (b) The gong sounds.
  - (c) The FEEL or PCA light comes on.
- (9) Place ADC1 TEST selector switch in NORM position.
- (10) On ADC control panel place ADC1 switch in OFF position.

### E. Close-up

- (1) Carry out close-up operations detailed in procedure to set flight controls in mechanical mode (Ref. 27-00-00, Servicing).
- (2) Discontinue interphone communication with ground crew.
- (3) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.
- (4) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (5) Remove warning notices.
- (6) Close access doors and panels 151DB, 153BB, 213BF, 213BZ.

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## MAINTENANCE MANUAL

### ARTIFICIAL FEEL JACK (BLUE) - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

- A. The Blue artificial feel jack applies a force to the mechanical control, which is a function of the flight conditions.

#### 2. Artificial Feel Jack (Blue)

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins - Synchro Pack	D925252000
Circuit Breaker Safety Clips	
General Lubricant (Ref. 20-30-00, No.51)	
Access Platform 3.672 m (12 ft.)	
Blanking Plugs/Caps for Hydraulic Lines	
Lockwire dia. 1 mm (0.041 in.)	
Corrosion Resistant Steel	

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### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ROLL ART FEEL COMP 1 SUP	2-213	1C 243	E 3
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

- (3) Make certain that roll controls and roll trim are in zero position.
- (4) Remove access panels 121DB and 121FB : insert rigging pin in roll resolvers using equipment D925252001.
- (5) Open access doors 151DB, and 153BB beneath the fuselage and depressurize the Green, Blue and Yellow hydraulic systems. Depressurize the Blue hydraulic tank. Close and safety tank depressurization valve with lockpin.

**WARNING :** DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS USED, DISPLAY A WARNING NOTICE ON THIS UNIT, PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (6) Open floor panel 213BF and remove access door 213BZ.
- (7) Remove spring rod (Ref. 27-12-12, Removal/Installation).

### C. Remove

- (1) Disconnect electrical connectors (9).

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- (2) Cut lockwire, unscrew bolts (13) and (15) and remove mounting (14).
- (3) Remove cotter (11) and loosen nut (10).
- (4) Remove washer (12) and bolt (1).
- (5) Disconnect hydraulic lines (3) and (4) and cap their ends.
- (6) Cut and remove lockwire and remove bolts (7) attaching LH pivot support (8).
- (7) Support jack, cut and remove lockwire and remove bolts (6) attaching RH pivot support (5).
- (8) Remove artificial feel jack (2).
- (9) Remove RH and LH pivot supports (5) and (8).

### D. Preparation of Replacement Component

WARNING : HOLD JACK BY BODY : CAREFULLY AVOID TO DAMAGE EYE END FITTING OR TRANSDUCER HOUSING.

DO NOT HOLD JACK BY : EYE END FITTING

- FORCE TRANSDUCER HOUSING
- TRANSDUCER CABLE BUNDLE
- JACK PISTON ROD
- SERVO VALVES.

### E. Install

- (1) Position and install rear section of jack with RH and LH pivot supports (5) and (8) on beam attachment fittings.

NOTE : Lubricate, when installing, bearing housings of pivots (5) and (8), with product No.51.

- (2) Attach jack to beam attachment fittings with bolts (6) and (7). Torque to between 125 and 140 lbf.in. (1.41 and 1.58 m.daN). Safety with lockwire.
- (3) Connect hydraulic lines (3) and (4) to jack supply block. Jack must be left free to move in order to avoid imposing force on transducer due to tightening of nuts.
- (4) Install eye-end fitting on rocker arm ; attach with bolt (1), washer (11), nut (10). Torque to between 140 and 155 lbf.in. (1.6 and 1.75 m.daN). Safety with

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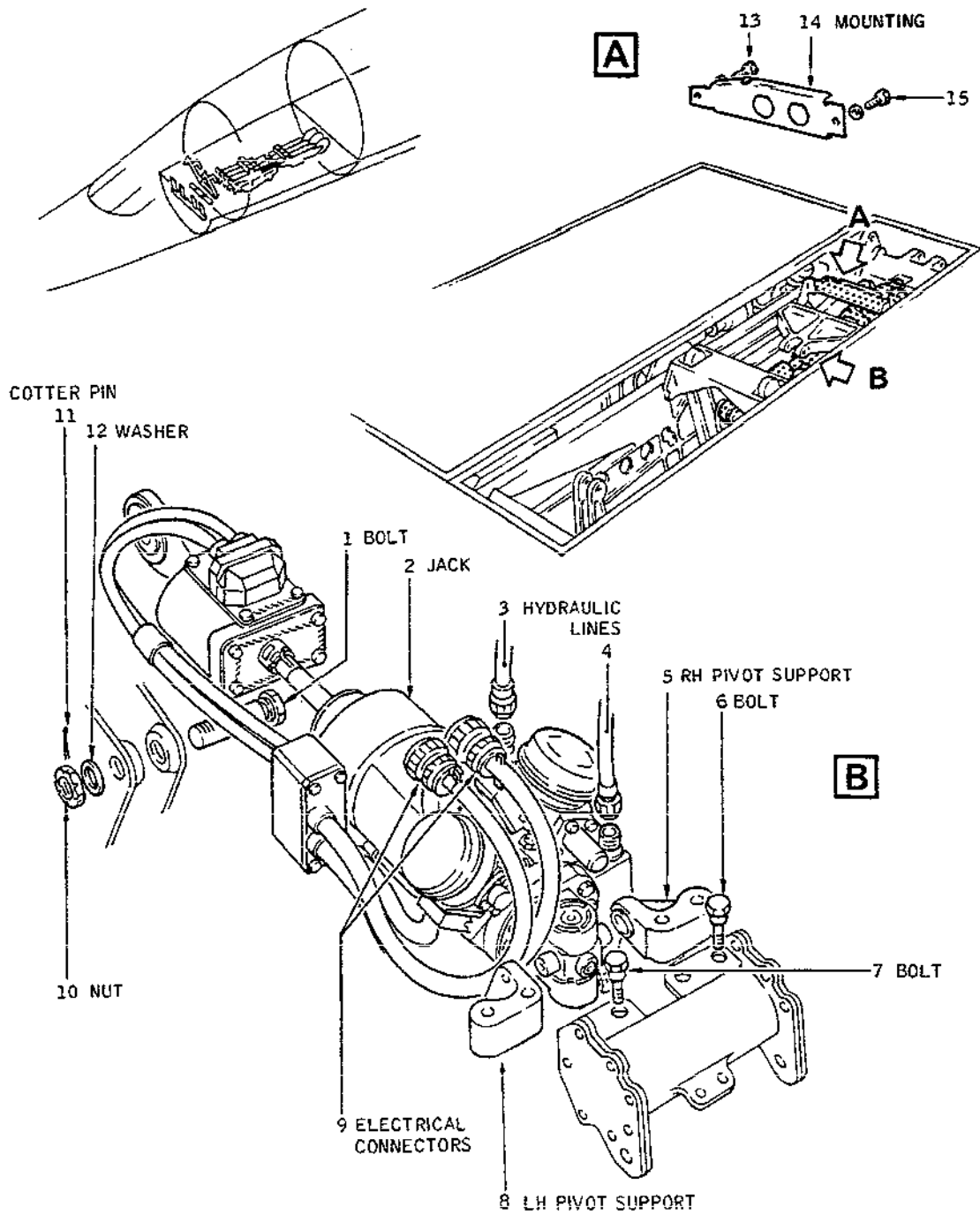
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CMA 27 14 13 4 AAMD

Artificial Feel Jack - Blue System  
Figure 401

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cotter pin.

- (5) Install mounting (14), attach with bolts (13) and (15). Safety with lockwire.
- (6) Connect electrical connectors (9).
- (7) Install spring rod (Ref. 27-12-12, Removal/Installation).
- (8) Remove rigging pin D925252001.

### F. Test

- (1) Carry out an operational test (Ref. 27-14-13, Adjustment/Test).
- (2) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Clean artificial feel jack and adjacent area ; make certain that no traces of hydraulic fluid remain.
- (3) Install access door 213BZ and floor panel 213BF.
- (4) Close access doors and panels 121DB, 121FB, 151DB and 153BB.
- (5) Remove safety clips and tags and reset circuit breakers.
- (6) Remove access platform.
- (7) Remove warning notices.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### ARTIFICIAL FEEL JACK - BLUE SYSTEM - ADJUSTMENT/TEST

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The purpose of the following test is to check the operation of the artificial feel jack electrovalve (blue system) on the roll axis.

#### 2. Test

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Circuit Breaker Safety Clips	

##### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Aircraft must be on the ground ; shock absorbers compressed.

EFFECTIVITY: ALL

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- (3) On ADC control panel (centre console) check that ADC1 and ADC2 switches are in OFF position and ADC1 and ADC2 TEST selector switches are in NORM position.

- (4) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
STICK SHAKER SUP	1-213	W 513	P15

- (5) Check that the following circuit breakers are reset :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ADC 1 28V SUP	1-213	1F 74	P12
ADC 1 26V SUP	2-213	1F 78	A 2
1ST PLT ADC INST SUP		1F 75	B 3
ROLL ART FEEL COMP 1 SUP		1C 243	E 3
ADC 1 115V SUP		1F 73	F 3
RH VC WEIGHT SW B SYS SUP	3-213	G 294	B 9

- (6) Remove safety clips and tags and set the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT & NAV BUS 14XS	2-213	X 355	H 2
NAV INST BUS 13XS	13-216	X 345	G 4

- (7) Carry out Prepare paragraph operations detailed in procedure to set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).

NOTE : During the following test, do not take into account aural and visual warnings which are not mentioned.

C. Test

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- (1) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (2) At center console, on ADC control panel.
  - (a) Place ADC1 switch in ON position.
  - (b) Place ADC1 TEST selector switch in position 1.
    - (b1) Amber ADC1 warning light must illuminate.
    - (b2) After approximately 30 seconds, ADC1 blue TEST indicator light must illuminate.
  - (c) Press and release ADC1 warning light :  
this light must go off.
- (3) At overhead panel, on ARTIFICIAL FEEL No.1 engage switch unit, engage ROLL switch :  
this switch must remain engaged.
- (4) Fully turn control handwheel in both directions and note load required to carry out this operation.
- (5) While turning handweel ;
  - (a) Maintain ROLL switch engaged.
  - (b) Press and hold ARTIFICIAL FEEL TEST 1 push-button (At Flight Engineer's station, panel 29-214).  
As soon as TEST push-button is pressed, load applied to handwheel must be less than exerted in (4) above.
- (6) Stop operating control handwheel.
- (7) Release Roll switch, while holding TEST 1 push-button pressed.  
ROLL switch must disengage and indicate OFF.
- (8) At Flight Engineer's panel 29-214, release ARTIFICIAL FEEL TEST 1 push-button.

### D. Close-Up

- (1) At centre console, on ADC control panel ;
  - (a) Place ADC1 TEST selector switch in NORM position
  - (b) Place ADC1 switch in OFF position.

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- (2) Carry out Close-Up operations detailed in procedure to set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (3) Remove safety clip and tag and reset circuit breaker W513.
- (4) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT & NAV BUS 14XS	2-213	X 355	H 2
NAV INST BUS 13XS	13-213	X 345	G 4

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### ARTIFICIAL FEEL JACK (GREEN, ROLL) - SERVICING

**WARNING:** MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

This procedure is to render an artificial feel jack inoperable following an electro-valve failure, servo valve failure or for other operational reasons.

#### 2. De-activation of Artificial Feel Jack (Green)

##### A. Equipment and Materials

	DESCRIPTION	PART NO.
RB RB	Blanking Plug	C27-133
	Blanking Plugs	AN 929-4S
	Blanking Plugs	AN 929-5S
	Circuit Breaker Safety Clips	B24715
	Lockwire dia. 1 mm (0.041 in)	
	Corrosion Resistant Steel	-
	Warning Notices	-

##### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.

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- (2) Trip, safety and tag the following circuit breakers:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
ROLL ART FEEL COMP 2 SUP	13-216	2C243	G17
HYD TANK COMPR CONT	15-215	M602	D8
HYD TANK AIR COMPR SUP	13-215	M601	G7
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M626	F22

- (3) Open access doors 151DB, and 153BB beneath the fuselage and depressurize the Green, Blue and Yellow hydraulic systems. Depressurize the Green hydraulic tank. Close and safety tank depressurization valve with lockpin.

WARNING: DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS USED, DISPLAY A WARNING NOTICE ON THIS UNIT, PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (4) Remove access panels 121DB and 121FB.

### C. Procedure A. (Ref. Fig. 001)

CAUTION: ENSURE THAT THE ARTIFICIAL FEEL JACK TO BE DE-ACTIVATED IS AGAINST MECHANICAL STOP.

NOTE: An alternative method for de-activation of artificial feel jack is shown in Procedure B.

- (1) Cut and remove wire locking. Disconnect artificial feel jack pressure pipe at hydraulic system manifold 5105.
- (2) Fit blanking plug C27-133 (located in the Flight Kit) to manifold. Connect the pressure pipe to blanking plug C27-133 and safety with lockwire.

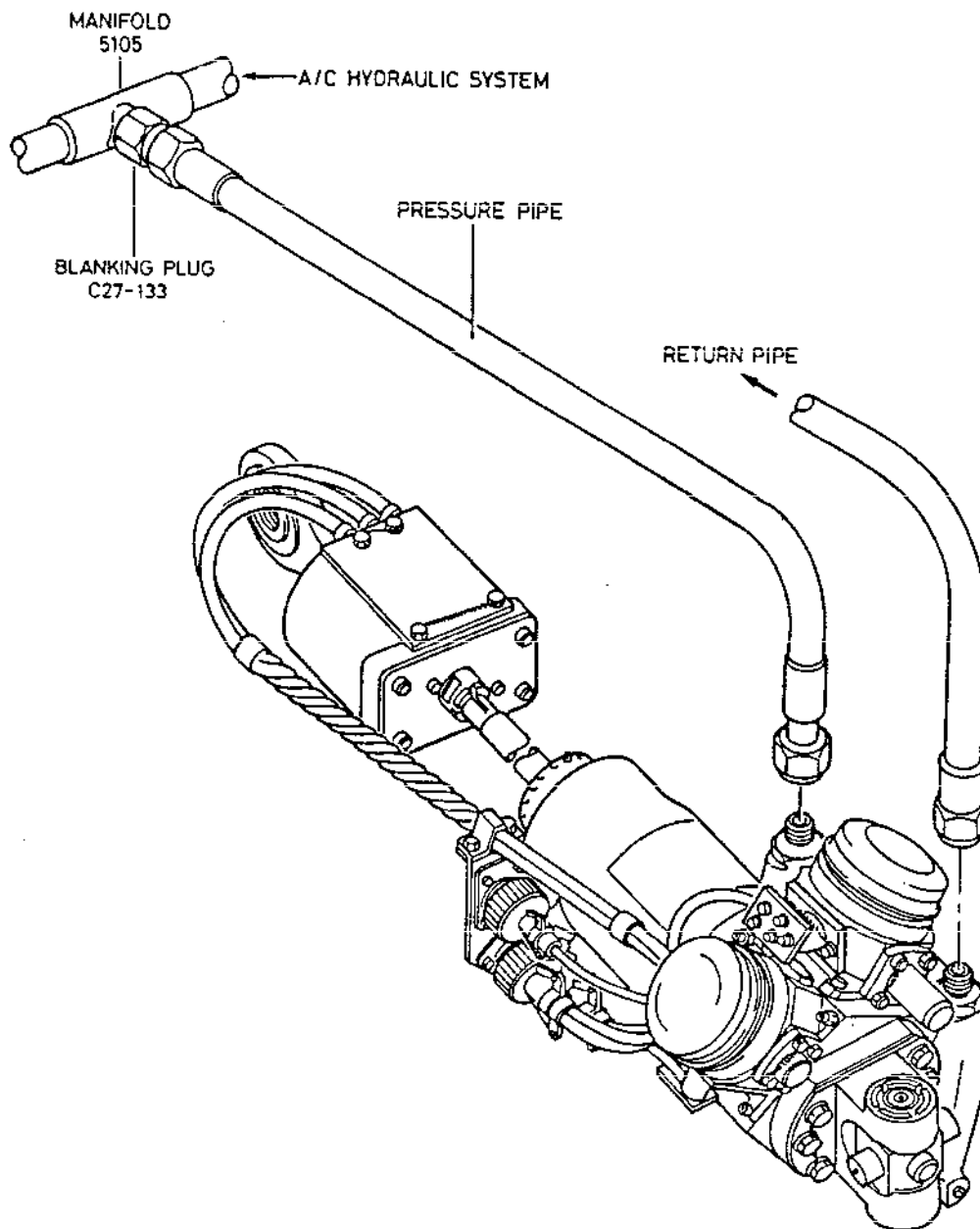
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De-activation of Artificial  
Feel Jack  
Fig. 001

CMA 27 14 15 001A

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Procedure B. (Ref. Fig. 001)

CAUTION: ENSURE THAT THE ARTIFICIAL FEEL JACK TO BE DE-ACTIVATED IS AGAINST MECHANICAL STOP.

- (1) Cut and remove wire locking. Disconnect pressure and return pipes from artificial feel jack and hydraulic system manifolds 5105 and 5106 respectively. Retain the hydraulic pipes removed.

- RB (2) Fit blanking plugs AN 929-4S to artificial feel jack pressure port and manifold 5105. Fit blanking plugs RB AN 929-5S to artificial feel jack return port and manifold 5106. Wirelock all blanks.

### D. Test

- (1) Remove safety clips and tags, reset circuit breakers tripped in para. B.(2).
- (2) Establish interphone communication with ground crew.
- (3) Pressurize Green hydraulic tank (Ref. 29-00-00, Servicing).
- (4) Set flight controls in mechanical mode (Ref. 27-00-00, Servicing).
- (5) At centre console, on ADC control panel:
  - (a) Place ADC2 switch in ON position.
  - (b) After approximately 30 seconds ADC2 blue TEST light is lit.
  - (c) Press and release ADC2 amber warning light:  
- the light must go off.

NOTE: During the test check for leaks around the blanking plug.

- (6) Operate the handwheel over the full range of movement. Check control surface deflection at the ICOVOL indicator.
- (7) On ADC control panel:
  - (a) Place ADC2 TEST selector switch in position 1.
  - (b) Press and release ADC2 amber warning light:  
- the light must go off.

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- (8) At overhead panel, on ARTIFICIAL FEEL engage switch unit, operate system 2 ROLL channel switch. Check that:
  - (a) The switch does not engage.
  - (b) The gong sounds.
  - (c) The FEEL or PCA light comes on.
- (9) Place ADC2 TEST selector switch in NORM position.
- (10) On ADC control panel, place ADC2 switch in OFF position.

### E. Close-up

- (1) Carry out close-up operations detailed in procedure to set flight controls in mechanical mode (Ref. 27-00-00, Servicing).
- (2) Discontinue interphone communication with ground crew.
- (3) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.
- (4) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (5) Remove warning notices.
- (6) Close access doors and panels 151DB, 153BB, 121FB and 121DB.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### ARTIFICIAL FEEL JACK - GREEN SYSTEM - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

- A. The Green artificial feel jack applies a force, to mechanical control, which is a function of the flight conditions.

#### 2. Artificial Feel Jack - Green System

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins - Synchro Pack	0925252000
Circuit Breaker Safety Clips	
Access Platform 3.672 m (12 ft.)	
General Lubricant (Ref. 20-30-00, No.51)	
Blanking Plugs/Caps for Hydraulic Lines	
Lockwire Dia. 1.0 mm (0.041 in.)	

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DESCRIPTION

PART NO.

Corrosion Resistant Steel

### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ROLL ART FEEL COMP 2 SUP	13-216	2C 243	G17
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22
(3) Make certain that roll controls and trim controls are set to zero.			
(4) Remove access panels 121DB and 121FB, immobilize roll resolvers with rigging pin D925252001.			
(5) Open access doors 151DB, and 153BB beneath the fuselage, and depressurize the Green, Blue and Yellow hydraulic systems. Depressurize the Green hydraulic tank. Close and safety tank depressurization valve with lock pin.			

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND  
3 PROHIBITING PRESSURIZATION OF BLUE, GREEN  
AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC  
GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S  
STATION PROHIBITING USE OF GROUND PRESSURI-  
ZING SYSTEM ELECTRIC PUMPS.  
IF A HYDRAULIC GROUND POWER UNIT IS CONNec-  
TED DISPLAY A WARNING NOTICE ON THIS UNIT,  
PROHIBITING PRESSURIZATION OF THE AIRCRAFT  
HYDRAULIC SYSTEMS.

- (6) Remove rods between Artificial Feel input lever and

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synchro pack of Roll mechanical control. Do not change length of these rods.

NOTE : For installing or removing attachment bolts it is necessary to press plunger on head of bolt in order to free the locking balls.

### C. Remove

- (1) Disconnect electrical connectors (11) on mounting (18).
- (2) Remove electrical connector mounting (18).
  - (a) Remove cotter pins, unscrew nuts (15), remove washers (16) and bolts (17).
  - (b) Remove cotter pins (20) and tube (19).
  - (c) Remove mounting (18).
- (3) Remove cotter pin (1), unscrew nut (2).
- (4) Remove washer (3), and bolt (4).
- (5) Disconnect hydraulic lines (9) and (10) and cap their ends.
- (6) Unsafety and unscrew bolts (6) attaching LH pivot support (5).
- (7) Support jack, unsafety and unscrew bolts (7) attaching RH pivot support (8).
- (8) Remove artificial feel jack (12).
- (9) Remove LH and RH pivot supports (5) and (8).

### D. Preparation of Replacement Component

WARNING : HOLD JACK BY BODY : CAREFULLY AVOID TO DAMAGE EYE END FITTING OR TRANSDUCER HOUSING.  
DO NOT HOLD JACK BY : EYE END FITTING, FORCE TRANSDUCER HOUSING, TRANSDUCER CABLE BUNDLE, JACK PISTON ROD, SERVO VALVES.

### E. Install

- (1) Position and install rear section of jack with RH and LH pivot supports (8) and (5) on beam attachment fittings.

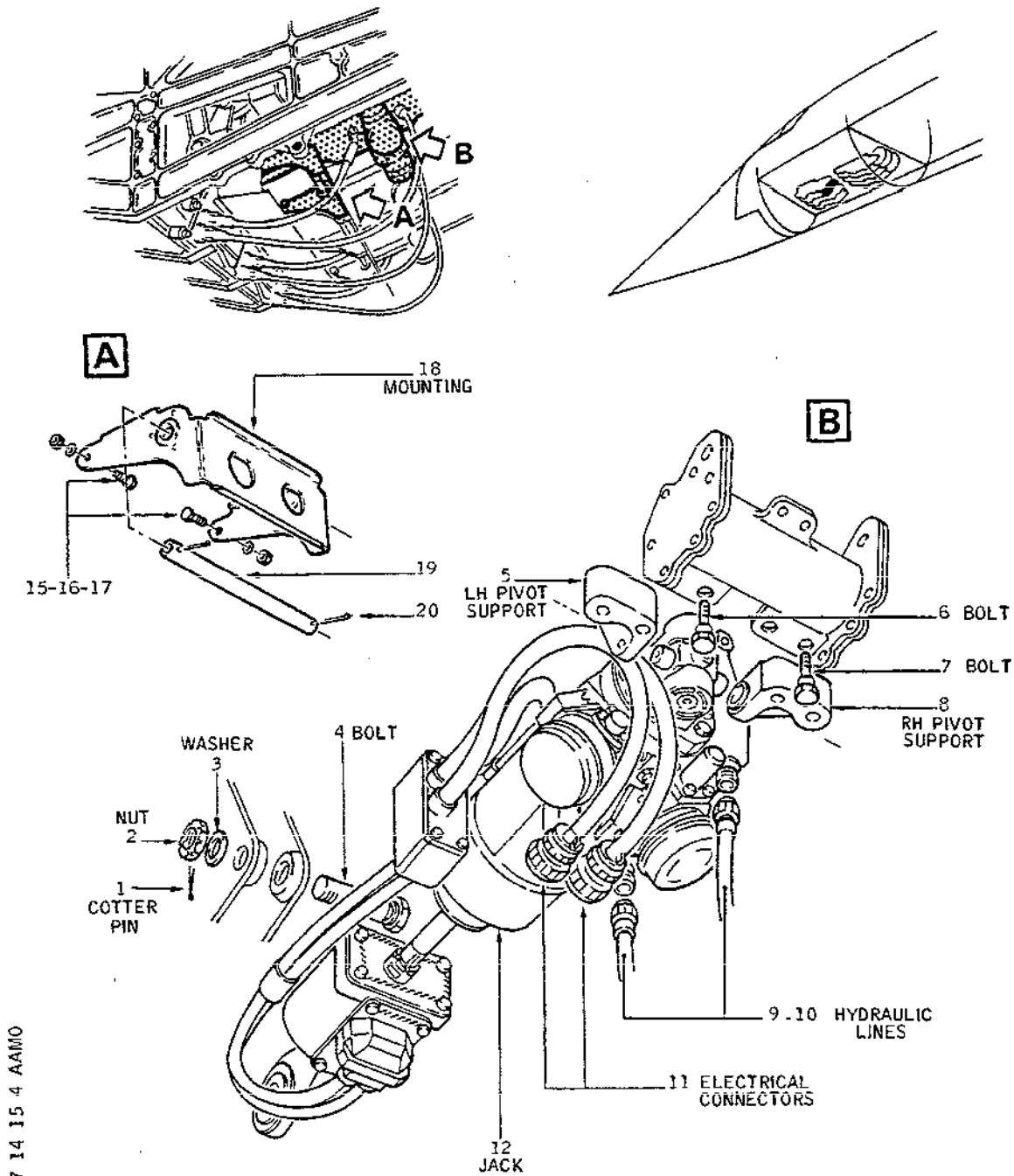
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Green Artificial Feel Jack  
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NOTE : During installation, lubricate bearing housings of pivots (5) and (8) with product No.51.

- (2) Attach jack (12) to beam attachment fittings using screws (7) and (6).  
Torque to between 125 and 140 lbf.in. (1.412 and 1.581 m.daN).  
Safety with lockwire as per 20-21-13.
- (3) Connect hydraulic lines (9) and (10) to hydraulic supply block. Jack must be left free to move in order to avoid imposing force (due to tightening) on transducer.
- (4) Install eye end fitting on rocker arm ; attach with bolt (4), washer (3), nut (2).  
Torque to between 100 and 110 lbf.in. (1.129 and 1.242 m.daN). Safety with cotter pin.
- (5) Install electrical connector mounting (18) on chassis.
  - (a) Install tube (19), attach with cotter pins (20).
  - (b) Install bolts (17), washers (16), nuts (15).  
Torque to between 12 and 15 lbf.in. (0.135 and 0.169 m.daN). Safety with cotter pin.
- (6) Connect electrical connectors (11).
- (7) Install rods between artificial feel lever and synchro pack, bolt, special washer, flat washer, nut.  
Torque to between 27 and 32 lbf.in. (0.30 and 0.35 m.daN). Safety with cotter pin.
- (8) Remove rigging pin D925252001.

### F. Tests

- (1) Carry out an operational test (Ref. 27-14-15, Adjustment/Test).
- (2) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Clean artificial feel jack and adjacent area.  
Make certain that no trace of hydraulic fluid remains.
- (2) Make certain that working area is clean and clear of

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tools and miscellaneous items of equipment.

- (3) Close access doors and panels 121DB, 121FB, 151DB and 153BB.
- (4) Remove safety clips and tags and reset circuit breakers 2C243, panel 13-216 Map. ref. G17  
M626, panel 15-216 Map. ref. F22.
- (5) Remove access platform.
- (6) Remove warning notices.

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### ARTIFICIAL FEEL JACK - GREEN SYSTEM - ADJUSTMENT/TEST

WARNING: MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE: DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED: DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The purpose of the following test is to check the operation of the artificial feel jack electrovalve (Green system) on the Roll axis.

#### 2. Test

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical ground power unit	-
Circuit breaker safety clips	-

##### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Aircraft must be on the ground, shock absorbers compressed.
- (3) On ADC control panel (centre console) check that ADC1 and ADC2 switches are in OFF position and ADC1 and ADC2 TEST selector switches are in NORM position.

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- (4) Trip, safety and tag the following circuit breaker:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
STICK SHAKER SUP	1-213	W 513	P15

- (5) Check that the following circuit breakers are set:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW A SYS SUP	1-213	G 292	H17
ADC 2 28V SUP	5-213	2F 74	F12
2ND PLT ADC INST SUP	13-216	2F 75	A14
ADC 2 26V SUP		2F 78	F14
ADC 2 115V SUP		2F 73	F15
ROLL ART FEL COMP 2 SUP		2C 243	G17

- (6) Remove safety clips and tags and set the following circuit breakers:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT & NAV BUS 14XS	2-213	X 355	H 2
NAV INST BUS 13XS	13-216	X 345	G 4

- (7) Carry out Prepare paragraph operations detailed in Procedure to set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).

NOTE: During the following test, do not take into account aural and visual warnings which are not mentioned.

### C. Test

- (1) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (2) At centre console, on ADC control panel.
  - (a) Place ADC2 switch in ON position.
  - (b) Place ADC2 TEST selector switch in position 1.

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b1) Amber ADC2 warning light must illuminate.

b2) After approximately 30 seconds, ADC2 blue TEST indicator light must illuminate.

(c) Press and release ADC2 warning light:

- This light must go off.

(3) At overhead panel, on ARTIFICIAL FEEL No.2 engage switch unit, engage ROLL switch. This switch must remain engaged.

(4) Fully turn control handwheel in both directions and note load required to carry out this operation.

(5) While turning control handwheel.

(a) Maintain ROLL switch engaged.

(b) Press and hold ARTIFICIAL FEEL TEST 2 push button (at Flight Engineer's station, panel 29-214).

As soon as TEST push button is pressed, load applied to handwheel must be less than that exerted in (4) above.

(6) Stop operating control handwheel.

(7) Release ROLL switch while holding TEST 2 push button pressed.

ROLL switch must disengage and indicate OFF.

(8) At Flight Engineer's panel 29-214, release ARTIFICIAL FEEL TEST 2 push button.

### D. Close-Up

(1) At centre console, on ADC control panel.

(a) Place ADC 2 TEST selector switch in NORM position.

(b) Place ADC 2 switch in OFF position.

(2) Carry out Close-Up operations detailed in Procedure to set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).

(3) Remove safety clip and tag and set circuit breaker W 513.

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(4) Trip, safety and tag the following circuit breakers:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT & NAV BUS 14XS	2-213	X 355	H 2
NAV INST BUS 13XS	13-216	X 345	G 4

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### 26 V, 1800 Hz GENERATION - DESCRIPTION AND OPERATION

#### 1. General

- An electrical generation system reserved solely for the supply of flight control electrical channels is necessary for the following reasons :
  - To provide a 26 V-1800 Hz AC current. This frequency is that which enables the resolvers on the various control and monitoring channels to operate at optimum performance.
  - To be independent of engine failure.
  - To be free from voltage fluctuations in the main aircraft network.
  - To avoid possible interference with the 400 Hz aircraft network.

This electrical generation is common to the 3 axes : pitch, roll and yaw.

- Two electrical control and monitoring channels are used ; each totally independent of and able to replace the other. Two 26 V-1800 Hz networks (Blue and Green) also totally independent of each other, though identical, are installed in the aircraft.

#### 2. Description (Ref. Fig. 001 )

- A 26 V-1800 Hz A.C. generation system consists of :
  - An inverter supplied with 28 VDC from the essential bus bars and produces 26 VAC 1800 Hz. The Blue and Green inverters supply the Blue and Green 26 V-1800 Hz bus bars respectively.
  - A protection unit which, in the event of over voltage, under voltage, over frequency or under frequency;
    - Cuts off the power supply to the inverter
    - Changes control channel (Ref. 27-16-00 and 27-17-00)
    - Operates the warning system (warning lights and aural warnings).
  - A control and indicating unit common to the two systems is located on the overhead panel in the flight compartments and consisting of :
    - A control switch and a FAIL caption light for each of the the Blue and Green inverters.  
(Pressing the FAIL caption light operates the aural and luminous warnings : "Test" function).
  - Indicating relays which operate the FAIL caption light for a failed inverter and set off the master warnings (luminous and aural).

EFFECTIVITY: ALL

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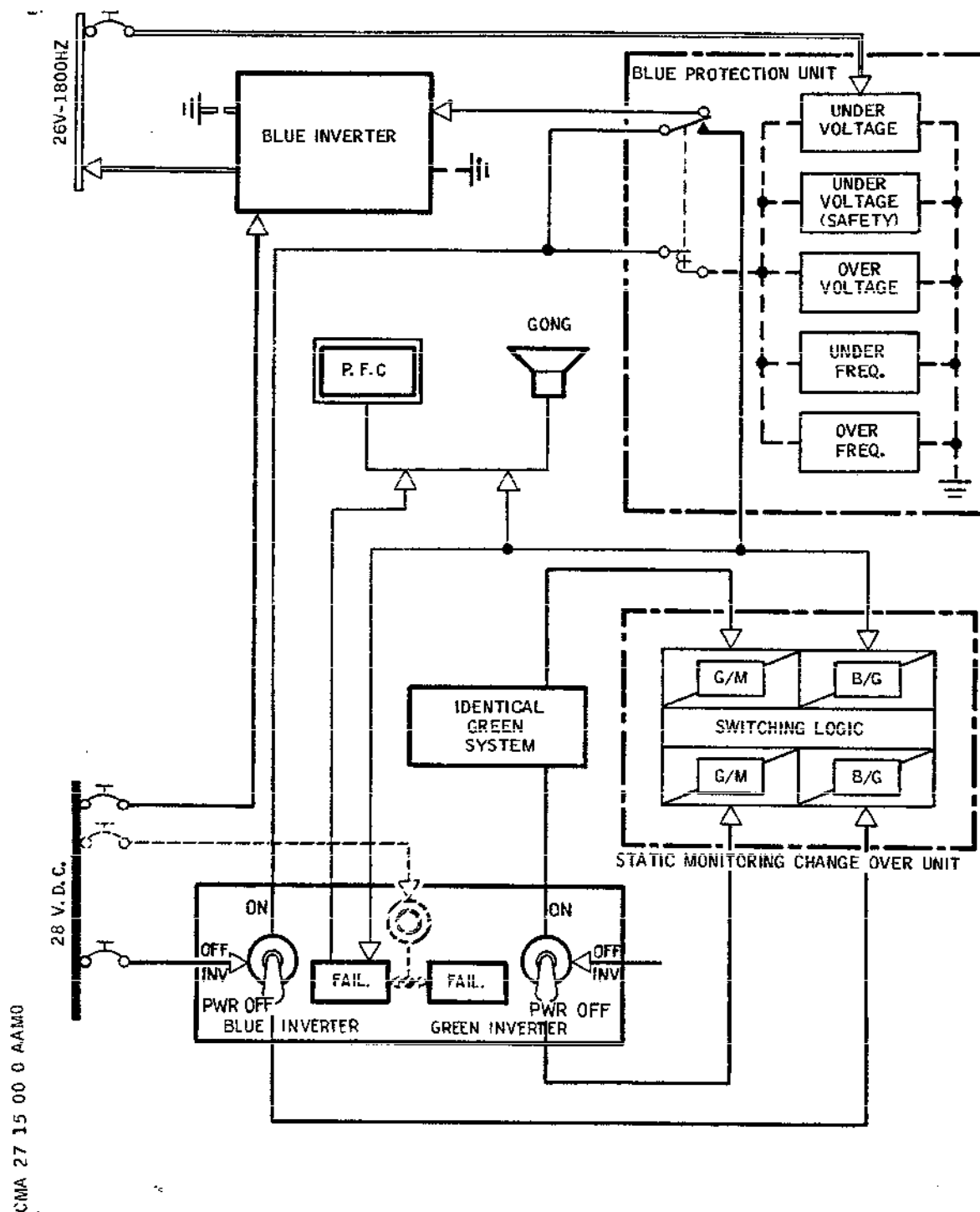
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## MAINTENANCE MANUAL



26 V, 1800 Hz AC Generation - Block Diagram  
Figure 001

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## MAINTENANCE MANUAL

### 3. Static Inverters

An inverter, of entirely static design, is supplied with 28VDC from an essential bus bar. It delivers a nominal 300 VA at 26 VAC and 1800 Hz (single phase).

- For a supply voltage varying between 22 V and 30 VDC, the output voltage remains between 25.6 and 26.4 volts for a given power of between 75 and 150 VA.  
The frequency, under these circumstances, remains between 1782 Hz and 1818 Hz ( $1800 \pm 18$  Hz) for these conditions.

An inverter can provide 450 VA for a period of 5 mins, or 600 VA for a period of 10 seconds.

The level of conduction interference and spurious emission is reduced to a level which conforms to specification MIL.I.26600.

The general principles of operation are as follows :

The conversion from DC to AC voltage is achieved using two switching transistors and a transformer consisting of a centre-tapped primary winding and a secondary winding. The transistors receive alternate conduction and blocking signals in such a manner that the current passing through the two halves of the primary windings produce an AC voltage of square waveform at the secondary winding. After wave forming, the voltage is sent to the distribution bar, (bus bar).

### 4. Protection Units

A protection unit is associated with each inverter, each unit consisting essentially of :

- a transformer, the primary winding of which is supplied by the inverter and the secondary windings in turn power the modules which detect :
  - an under voltage of  $20.5 \pm 0.5$  volts
  - an over voltage of  $30 \pm 0.4$  volts
  - an over frequency of  $1870 \pm 10$  Hz
  - an under frequency of  $1730 \pm 10$  Hz
  - an under voltage (safety  $18 \pm 1$  volts).
- Two detection relays, one or other of which is energized when one of the above faults is detected.

### 5. Control Unit

This unit forms part of the Flight Control Unit.  
It includes two control switches, BLUE INVERTER and GREEN IN-

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VERTER, each having three positions, ON, INV OFF and PWR OFF : also two FAIL caption lights which indicate the failure of one or other of the networks.

Various relays in the unit are controlled by signals from the protection unit and which in turn cause the FAIL caption light to illuminate or extinguish.

### 6. Operation (Ref. Fig. 002 )

- The BLUE INVERTER (GREEN INVERTER) control switch has three positions :
  - In PWR OFF position, the switch isolates the Blue system (Green system) 28 VDC bus bar and only supplies the Blue (Green) control and monitoring channels using this voltage. This position, used on the ground only, avoids the necessity of leaving the circuits not in use energized while the A/C network is energized by a ground power supply unit. For this position, the corresponding FAIL indicator light is illuminated.
  - In OFF INV position the Blue system (Green system) 28 VDC bus bar is supplied but the corresponding inverter does not operate.
- By placing BLUE INVERTER (GREEN INVERTER) control switch in "ON", the inverter is supplied with 28 VDC if the Blue (or Green) protection unit so permits. This 28 VDC power can only be supplied if the voltage and frequency monitoring modules in the protection unit detect no fault in the 1800 Hz generation system. The protection unit is therefore supplied from the bus bar which supplies the inverter, in order to monitor voltage and frequency. When a fault occurs, the relays in the protection unit close and cause :
  - The 28 VDC inverter control supply to be cut off.
  - The operation of the "Green (Blue) electrical generation system fault" logic circuit in the static monitoring changeover unit : this causes a changeover of control channel.
  - Blue channel to Green channel if the Green inverter operates
  - Green channel to mechanical system if the Green inverter is inoperative.

This control channel changeover is indicated by "G" or "M" displayed on the magnetic indicators of the flight control surface position indicator (ICOVOL).

- The supplying of Blue (Green) system indicating relays of the control and indicating unit, which causes :
  - FAIL - BLUE INVERTER (GREEN INVERTER) caption light to illuminate.
  - The gong to sound.

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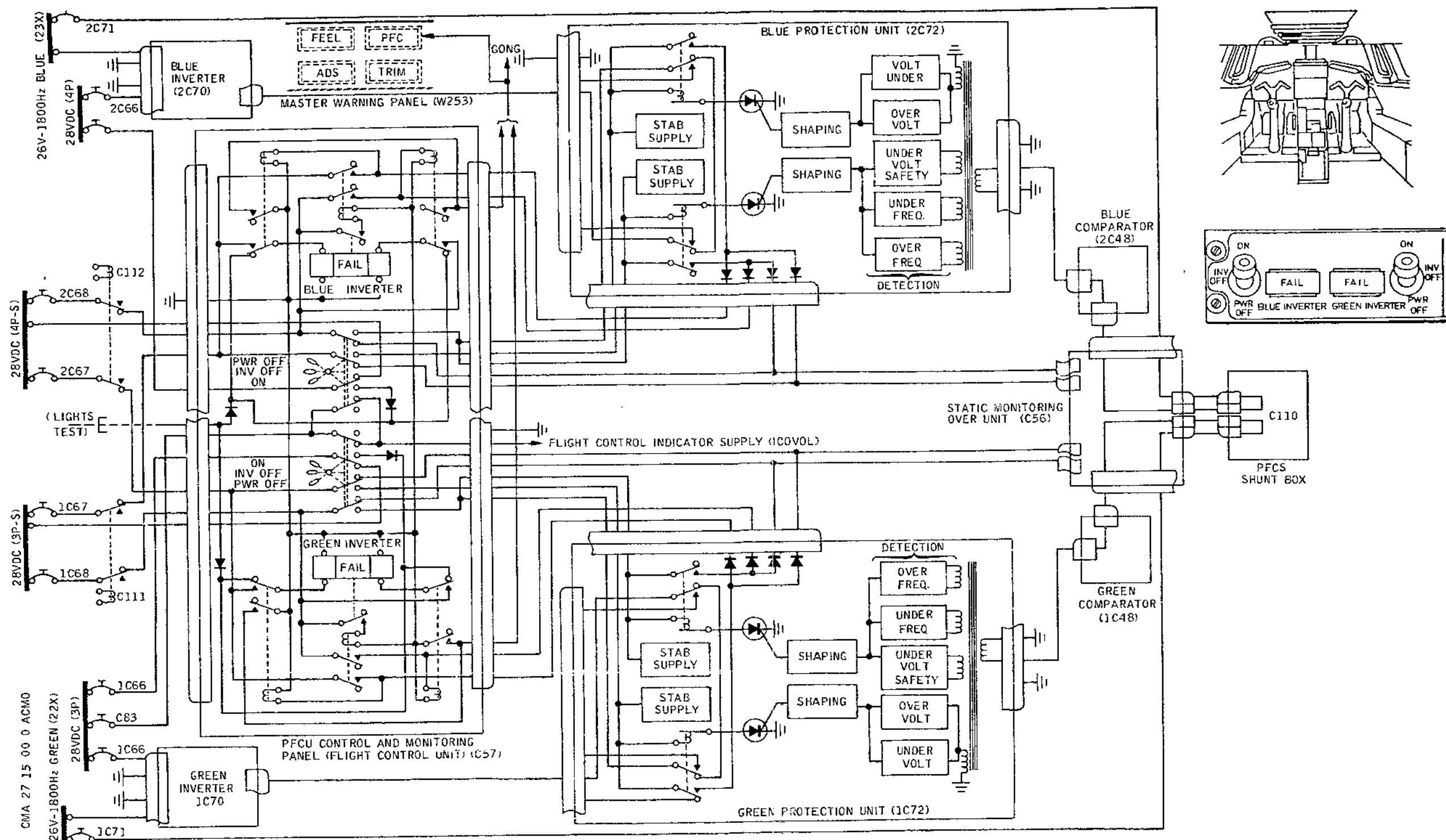
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## MAINTENANCE MANUAL



Blue and Green 26 V, 1800 Hz Generation -  
Schematic  
Figure 002

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- PFC warning light to illuminate on the master warning panel.

The 26 V 1800 Hz supply to the protection unit is possible only if the monitoring comparator and the static monitoring change-over unit are plugged in.

This safety precaution prevents the flight control electrical generation from being operated, if the corresponding monitoring channel is not operating.

### 7. Electrical Power Supply

The Blue and Green system inverters are supplied with essential 28 VDC busbars.

The control system of each inverter is supplied with a 28 VDC bar (one for each inverter) ; this bar supplies only the flight control system.

Each inverter supplies a distribution bar with 26 V - 1800 Hz current.

Details of supply and distribution busbars with their location are given in the following Table.

SERVICE	BUSBAR	C/B PANEL	
Blue Inverter Power Supply	28 VDC B.ESS.4P	5-213	
Green Inverter Power Supply	28 VDC A.ESS.3P	1-213	
Blue Inverter Control System Power Supply	28 VDC B.ESS.4P.S	5-213	
Green Inverter Control System Power Supply	28 VDC B.ESS.3P.S	1-213	
Blue Distribution Bar	B. FLYING CONTROL 26 VAC - 1800 Hz	23X	2-213
Green Distribution Bar	A. FLYING CONTROL 26 VAC - 1800 Hz	22X	2-213

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## MAINTENANCE MANUAL

### 26V, 1800Hz GENERATION - TROUBLE SHOOTING

**WARNING** : OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN CHAPTER 24-00-00, S.

#### 1. General

The following information is intended to enable faults found in flight or on the ground to be quickly rectified.

This information is given in the form of Fault analysis synoptic charts.

The electrical wiring is assumed to be serviceable. However if the component fault is not found, check the wiring in accordance with the Wiring Diagram Manual (27-35-01).

The system consists of two channels. Trouble shooting procedure described is for channel 1, trouble shooting procedure for channel 2 is indicated between brackets.

#### 2. Prepare

##### A. Equipment and Materials

---

DESCRIPTION

PART NO.

---

Electrical Ground Power Unit

##### B. Make certain that the following circuit breakers are set :

---

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
<hr/>			
PFCS INV GRN FAIL IND	1-213	1C 73	M15
AUDIO WARN SYS SUP 1		W 371	M21
PFCS INV BLUE FAIL SUP		1C 67	N14
PFCS INV GRN PROTN CONT		1C 68	N15
M.W.S. SUP 1		W 252	N21
P.F.C.S. INV GRN SUP		1C 66	P11
PFCS INV BLUE PROTN SUP	2-213	2C 71	D 5
PFCS INV GRN PROTN SUP		1C 71	G 5
PFCS INV BLUE SUP	5-213	2C 66	B14
PFCS INV GRN FAIL SUP		2C 67	C13
PFCS INV BLUE PROTN CONT		2C 68	C14

---

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
AUDIO WARN SYS SUP 2		W 372	C17
M.W.S. SUP 2		W 251	D15
PFCS INV BLUE FAIL IND		2C 73	E11

C. On Overhead Panel, on Flight Control Unit :

- (1) Place O & M ELEVONS, IN ELEVONS and RUDDER switches in MECH position.
- (2) Place BLUE INVERTER and GREEN INVERTER switches in OFF INV position.

D. Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, S).

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## MAINTENANCE MANUAL

### 3. Trouble Shooting

\*\*\*\*\*  
\*On overhead panel, on Flight Control\*  
\*Unit, press and hold pressed BLUE \*  
\*INVERTER (GREEN INVERTER) FAIL \*  
\*indicator light. Circuit breakers \*  
\*2C68(1C68) and 1C67 (2C67) remain \*  
\*set. \*

*****	*****	*****
OK	NOT OK-----	Replace Flight Control Unit (Ref. 27-36-15, R/I)

\*\*\*\*\*  
\*Both lamps of BLUE INVERTER (GREEN \*  
\*INVERTER) FAIL indicator light \*  
\*illuminate \*

*****	*****	*****
OK	NOT OK-----	BLUE INVERTER (GREEN INVERTER) FAIL Press to Test indicator light faulty : Both lamps of indicator light are off. Chart 102

*****	*****	*****
	NOT OK-----	BLUE INVERTER (GREEN INVERTER) FAIL Press to Test indicator light faulty : one of the two lamps of the indicator light is off. Chart 103

R \*\*\*\*\*  
\*Gong sounds and on master warning \*  
\*panel, PFC warning light illuminates\*  
\*\*\*\*\*

*****	*****	*****
OK	NOT OK-----	(Ref. 33-15-00, T/S)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\*Release BLUE INVERTER (GREEN INVER- \*  
\*TER) FAIL indicator light; it must \*  
\*go off. \*  
\*Place BLUE INVERTER (GREEN INVERTER)\*  
\*switch in ON position. \*  
\*BLUE INVERTER (GREEN INVERTER) FAIL \*  
\*indicator light remains off \*  
\*\*\*\*\*

		Blue (Green) 26V 1800Hz Gene-
OK	NOT OK-----	ration Warning : Both lamps
		of BLUE INVERTER (GREEN INV-
		ERTER) FAIL indicator light
		illuminate.
		Chart 104

\*\*\*\*\*  
\*Place BLUE INVERTER (GREEN INVERTER)\*  
\*switch in PWR OFF position. \*  
\*BLUE INVERTER (GREEN INVERTER) FAIL \*  
\*indicator light illuminates \*  
\*\*\*\*\*

		Replace Flight Control Unit
OK	NOT OK-----	(Ref. 27-36-15, R/I)

\*\*\*\*\*  
\*Trouble shooting of inverter protec-\*  
\*tion unit, using Flight controls \*  
\*electrical circuits test set is \*  
\*dealt with in chapter 27-10-00, T/S \*  
\*\*\*\*\*

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## MAINTENANCE MANUAL

*****	
*BLUE INVERTER (GREEN INVERTER) FAIL *	GROUND EQUIPMENT REQUIRED
*press to test indicator light *	-----
*faulty: Both lamps of indicator *	DESCRIPTION PART NO
*light are off *	
*****	
	Voltmeter

\*\*\*\*\*  
\*On overhead panel, on Flight Control\*  
\*unit, place BLUE INVERTER (GREEN \*  
\*INVERTER) switch in PWR OFF position\*  
\*Both lamps of BLUE INVERTER (GREEN \*  
\*INVERTER) FAIL indicator light \*  
\*illuminate. \*

*****	
YES	NO-----
	On circuit breaker panel
	5-213 (1-213) replace
	circuit breaker 2C73(1C73)
	Ref. 24-50-00, R/I

\*\*\*\*\*  
\*Unlock circuit breaker panel 15-216 \*  
\*and on shelf 12-216 remove relay \*  
\*C112 (C111). On relay base, check \*  
\*voltage on pin B2. \*

*****	
28V	0V-----
	On circuit breaker panel
	5-213 (1-213), replace
	circuit breaker 2C68 (1C68)
	Ref. 24-50-00, R/I

Chart 102 (Sheet 1 of 2)

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## MAINTENANCE MANUAL

||  
\*\*\*\*\*  
\*On shelf 12-216, interchange relays \*  
\*C112 and C111, then on overhead \*  
\*panel, on Flight Control unit, place\*  
\*BLUE INVERTER (GREEN INVERTER) \*  
\*switch in OFF INV position. Press \*  
\*BLUE INVERTER (GREEN INVERTER) FAIL \*  
\*indicator light. This indicator \*  
\* light illuminates. \*  
\*\*\*\*\*

		Replace Flight Control Unit
YES	NO-----	C 57.
		(Ref. 27-36-15, R/I)
	-----	Replace Relay in C111 (C112)
		position

Chart 102 (Sheet 2 of 2)

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# MAINTENANCE MANUAL

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO
Voltmeter	

Replace Flight Control Unit  
C 57.  
(Ref. 27-36-15, R/I)

On circuit breaker 1-213  
(5-213), replace circuit  
breaker 1C67 (2C67)  
(Ref. 24-50-00, R/I)

Replace Flight Control Unit  
C 57.  
(Ref. 27-36-15, R/I)

Replace relay in C112  
(C111) position.

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## MAINTENANCE MANUAL

```
*****
*Blue (Green) 26V 1800Hz generation *
*warning : Both lamps of BLUE      *
*INVERTER (GREEN INVERTER) FAIL    *
*indicator light are illuminated    *
*****
```

DESCRIPTION	PART NO
Voltmeter	

```
*****
*Interchange 26 Volt 1800Hz static *
*inverters 2C70 and 1C70 - Ref.    *
*27-35-11, R/I. Both lamps of BLUE *
*INVERTER (GREEN INVERTER) FAIL    *
*indicator light remain illuminated. *
*****
```

YES	NO	
		Replace static inverter in 1C70 (2C70) position. (Ref. 27-35-11, R/I)

```
*****
*Interchange inverter protection    *
*units 2C72 and 1C72 Ref. 27-35-12, *
*R/I. Both lamps of BLUE INVERTER  *
*(GREEN INVERTER) FAIL indicator    *
*light remain illuminated            *
*****
```

YES	NO	
		Replace inverter protection unit in 1C72 (2C72) position. (Ref. 27-35-12, R/I)

Chart 104 (Sheet 1 of 2)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\*Remove static inverter 2C70 (1C70) \*  
\*Ref. 27-35-11, R/I. Measure voltage \*  
\*on pin 5 of electrical connector \*  
\*2C70 A (1C70 A) \*  
\*\*\*\*\*

		On circuit breaker panel
28V	0V-----	5-213 (1-213) replace
		circuit breaker 2C66 (1C66)
		(Ref. 24-50-00, R/I)
-----		
		On circuit breaker panel
		2-213 replace circuit
		breaker 2C71 (1C71)
		(Ref. 24-50-00, R/I)
-----		

Chart 104 (Sheet 2 of 2)

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### 4. Close-Up

- A. De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, S).

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## MAINTENANCE MANUAL

### 26 V, 1800 Hz GENERATION - ADJUSTMENT/TEST

#### R 1. General

R 26V 1800 Hz Blue and Green power generation networks supply the  
R Flight Control system in Blue and Green electrical modes.  
R Therefore, the following tests of 26V 1800 Hz power generation  
R are common to the three Flight Control Axes (Roll, Yaw and  
R Pitch).

#### R 2. Operational Test

##### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

R Electrical Ground Power Unit

##### B. Prepare

R (1) At overhead panel, on Flight Control Unit, make certain  
R that O & M ELEVONS, IN ELEVONS and RUDDER switches  
R are in MECH position and BLUE INVERTER and GREEN  
R INVERTER switches are in PWR OFF position.

(2) Make certain that the following circuit breakers are  
set :

---

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
---------	-------	--------------------	-------------

---

R PFCS INV GRN FAIL 1-213 1C 73 M15  
R IND

R AUDIO WARN SYS SUP 1 W 371 M21

R PFCS INV BLUE FAIL 1C 67 N14

R SUP

R PFCS INV GRN PROTN 1C 68 N15

R CONT

R MWS SUP 1 W 252 N21

R PFCS INV GRN SUP 1C 66 P11

R PFCS INV BLUE PROTN 2-213 2C 71 D 5

R SUP

R PFCS INV GRN PROTN 1C 71 G 5

R SUP

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	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
R	PFCs INV BLUE SUP	5-213	2C 66	B14
R	PFCs INV GRN FAIL		2C 67	C13
R	SUP			
R	PFCs INV BLUE PROTN		2C 68	C14
R	CONT			
R	AUDIO WARN SYS SUP 2		W 372	C17
R	MSW SUP 2		W 251	D15
R	PFCs INV BLUE FAIL		2C 73	E11
R	IND			
R	ROOF PNL LT TEST SUP	15-216	L1002	D13
R	(3) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).			
R	- At overhead panel :			
R	(a) Gong must sound			
R	(b) On master warning panel, PFC warning light must illuminate			
R	(c) On Flight Control Unit, FAIL warning lights of BLUE INVERTER and GREEN INVERTER switches must illuminate			
	<u>NOTE</u> : Do not take into account other caption or indicator lights which may illuminate.			
R	(4) At overhead panel, on master warning panel ;			
R	Press and release PFC warning light,			
	- It must extinguish.			
	C. Test			
R	(1) At overhead panel,			
R	(a) On Flight Control Unit,			
R	(a1) Place BLUE INVERTER switch in INV OFF position			
R	- the associated FAIL warning light extinguishes.			

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- R (a2) Place GREEN INVERTER switch in INV OFF posi-  
R tion
- R - The associated FAIL warning light extin-  
R guishes.
- R (a3) Press BLUE INVERTER FAIL warning light, then  
R release it.
- R - This warning light must illuminate then  
R extinguish  
R - On depression of the warning light, the  
R gong sounds.  
R - On master warning panel, the PFC warning  
R light illuminates.
- R (b) On master warning panel, press and release PFC  
R warning light  
R - this warning light extinguishes.
- R (c) On Flight Control Unit press and release GREEN  
R INVERTER FAIL warning light
- R - This warning light must illuminate then  
R extinguish  
R - On depression of the warning light, the gong  
R sounds.  
R - On master warning panel, the PFC warning light  
R illuminates.
- R (d) On master warning panel, press and release PFC  
R warning light
- R - The warning light extinguishes
- R (e) On Flight Control Unit, place BLUE INVERTER switch  
R in ON position.
- R - There is no apparent reaction
- R (2) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFCs INV BLUE PROTN SUP	2-213	2C 71	D 5
At overhead panel :			

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- R (a) Gong must sound
- R (b) On Flight Control Unit, BLUE INVERTER FAIL warning light must illuminate.
- R (c) On master warning panel, PFC warning light must illuminate.
- R (3) Reset circuit breaker 2C71 previously tripped.
- There is no apparent reaction.
- R (4) At overhead panel,
- R (a) On master warning panel, press and release PFC warning light
- R - This warning light extinguishes.
- R (b) On Flight Control Unit
- R (b1) Place BLUE INVERTER switch in INV OFF position, and then in ON position.
- R - The BLUE INVERTER FAIL warning light extinguishes.
- R (b2) Place GREEN INVERTER switch in ON position
- R - There is no apparent reaction.
- R (5) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
---------	-------	--------------------	-------------

- R PFCS INV GRN PROTN SUP 2-213 1C 71 G 5
- R At overhead panel :
- R (a) Gong sounds
- R (b) On Flight Control Unit, GREEN INVERTER FAIL warning light illuminates
- R (c) On master warning panel, PFC warning light illuminates.
- R (6) Reset circuit breaker 1C71 previously tripped.

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- There is no reaction.

R (7) At overhead panel, on Flight Control Unit,

R (a) Place GREEN INVERTER switch in INV OFF, and then  
R in ON position.

R - The GREEN INVERTER FAIL warning light extin-  
R guishes.

R (b) Place BLUE INVERTER and GREEN INVERTER switches in  
R PWR OFF position

R - The two associated FAIL warning lights illuminate.

### D. Close-Up

R (1) De-energize the aircraft electrical network and dis-  
connect electrical ground power unit (Ref. 24-41-00,  
R Servicing).

### R 3. Functional Test

R A complete functional test of the monitoring channels is carried  
R out by means of the Flight Controls Electrical Circuits Test  
R Set, P/N 31-56-100  
R Refer to topic 27-17-00, Adjustment/Test, Paragraph 3.

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## MAINTENANCE MANUAL

### ELECTRICAL CONTROL CHANNELS - DESCRIPTION AND OPERATION

#### 1. General

The six elevons, each actuated by a Power Flight Control Unit (PFCU), carry out the pitch and roll orders.

- Two electrical channels (Blue channel and Green channel) and a mechanical mode channel are available to control the PFCU's, however one channel alone is sufficient to operate the PFCUs.

The Blue channel is defined as the normal control channel ; in the event of faulty operation this channel is overridden by the Green channel and the mechanical channel overrides the Green channel if it, in turn, fails.

A control channel change-over (Blue to Green or Green to Mechanical) is triggered by the associated monitoring channel (Ref. 27-17-00, Description and Operation).

An electrical channel converts the deflection of the flight controls into electrical signals which are processed, then transmitted to the appropriate servovalve of each PFCU. The servovalve causes the PFCU to be displaced proportionally to and in the direction ordered by the flight controls.

#### A. Principle (Ref. Fig. 001 )

In roll control, the control handwheel drives a CDX differential resolver (one for each control channel) supplied with a 26V 1800Hz voltage by the pitch CX resolver output signals (These signals may be proportional to control column deflection. (Ref. 27-36-00)). The CDX resolver output signals are the sum of :

- the signals from the CX resolver (proportional to pitch orders)
- the signals generated by the handwheel rotation.

These signals are then applied to a CT resolver, the rotor of which is driven by the displacement of the PFCU. If the PFCU (and thus the elevon) is not in a position corresponding to that ordered by the flight control, a signal is generated at the output terminals of the CT resolver. This signal is amplified, then applied to the corresponding servovalve of the PFCU. The PFCU moves and drives the rotor of the CT resolver.

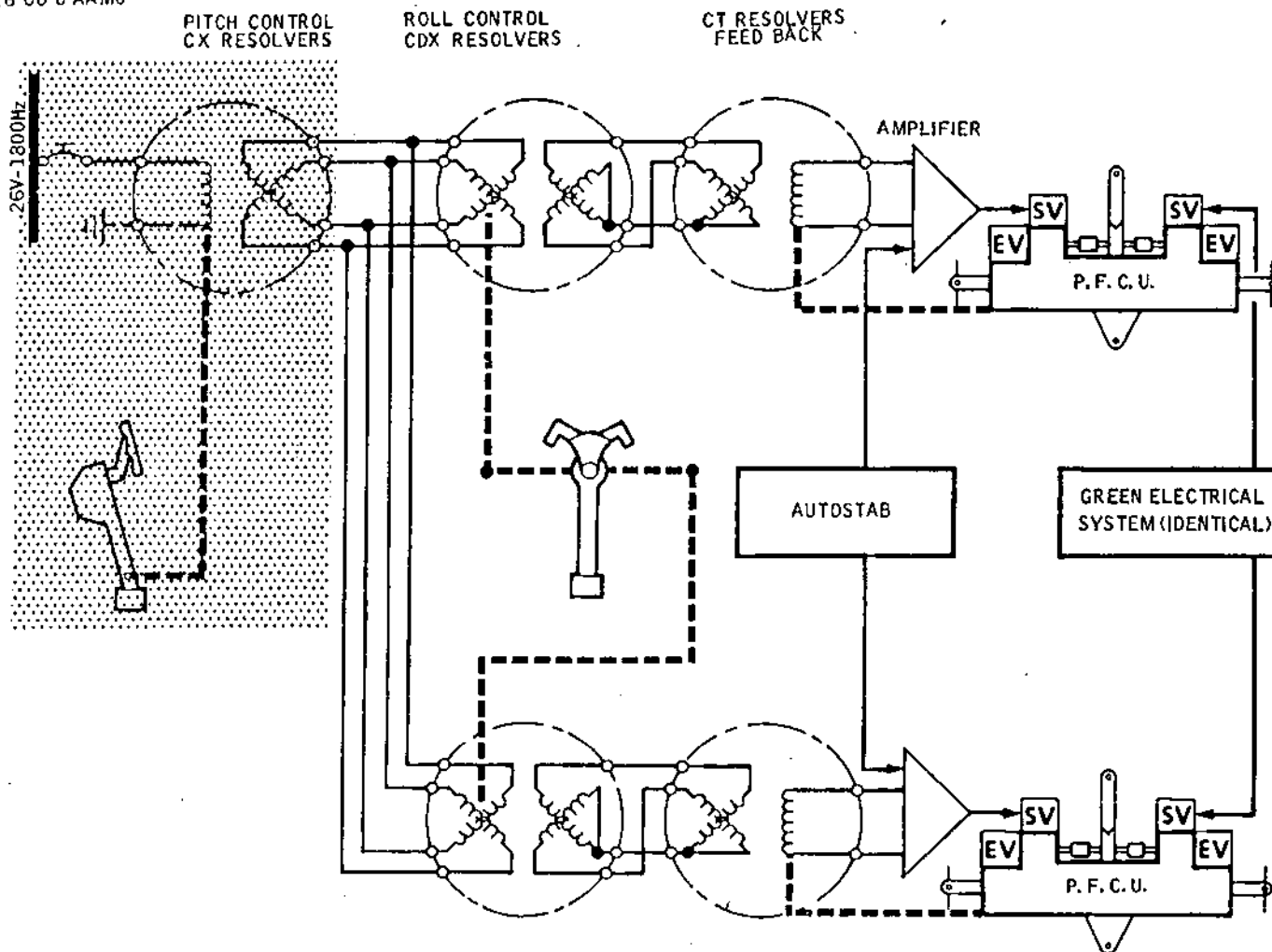
When the PFCU (and therefore the CT resolver rotor) reaches the ordered position, voltage at the CT resolver output terminals is zero and the PFCU stops.

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Control Channel for Two Symmetrical Elevons -  
Block Diagram  
Figure 001

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R

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### 2. Description (Ref. Fig. 002)

The aircraft having six elevons, each controlled by a PFCU, their control should normally need six CX resolvers, six CDX resolvers and six CT resolvers for each channel.

However the solution adopted for deflection of these elevons is such that the number of the CX and CDX resolvers has been reduced.

For each channel, in pitch control, two CX resolvers are sufficient to control the six PFCU's.

- Within the normal flight envelope, outer and middle elevons of each wing deflect by the same value when an order is given by the control column, thus, one CX resolver is sufficient to control the four elevons.
- A second CX resolver is necessary to control the deflection of the inner elevons which is different from that of outer and middle elevons.

The signals of each CX resolver are applied respectively to:

- The two outer and middle elevons CDX resolvers (of LH and RH wing)
- The two inner elevon CDX resolvers (of RH and LH wing).

In roll control, four CDX resolvers are sufficient to control the six PFCU's.

- Within the normal flight envelope, outer and middle elevons of a wing deflect equally in the same direction when a control handwheel input is given: since these two elevons deflect in the opposite direction to the outer and middle elevons of the opposite wing, two CDX resolvers are required to control the four outer and middle elevons.
- The output signals of each CDX resolvers are applied in parallel to each outer and middle elevon PFCU CT resolver of the corresponding RH and LH wing.
- Deflection of inner elevons which is different from that of the outer and middle elevons requires the use of one CDX resolver for each elevon PFCU.
- The output signals of each CDX resolver are respectively applied to the inner elevon PFCU CT resolver of the corresponding RH or LH wing.

Each PFCU includes one CT resolver which stops the PFCU when it reaches the position ordered.

- The output signal of each CT resolver is applied to an amplifier, together with an autostabilization signal. These two signals are summed, processed and transmitted to the servo-valve of the corresponding PFCU which is actuated causing the elevon to deflect by the controlled value. However, when the aircraft speed (VC) exceeds the maximum operational speed (VMO) by 25 knots (VC - VMO greater than or equal to 25 knots) a signal from the Air Data Computers triggers a neutralization computer.

This computer generates a signal of equal value but opposite

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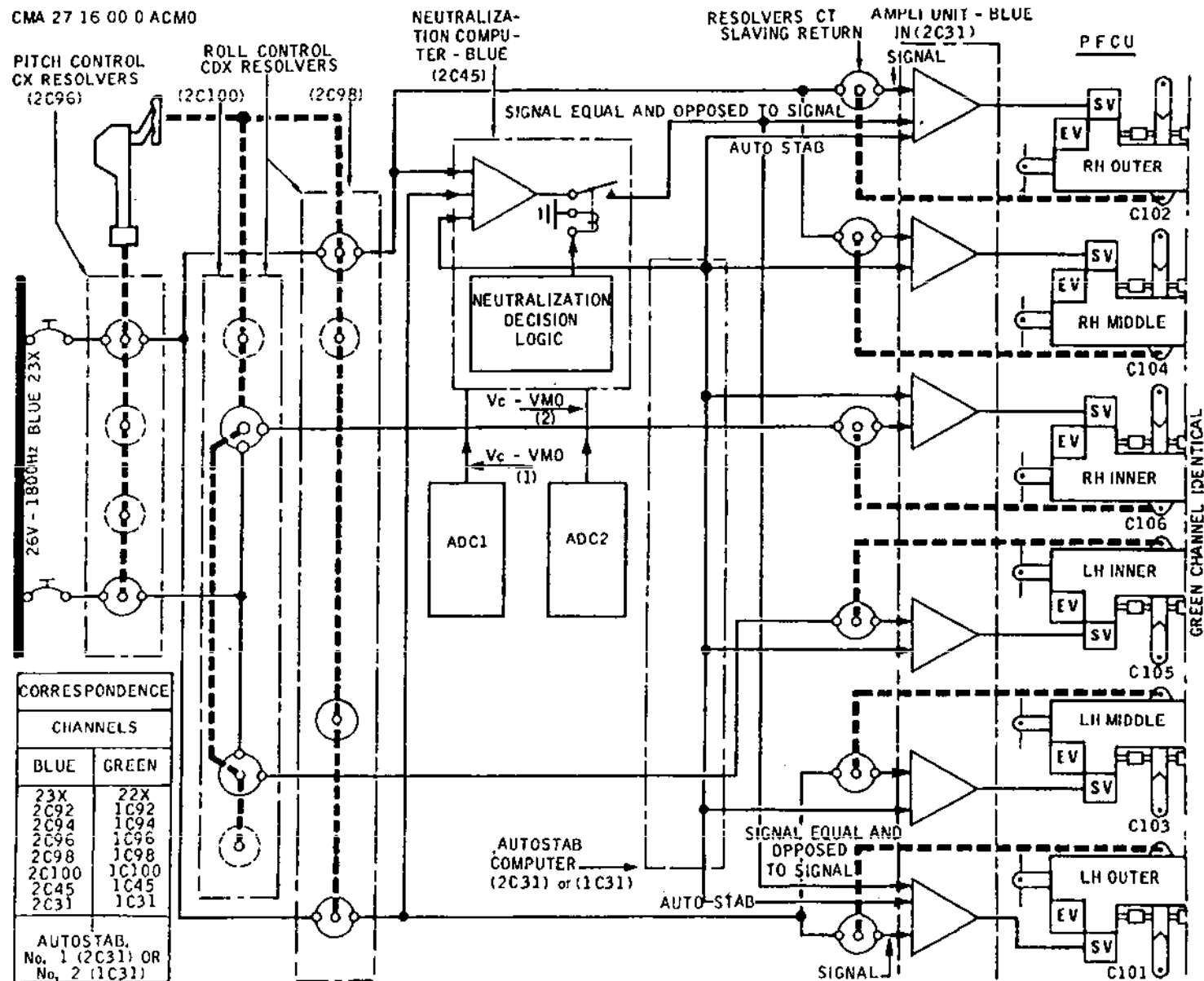
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Elevon Control Electrical Channel Composition  
Figure 002

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sense to that generated at the output of the outer and middle elevon CDX resolver of each wing which represents the sum of pitch and roll orders.

This signal, applied to the amplifier of each outer elevon PFCU, is progressively opposed to the control signal : the PFCU stops and return to neutral position when the computer signal is equal and opposite to the control signal.

When the aircraft speed is lower than that which triggered the neutralization computer, the signal generated by this computer is progressively cancelled.

The control signal prevails and causes the outer elevons to return to ordered position.

This outer elevon neutralization avoids any control inversion due to wing deformation.

The electrical control channels are activated via a unit located on over head panel in flight compartment.

The ICOVOL indicator (Flight Control Surface Position Indicator) located on First Officer's instrument panel, informs the crew of elevon position and indicates which channel is operative.

### 3. Synchro Pack - Roll Control (Ref. Fig. 003 )

The 8 CDX resolvers (four for each channel) are grouped in one synchro pack in four assemblies (two for each channel) called single units.

- For each channel, a single unit contains the two outer and middle elevon control CDX resolvers (one for each wing). It also includes two other CDX resolvers used for the corresponding monitoring channel (Ref. 27-17-00).

The four CDX resolvers in this unit are driven by the same spindle.

- The second single unit contains the two inner elevon control CDX resolvers (one for each wing) together with two other CDX resolvers used for the corresponding monitoring channel (Ref. 27-17-00).

The four CDX resolvers in this unit are actuated by the same spindle.

The two units of each channel are mounted on a flange, the two flanges being installed opposite one another on the artificial feel chassis.

This provides for control of the 4 units by two control links connected to the control lever which is actuated by the linkage connected to the control handwheel.

### 4. CT Resolvers - PFCU's

The CT resolvers of the Blue and Green channels are housed in a unit integral with the body of each PFCU. This unit also encloses a resolver associated with the ICOVOL indicator and a small

EFFECTIVITY: ALL

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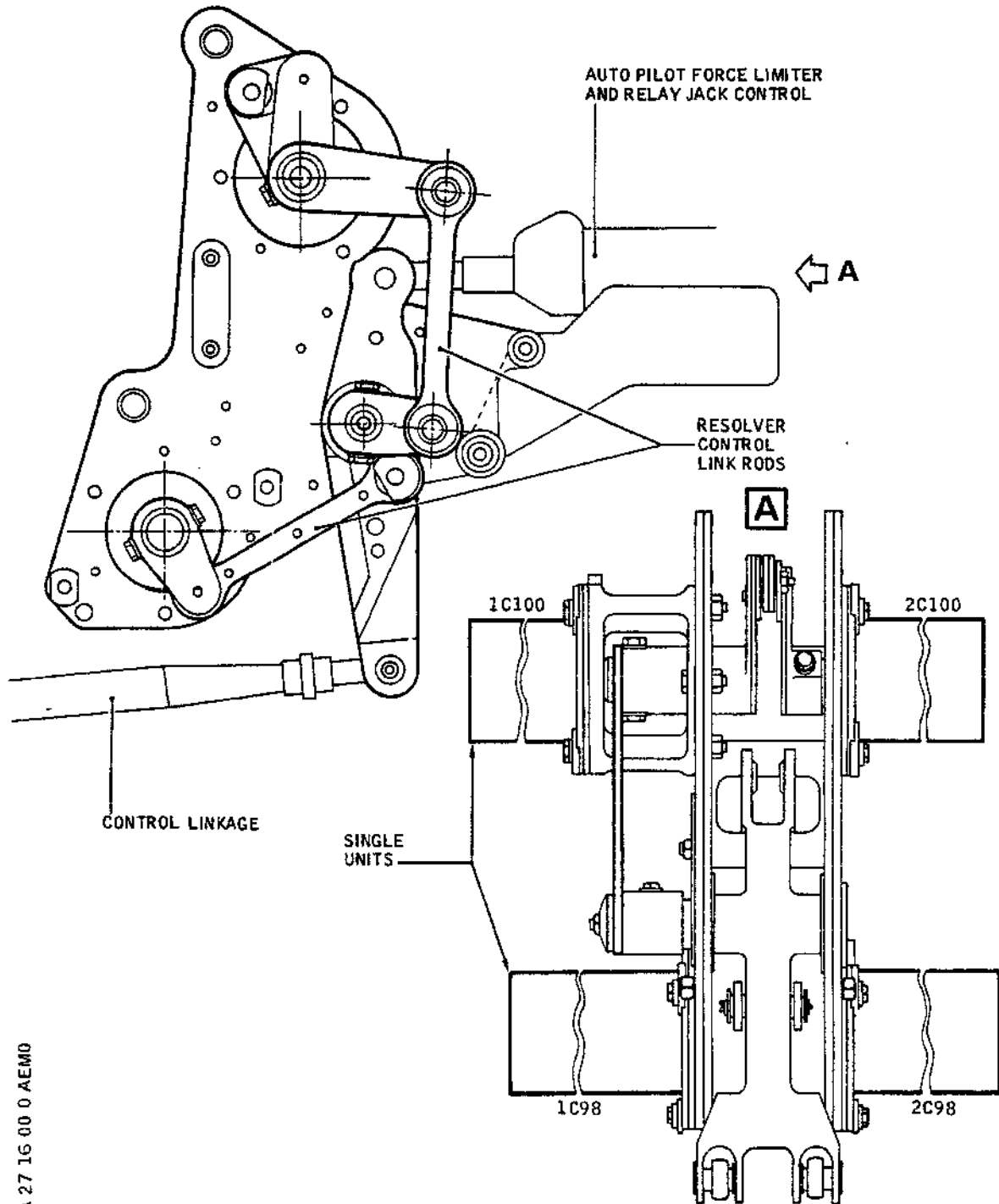
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CMA 27 16 00 0 AEM0

Synchro Pack  
Figure 003

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unit containing two "pancake" resolvers used for the monitoring system (Ref. 27-17-00).

- The spindles of these resolvers are simultaneously driven, when the PFCU moves, by a lever and link rod system, one end of which is attached to the aircraft structure.

### 5. Computers - Neutralization

A neutralization computer is assigned to each channel. This computer sends to the outer elevon PFCU's an order of equal amplitude but opposite sign to the control order when, the aircraft going out of its normal flight envelope, the difference between its speed (VC) and the maximum operational speed (VMO) reaches or exceeds 25 knots :

VC - VMO equal to or greater than 25 knots. The outer elevons return to neutral if they had received a deflection order or stay to zero if they receive, at this moment, a deflection order.

- When the aircraft returns to its normal flight envelope, i-e : when VC - VMO is equal to or less than 20 knots (the 5 knots variation between VC - VMO equal to or greater than 25 knots and VC - VMO equal to or less than 20 knots avoids successive activations and de-activations of neutralization when the aircraft speed is within this range) the neutralization order is cancelled. The outer elevons return to the ordered position if there was an order, or are ready to carry out this order if they received it.
- VC - VMO signal is supplied by each AIR DATA COMPUTER. The computer detects whether VC - VMO is greater than or equal to 25 Kts or less than or equal to 20 Knots. It compares VC - VMO signal from the ADC to a VC - VMO signal which it generates. When the VC - VMO signal from the ADC is equal to the VC - VMO signal generated by the computer, the latter activates or suppresses neutralization. For activation or suppression of neutralization by the computer it is necessary that :
  - If the two ADC are operating (normal case) :
    - the two ADC deliver the same VC - VMO signal and the computer detects that the two VC - VMO signals are greater than or equal to 25 Kts (or that the two VC - VMO signals are less than or equal to 20 Kts). If there is a variation between the two signals, the computer makes no decision.
  - If only one ADC is operating (the second being stopped or defective) the signal VC - VMO, from the ADC which operates normally, is processed by the computer.
  - If the two ADC are defective, there cannot be a neutralization order.

The outer and middle elevon control signal (from the CDX

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resolvers assigned to these elevons) and the pitch and roll autostabilization signal are applied to the computer. These signals are summed in the computer. When the computer activates or suppresses neutralization, the signal resulting from the summing (which is identical with the control signal) is changed in sign, then formed into a staircase wave form, then applied, during an adjustable period of time between 2.55 and 10.2 seconds (at present adjusted to 5.1 seconds) to the outer elevon PFCU amplifiers.

This signal equal and opposite to the control signal, annuls progressively the latter and causes the progressive cancellation of the amplifier output signal.

The outer elevons then return to neutral position (or the signal opposite to the control signal is progressively suppressed, thus enabling the outer elevons to return to the controlled position).

The neutralization decision stage is duplicated. At the output of this second stage the neutralization actuation (or suppression) signal is fed to the comparator of the monitoring channel in operation (Ref. 27-17-00, Description and Operation).

In the indicating unit, on the front panel of the computer, the following controls are grouped to carry out the outer elevon neutralization system test :

- Two indicators displaying neutralization order on each outer elevon
- Two ADC1 and ADC2 three-position switches used to simulate :
  - . Operation of ADC1 or/and ADC2 (position ON)
  - . Transmission by ADC1 or/and ADC2 of a VC - VMO signal greater than or equal to 25 Kts (position VC > VMO).
- A TEST - LT TEST switch to check correct operation of the indicator lights described below (position LT - TEST) or to supply the + 28 VDC test circuit (position TEST)
- Two LOGICS C and M indicator lights which confirm activation of neutralization. The neutralization orders are sent to the outer elevon control channel amplifier (illumination of indicator light C) or to the monitoring comparator of the monitoring channel in operation (illumination of indicator light M).

### 6. Amplifiers

An amplifier controls each Blue and Green servo-valve of the eight PFCU's. (six PFCU's for the elevons and two PFCU's for the rudders). The 8 identical Blue amplifiers are located in unit 2C 31 (shelf 8-216) which also encloses the autostabilization computer No.1.

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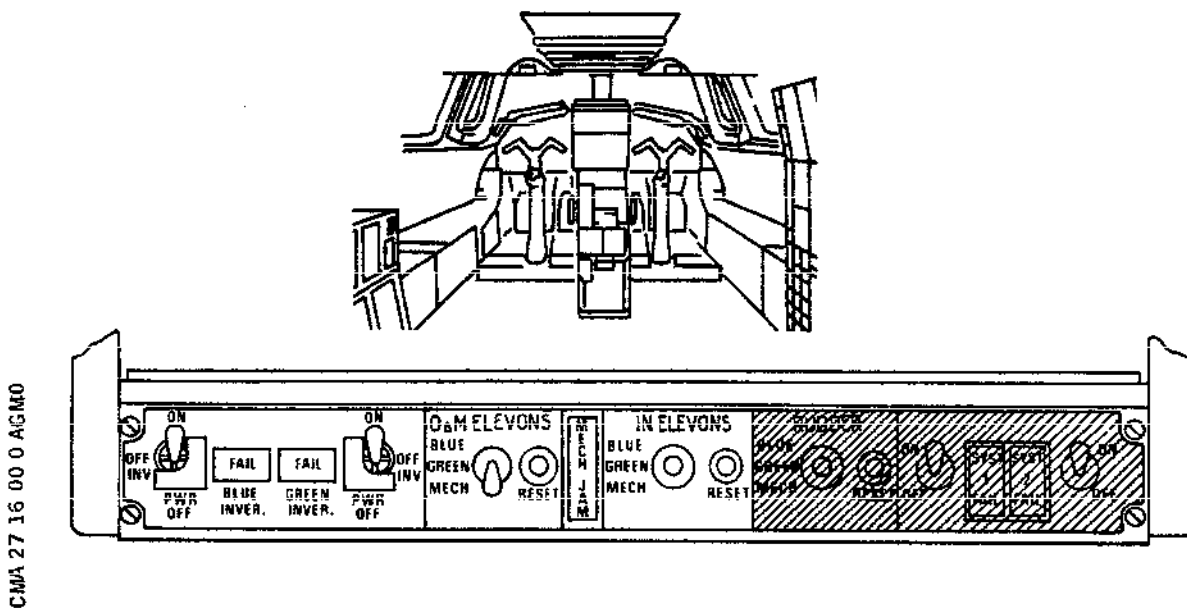
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The 8 identical Green amplifiers (also identical with the Blue amplifiers) are located in unit 1C 31 (on shelf 8-215) which also encloses the autostabilization computer No.2.

7. Panel - PFCU Control and Monitoring. (Flight Control Unit)  
(Ref. Fig. 004 )



PFCU Control and Monitoring Panel (Flight Control Unit)

Figure 004

The Flight Control Unit is located on Flight Compartment overhead panel.

It comprises controls for the 26V 1000Hz generation system (Ref. 27-15-00).

Three selector switches, O & M ELEVONS, IN ELEVONS and RUDDER, each having three positions. BLUE, GREEN and MECH determine in the BLUE position, the control channel designated as the normal channel (Blue channel). The GREEN and MECH positions are used to confirm the automatic change-over to the Green channel or Mechanical channel, after detection of a Blue or Green channel fault by the monitoring channels.

A RESET push button located to the right of each switch must be pressed to return to Blue channel after disappearance of the

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fault which caused the channel change over (or to change to Green channel if the channel in operation was the mechanical channel and if the Blue channel is still defective).

It is necessary to place the relevant switch (es) in BLUE position, before pressing the RESET push button.

A MECH JAM warning light, located between the O & M ELEVONS and IN ELEVONS switches illuminates when an abnormal stiffness is detected in the linkage actuated by the roll or pitch relay jack.

At the same time, the PFC warning light illuminates on the master warning panel and the gong sounds.

For test purposes, pressing the warning light causes its illumination.

Illumination of this warning light is ensured by a self holding circuit even if the fault that caused illumination disappears.

In this case, the self holding circuit can be cut off by pressing the warning light ; the warning light extinguishes.

The stiffness in linkage is detected by a microswitch actuated by a jam detection strut.

### 8. Indicator - Flight Control Surface Position. (ICOVOL) (Ref. Fig. 005 )

The Flight control surface position indicator (Icovol indicator) located on First Officer's instrument panel informs the crew of :

- The position of each elevon
- The control channel in operation
- A control channel change over due to an incorrect deflection of the elevons
- Vibrations at one or more of the elevons

The magnitude and direction of deflection of each elevon can be checked on the six scales graduated in degrees.

A magnetic indicator indicates for each elevon which control channel is in operation.

- A White B on a blue background for the Blue channel
- A White G on a green background for the Green channel
- A White M on a red background for the Mechanical channel

Due to monitoring system design (Ref. 27-37-00) the magnetic indicators associated with the four outer and middle elevons always display the same colour. The same condition applies to the inner elevons magnetic indicators.

- When a channel change over due to incorrect elevon deflection occurs, the corresponding warning lights illuminate. These warning lights remain extinguished if the channel change over is due to either a drop in hydraulic pressure or to a failure of the 26V - 1800Hz power supply.
- If vibrations above the 8Hz level are detected on one (or more) elevon (s), the red warning lights associated with this

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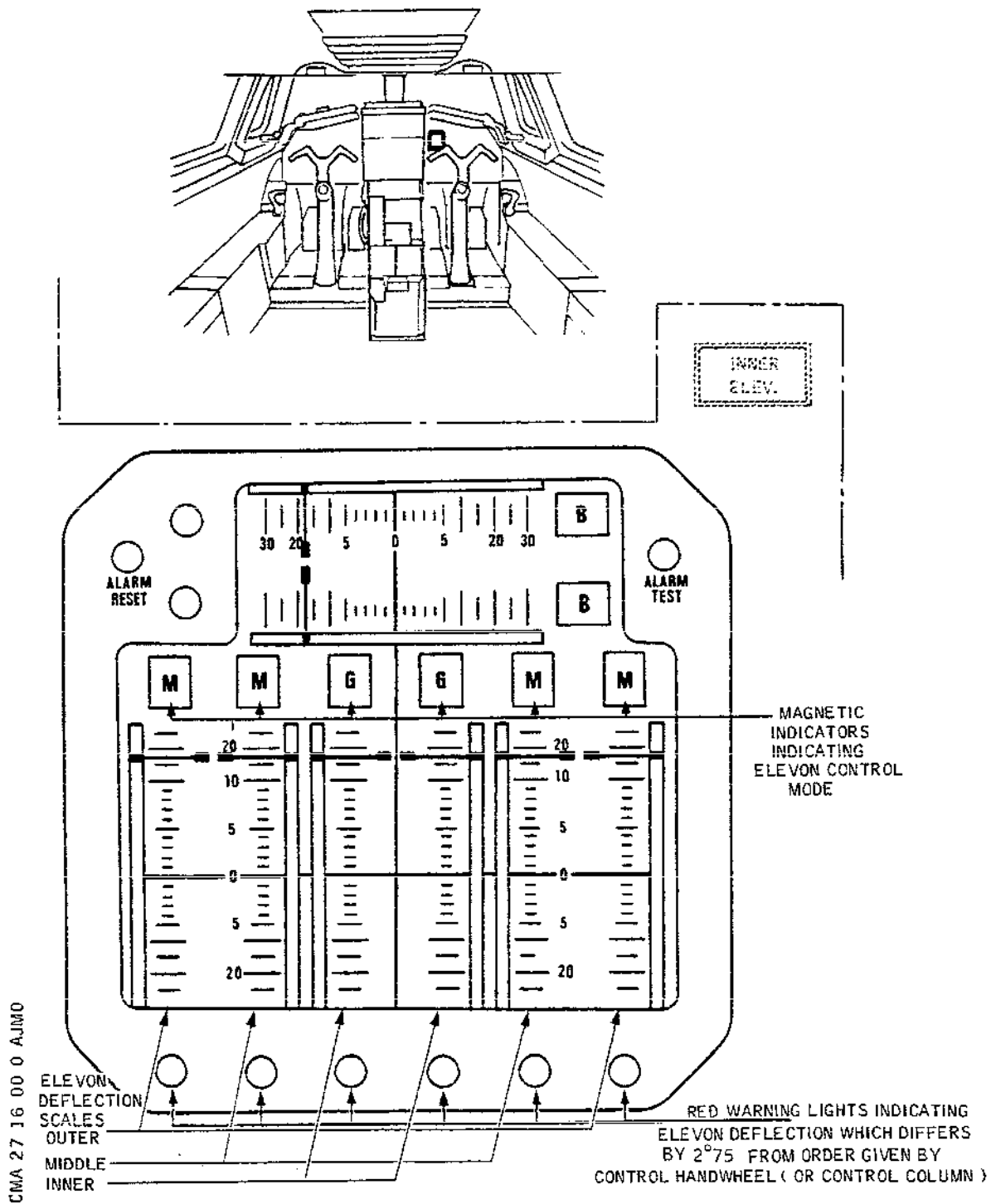
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Flight Control Surface Position Indicator. (ICOVOL)  
Figure 005

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(these) elevon (s) and the symmetrical elevon (s) flash at a frequency of approximately 2Hz.

- A ALARM TEST push button enables the condition of the warning light lamps as well as the various items inside the ICOVOL indicator to be checked.  
The 8 red warning lights flash during the time the button is pressed. When the button is released these lights remain illuminated.
- An ALARM RESET push button allows cancellation of the red warning lights either after a channel change over which has caused their illumination or after action on the ALARM TEST button.

Electrical supply to the ICOVOL indicator is provided by :

- the 28VDC network for activation of the warning lights, the magnetic indicators, and the internal relays
- the 115V - 400Hz network : to supply the six resolvers the rotors of which actuate the elevon position indicating pointers (and also the two resolvers associated with the rudders).

### 9. Electrical Power Supply

The resolvers of the ICOVOL synchro detection channel are supplied with 26V - 400Hz.

The resolvers of each channel (Blue or Green) and the associated amplifiers are supplied from a specific 26V - 1800Hz busbar for each channel.

The following table gives the distribution of these busbars, for each channel, in the various circuit breaker panels

SERVICE	BUSBAR	C/B PANEL
Blue Control Channel Amplifiers and Resolvers Supply	B FLYING CONTROL 26VAC - 1800Hz PFCS2 - 23X	2-213
Green Control Channel Amplifiers and Resolvers Supply	A FLYING CONTROL 26VAC - 1800Hz PFCS1 - 22X	2-213
ICOVOL Synchro Detection Channel Supply	26VAC A ESS 14Y 28VDC A ESS 3PS	2-213 1-213

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### ELECTRICAL CONTROL CHANNELS - TROUBLE SHOOTING

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN 24-00-00, SERVICING.

#### 1. General

- A. Electrical control channel trouble shooting will be carried out at the same time as that of electrical monitoring channels in 27-17-00, Trouble Shooting.

Therefore this topic will only include the Flight Control Surface Position Indicator (ICOVOL indicator) Fault analysis and trouble shooting procedures.

This trouble shooting procedure is common to the three axes (Roll, Yaw and Pitch).

- B. The following information is intended to enable faults found in flight or on the ground to be quickly rectified. This information is given in the form of fault analysis synoptic charts.  
The electrical wiring is assumed to be serviceable. However, if the component fault is not found, check the wiring in accordance with the Wiring Diagram Manual (22-26-02, 27-36-03 and 04).

#### 2. Prepare

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### A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Green Hydraulic System	29-11-00, S
Blue Hydraulic System	29-12-00, S

B. Take the precautions described in the previous WARNING paragraph.

C. Carry out Prepare paragraph of Procedure to set Flight Controls in Electrical Mode (Ref : 27-00-00, Servicing) up to energizing the aircraft electrical network.

### 3. Trouble Shooting

\*\*\*\*\*  
\*On overhead panel, on Flight Control\*  
\*Unit place GREEN INVERTER and BLUE \*  
\*INVERTER switches in OFF INV \*  
\*position. By pressing ALARM RESET \*  
\*button on ICVOL indicator (First \*  
\*Officer's instrument panel) cancel \*  
\*out warnings (red indicator lights) \*  
\*which may be illuminated. \*  
\*\*\*\*\*

OK	NOT OK-----	The 4 red warning lights of outer and middle elevons do not go off. Chart 101
	NOT OK-----	The 2 red warning lights of inner elevons do not go off. Chart 102
	NOT OK-----	The 2 red warning lights of rudder surfaces do not go off. Chart 103
		Two symmetrical red warning

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NOT OK-----	Lights flash permanently Replace ICOVOL indicator C82 Ref: 27-36-13, R/I
-------------	--

\*\*\*\*\*  
\*On ICOVOL indicator (First Officer's\*  
\*instrument panel) check that the 8 \*  
\*magnetic indicators display M \*  
\*\*\*\*\*

OK

NOT OK-----	Only one magnetic indicator does not display M. Replace ICOVOL indicator C82 Ref: 27-36-13, R/I
-------------	--

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OK

NOT OK-----

The 4 magnetic indicators of  
outer and middle elevons do  
not display M.  
Chart 104

NOT OK-----

The 2 magnetic indicators of  
inner elevons do not display  
M.  
Chart 105

NOT OK-----

The 2 magnetic indicators of  
rudder surfaces do not  
display M.  
Chart 106

\*\*\*\*\*  
\*On ICOVOL indicator (First Officer's\*  
\*instrument panel), press and hold \*  
\*pressed ALARM TEST push-button. The \*  
\*8 red warning lights flash. \*  
\*\*\*\*\*

OK

NOT OK-----

No red warning light is  
flashing.  
Chart 107

NOT OK-----

One red warning light is  
not flashing.  
Chart 108

\*\*\*\*\*  
\*On ICOVOL indicator (First Officer's\*  
\*instrument panel) release ALARM TEST\*  
\*push-button, the 8 red warning \*  
\*lights illuminate permanently. \*  
\*PFC warning light (on overhead panel\*  
\*on master warning panel) illumina- \*  
\*tes and gong sounds. \*  
\*\*\*\*\*

OK

NOT OK

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OK

NOT OK-----

PFC warning light does not illuminate and (or) gong does not sound.

Ref: 33-15-00, T/S

NOT OK-----

Two or several red warning lights do not illuminate. Replace ICOVOL indicator (C 82)

Ref: 27-36-13, R/I

\*\*\*\*\*  
\*On ICOVOL indicator (First Officer's\*  
\*instrument panel, press ALARM RESET \*  
\*button. \*  
\*The 8 red warning lights go off. \*  
\*\*\*\*\*

OK

NOT OK-----

The 8 red warning lights remain illuminated after reset. Replace ICOVOL indicator (C 82)

Ref: 27-36-13, R/I

\*\*\*\*\*  
\*Pressurize BLUE and GREEN hydraulic \*  
\*systems (Ref: 29-11-00 and 29-12-00,\*  
\*S) \*  
\*On ICOVOL indicator (First Officer's\*  
\*instrument panel) control surface \*  
\*position pointers reach trimmed \*  
\*position. \*  
\*\*\*\*\*

OK

NOT OK-----

Incorrect position indication of a control surface. Chart 109

NOT OK-----

Vibration of a control surface position pointer Replace ICOVOL indicator (C 82).

Ref: 27-36-13, R/I

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\*\*\*\*\*  
\*Operate control column and rudder \*  
\*pedals from stop to stop and check \*  
\*on ICOVOL indicator (First Officer's \*  
\*instrument panel) that control \*  
\*surface position pointers reproduce \*  
\*(without jerks or vibrations) \*  
\*exactly control surface deflections \*  
\*\*\*\*\*

OK

NOT OK-----

Jerks or vibrations of a  
control surface position  
pointer. Replace ICOVOL  
indicator (C 82)  
Ref: 27-36-13, R/I

\*\*\*\*\*  
\*On overhead panel, on Flight Control \*  
\*Unit, place BLUE INVERTER and GREEN \*  
\*INVERTER switches in ON position. \*  
\*Fail indicator lights of BLUE INVER- \*  
\*TER and GREEN INVERTER must go off. \*  
\*\*\*\*\*

OK

NOT OK-----

26 V 1800 Hz generation  
fault (FAIL indicator lights  
do not go off)  
Ref: 27-15-00, T/S

\*\*\*\*\*  
\*On overhead panel, on Flight Control \*  
\*Unit, place O&M ELEVONS, IN ELEVONS \*  
\*and RUDDER switches in BLUE posi- \*  
\*tion, then press and release each of \*  
\*the three RESET push-buttons located \*  
\*on the RH side of each switch. \*  
\*On ICOVOL indicator, First Officer's \*  
\*instrument panel, the 8 magnetic \*  
\*indicators display B. \*  
\*\*\*\*\*

OK

NOT OK-----

Reset impossible on all  
control surfaces (the 8  
magnetic indicators remain  
on M)  
Ref: 27-17-00, T/S

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OK

NOT OK-----

Magnetic indicators of an associated control surface assembly (inner elevons or outer and middle elevons or rudder surfaces) do not display B.

Chart 110

NOT OK-----

Only one magnetic indicator does not display B.

Replace ICOVOL indicator (C 82)

Ref: 27-36-13, R/I

\*\*\*\*\*  
 \*On overhead panel, on Flight Control\*  
 \*Unit, place O&M ELEVONS, IN ELEVONS \*  
 \*and RUDDER switches in GREEN posi- \*  
 \*tion. On ICOVOL indicator (First \*  
 \*Officer's instrument panel) the 8 \*  
 \*magnetic indicators display G. \*  
 \*\*\*\*\*

OK

NOT OK-----

Magnetic indicators of one associated control surface assembly (inner elevons or outer and middle elevons or rudder surfaces) still display B.

Chart 111

NOT OK-----

Magnetic indicators of one associated control surface assembly (inner elevons or outer and middle elevons or rudder surfaces) change to M.

Chart 112

NOT OK-----

Only one magnetic indicator does not display G.

Replace ICOVOL indicator C82  
 Ref: 27-36-13, R/I

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\*\*\*\*\*  
\*On overhead panel, on Flight Control\*  
\*Unit, place O&M ELEVONS, IN ELEVONS \*  
\*and RUDDER switches in MECH position\*  
\*On ICOVOL (First Officer's instru- \*  
\*ment panel) the 8 magnetic indica- \*  
\*tors display M. \*  
\*\*\*\*\*

NOT OK-----

Magnetic indicators of an associated control surface assembly (inner elevons or outer and middle elevons or rudder surfaces) still display G.

Chart 113

NOT OK-----

Only one magnetic indicator does not display M.  
Replace ICOVOL indicator C82  
Ref: 27-36-13, R/I

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\*\*\*\*\*-----  
\*The 4 red warning lights of outer \*| GROUND EQUIPMENT REQUIRED |  
\*and middle elevons do not go off \*|-----  
\*\*\*\*\*| DESCRIPTION PART No. |  
| Multimeter |  
\*\*\*\*\*|-----

\*\*\*\*\*  
\*On First Officer's instrument panel, remove ICOVOL \*  
\*indicator (C 82) Ref: 27-36-13, R/I. \*  
\*On circuit breaker panel 1-213, remove safety clip \*  
\*and set circuit breaker C 83 (Map Ref: R11) \*  
\*On aircraft connector C 82, check that voltage \*  
\*measured between pins z and y then t and y is zero \*  
\*\*\*\*\*

28 V	0 V-----	Replace ICOVOL indicator C82 Ref: 27-36-13, R/I
------	----------	--

\*\*\*\*\*  
\*On First Officer's instrument panel re-install \*  
\*ICOVOL indicator (C 82) Ref: 27-36-13, R/I \*  
\*On shelf 8-215, remove GREEN comparator (1C 48) \*  
\* Ref: 27-37-11, R/I \*  
\*On the latter check non-continuity between \*  
\*pins AA60 and 61 then AB38 and 39. \*  
\*\*\*\*\*

OK	NOT OK-----	Replace GREEN comparator (1C 48) Ref: 27-37-11, R/I
----	-------------	---

\*\*\*\*\*  
\*On shelf 8-216, remove BLUE comparator (2C 48) \*  
\* Ref: 27-37-11, R/I \*  
\*On the latter check non-continuity between pins \*  
\*AA60 and 61 then AB38 and 39. \*  
\*\*\*\*\*

OK	NOT OK-----	Replace BLUE comparator (2C 48) Ref: 27-37-11, R/I
		Replace static monitoring change over unit (C 56) Ref: 27-37-12, R/I

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*****		
*Both red warning lights of inner	*	GROUND EQUIPMENT REQUIRED
*elevons do not go off	*	
*****		
	DESCRIPTION	PART No.
	Multimeter	
*****		

\*\*\*\*\*  
\*On First Officer's instrument panel, remove ICOVOL \*  
\*indicator (C 82) Ref: 27-36-13, R/I \*  
\*On circuit breaker panel 1-213, remove safety clip \*  
\*and set circuit breaker C 83 (Map ref: R11). On \*  
\*aircraft connector C 82, check that voltage measured \*  
\*between pins v and y is zero. \*  
\*\*\*\*\*

28 V	0 V-----	Replace ICOVOL indicator C82
		Ref: 27-36-13, R/I
*****		

\*\*\*\*\*  
\*On First Officer's instrument panel, re-install \*  
\*ICOVOL indicator (C 82) Ref: 27-36-13, R/I \*  
\*On shelf 8-215, remove GREEN comparator (1C 48) \*  
Ref: 27-37-11, R/I \*  
\*On the latter, check non-continuity between pins \*  
\*AA32 and 33 then AB40 and 28. \*  
\*\*\*\*\*

OK	NOT OK-----	Replace GREEN comparator
		(1C 48)
		Ref: 27-37-11, R/I
*****		

\*\*\*\*\*  
\*On shelf 8-216, remove BLUE comparator (2C 48) \*  
\* Ref: 27-37-11, R/I \*  
\*On the latter, check non-continuity between pins \*  
\*AA32 and 33 then AB40 and 28. \*  
\*\*\*\*\*

	NOT OK-----	Replace BLUE comparator
		(2C 48)
		Ref: 27-37-11, R/I
*****		
		Replace static monitoring
		change over unit (C 56)
		Ref: 27-37-12, R/I
*****		

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## MAINTENANCE MANUAL

*****		
*Both red warning lights of rudder	*	GROUND EQUIPMENT REQUIRED
*surfaces do not go off.	*	
*****		
	DESCRIPTION	PART No.
	Multimeter	
*****		

\*\*\*\*\*  
\*On First Officer's instrument panel, remove IC0VOL \*  
\*indicator (C 82) Ref : 27-36-13, R/I \*  
\*On circuit breaker panel 1-213, remove safety clip \*  
\*and set circuit breaker C 83 (Map ref: R11). On \*  
\*aircraft connector C 82, check that voltage \*  
\*measured between pins BB and Y is zero. \*  
\*\*\*\*\*

28 V	0 V-----	Replace IC0VOL indicator (C 82)
		Ref: 27-36-13, R/I
*****		

\*\*\*\*\*  
\*On First Officer's instrument panel, re-install \*  
\*IC0VOL indicator (C 82) Ref: 27-36-13, R/I \*  
\*On shelf 8-215, remove GREEN comparator (1C 48) \*  
\* Ref: 27-37-11, R/I \*  
\*On the latter, check non-continuity between pins \*  
\*AA39 and 40 then AB19 and 32. \*  
\*\*\*\*\*

OK	NOT OK-----	Replace GREEN comparator (1C 48)
		Ref: 27-37-11, R/I
*****		

\*\*\*\*\*  
\*On shelf 8-216, remove BLUE comparator (2C 48) \*  
\* Ref: 27-37-11, R/I \*  
\*On the latter, check non-continuity between pins \*  
\*AA39 and 40 then AB19 and 32. \*  
\*\*\*\*\*

OK	NOT OK-----	Replace BLUE comparator (2C 48)
		Ref: 27-37-11, R/I
*****		
-----	-----	Replace static monitoring Change over unit (C 56)
		Ref: 27-37-12, R/I
*****		

Chart 103 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****	
*The 4 magnetic indicators of outer * *and middle elevons do not display M *	GROUND EQUIPMENT REQUIRED
*****	
	DESCRIPTION                      PART No.
	Multimeter
*****	

\*\*\*\*\*  
\*On First Officer's instrument panel \*  
\*remove IC0VOL indicator (C 82) \*  
\*                      Ref: 27-36-13, R/I \*  
\*On circuit breaker panel 1-213, \*  
\*remove safety clip and set circuit \*  
\*breaker C 83 (Map ref: R11) \*  
\*On aircraft connector C 82, check \*  
\*that voltages measured between pins \*  
\*s and y, r and y, x and y, FF and y \*  
\*are zero. \*  
\*\*\*\*\*

OK	NOT OK-----	Replace static monitoring change over unit (C 56) Ref: 27-37-12, R/I
		Replace IC0VOL indicator (C 82) Ref: 27-36-13, R/I

Chart 104 (Sheet 1 of 1)

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# Concorde

## MAINTENANCE MANUAL

*****		-----	
*Both magnetic indicators of inner	*	GROUND EQUIPMENT REQUIRED	
*elevons do not display M.	*	-----	
*****		DESCRIPTION	PART No.
		Multimeter	
		-----	

\*\*\*\*\*  
\*On First Officer's instrument panel \*  
\*remove ICOVOL indicator (C 82) \*  
\* Ref: 27-36-13, R/I \*  
\*On circuit breaker panel 1-213, \*  
\*remove safety clip and set circuit \*  
\*breaker C 83 (Map ref: R11). On \*  
\*aircraft connector C 82, check that \*  
\*voltages measured between pins f \*  
\*and y then e and y are zero. \*  
\*\*\*\*\*

OK	NOT OK-----	Replace static monitoring change over unit (C 56) Ref: 27-37-12, R/I
		-----
	-----	Replace ICOVOL indicator (C 82) Ref: 27-36-13, R/I
		-----

Chart 105 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****	
*Both magnetic indicators of rudder * *surfaces do not display M.	GROUND EQUIPMENT REQUIRED
*****	
	DESCRIPTION                      PART No.
	Multimeter
*****	

\*\*\*\*\*  
 \*On First Officer's instrument panel \*  
 \*remove IC0VOL indicator (C 82) \*  
 \*                      Ref: 27-36-13, R/I \*  
 \*On circuit breaker panel 1-213, \*  
 \*remove safety clip and set circuit \*  
 \*breaker C 83 (Map ref: R11). On \*  
 \*aircraft connector C82, check that \*  
 \*voltages measured between pins AA \*  
 \*and y, p and y, GG and y, HH and y \*  
 \*are zero. \*  
 \*\*\*\*\*

OK	NOT OK-----	Replace static monitoring change over unit (C 56) Ref: 27-37-12, R/I
		-----
-----	-----	Replace IC0VOL indicator (C 82) Ref: 27-36-13, R/I
		-----

Chart 106 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****	*****
*No red warning light flashes	*   GROUND EQUIPMENT REQUIRED
*****	*****
	DESCRIPTION PART No.
	Multimeter
	*****

\*\*\*\*\*  
 \*On ICOVOL indicator (First Officer's\*  
 \*instrument panel) release ALARM TEST\*  
 \*button. Red warning lights illumina-\*  
 \*te. \*

\*\*\*\*\*

	*****
	*On First Officer's instrument panel, remove *
	*ICOVOL (C 82) Ref: 27-36-13, R/I *
	*On circuit breaker panel 1-213, remove safety *
YES	*clip and set circuit breaker C 83 (Map Ref: R11)*
NO--	*On aircraft connector C 82, check that voltage *
	*measured between pins C and Y is 28 VDC *
	*****

*****	*****	*****
*On First Officer's instrument panel, remove ICOVOL *	OK	NOT OK
*indicator (C 82) Ref: 27-36-13, R/I *		
*On circuit breaker panel 2-213, remove safety clip *		
*and set circuit breaker C 84 (Map Ref: B4). *		
*On aircraft connector C 82, check that voltage *		
*measured between pins A and W is 26 VAC 400 Hz. *		
*****		

||  
 NOT OK

\*\*\*\*\*  
 \*Open circuit breaker panel 2-213\*  
 \*and measure voltage on \*  
 \*bar 14XS \*

\*\*\*\*\*

0 V	26 VAC

Replace circuit	Replace circuit	Replace ICOVOL	Replace circuit
breaker (X355)	breaker (C 84)	Indicator (C82)	breaker (C83)
Ref:24-50-00R/I	Ref:24-50-00R/I	Ref:27-36-13R/I	Ref:24-50-00R/I

Chart 107 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\*One red warning light does not flash\* | GROUND EQUIPMENT REQUIRED |  
\*\*\*\*\*

DESCRIPTION	PART No.
Multimeter	

\*\*\*\*\*  
\*On ICOVOL indicator (First Officer's\*  
\*instrument panel) unscrew cover of \*  
\*lamp which does not illuminate, and \*  
\*check that the latter is not burnt \*  
\*out. \*  
\*\*\*\*\*

 OK	 NOT OK-----	----- Replace faulty lamp. -----
-----		----- Replace ICOVOL indicator (C 82) Ref: 27-36-13, R/I -----

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R EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

\*\*\*\*\*  
 \*Incorrect indication of a control \* | GROUND EQUIPMENT REQUIRED |  
 \*surface position. \* |

*****	DESCRIPTION	PART No.
*****	Multimeter	
*****	Circuit breaker	
*****	Safety Clips	
*By means of the cross-reference *	Access platform:	
*table given in chart 109, sheet 3 of *	Elevons: 3.160 m (10ft. 4in.)	
*3, for the PFCU corresponding to *	Access platform	
*control surface, the position indi- *	Rudders: 11.250 m (36ft. 11	
*cation of which is incorrect on *	in.)	
*ICOVOL indicator :	TEST SET - ZERO SETTING -	
*(1) Trip, safety and tag circuit *	RESOLVERS	TE 3016000

\*\*\*\*\*  
 \* breakers listed in corresponding \*  
 \* removal/installation topic \*  
 \*(2) Open elevon fairing \*  
 \*(3) Disconnect connector. \*  
 \*(4) Measure rotor resistance of \*  
 \* ICOVOL resolver (120  $\Omega$  approxi- \*  
 \* mately) \*  
 \*(5) Measure stator resistance of \*  
 \* ICOVOL resolver (20  $\Omega$  approxi- \*  
 \* mately) \*  
 \*\*\*\*\*

		Replace considered PFCU
OK	NOT OK-----	referring to corresponding
		Removal/Installation topic.

\*\*\*\*\*  
 \*On circuit breaker panel 2-213, \*  
 \*remove safety clip and set circuit \*  
 \*breaker C 84. \*  
 \*Measure 26 VAC 400 Hz supply voltage\*  
 \*on considered PFCU connector (Ref: \*  
 \*cross-reference table). \*  
 \*\*\*\*\*

		Replace circuit breaker
OK	NOT OK-----	(C 84)
		Ref: 24-50-00, R/I

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Chart 109 (Sheet 1 of 3)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\*Connect TEST SET - ZERO SETTING - \*  
\*RESOLVERS (TE 3016000) equipment on \*  
\*PFCU of concerned control surface \*  
\*and energize equipment with 28 VDC. \*  
\*Check ICOVOL resolver. \*  
\*\*\*\*\*

OK	NOT OK-----	Replace considered PFCU referring to corresponding Removal/Installation topic.
		Replace ICOVOL indicator (C 82) Ref: 27-36-13, R/I

Chart 109 (Sheet 2 of 3)

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## MAINTENANCE MANUAL

### CROSS-REFERENCE TABLE

Control Surfaces	OUTER		MIDDLE		INNER		RUDDER	
	LH	RH	LH	RH	LH	RH	upper	lower
PFCU Item number	C-101	C-102	C-103	C-104	C-105	C-106	C-78	C-79
Fairing	553 LR	653 LR	552 LR	652 LR	551 LR	651 LR	352 CR	351 CL
Connector to be disconnect- ed	B	B	B	B	B	B	A	A
Rotor Pins R1-R3-R2	B-H B-G	B-H B-G	B-H B-G	B-H B-G	B-M B-L	B-M B-L	A-R A-A	A-R A-A
Stator Pins S1-S3-S4	B-Y B-Z	B-Y B-Z	B-Y B-Z	B-Y B-Z	B-K B-e	B-K B-e	A-T A-b	A-T A-b
Stator Pins S2-S3-S4	B-J B-Z	B-J B-Z	B-J B-Z	B-J B-Z	B-d B-e	B-d B-e	A-S A-b	A-S A-b
26 VAC 400 Hz Supply	B-G B-H	B-G B-H	B-G B-H	B-G B-H	B-L B-M	B-L B-M	A-A A-R	A-A A-R
Removal/ Installation	24-34-52		27-34-52		27-34-53		27-24-31	

Chart 109 (Sheet 3 of 3)

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## MAINTENANCE MANUAL

```
*****-----
*Magnetic indicators of an associated*| GROUND EQUIPMENT REQUIRED |
*control surface assembly (inner, or *-----
*outer and middle elevons or rudder *| DESCRIPTION          PART No. |
*surfaces) do not display B.         *| Multimeter          |
*****-----
```

```
*****
*On ICOVOL indicator (First Officer's instrument *
*panel) magnetic indicators of considered control *
*surface assembly display G.                      *
*****
```

<p>YES</p>	<p>NO--</p>	<pre>***** *Magnetic indicators display M. *On shelf 8-216, remove static monitoring change * *over unit (C 56). * *      Ref: 27-37-12, R/I *On circuit breaker panels 1-213 and 5-213 remove* *safety clips and set circuit breakers 1C 73 and * *2C 73 (Map ref: M15 and E11) *On rack connector C 56, measure + 28 VDC *voltage between pins : *- C 56-AA-33 and 34 for outer and middle elevons* *- C 56-AB-33 and 34 for inner elevons *- C 56-BA-33 and 34 for rudder surfaces *Measure shall be carried out by holding pressed * *the corresponding RESET button on Flight Control* *Unit (C 57). *****</pre>						
		<table border="1"> <tr> <td>28 VDC</td> <td>0 V--</td> <td>Replace Flight Control Unit C 57 Ref: 27-36-15, R/I</td> </tr> <tr> <td colspan="2"></td> <td>Replace static monitoring change over unit C 56 Ref: 27-37-12, R/I</td> </tr> </table>	28 VDC	0 V--	Replace Flight Control Unit C 57 Ref: 27-36-15, R/I			Replace static monitoring change over unit C 56 Ref: 27-37-12, R/I
28 VDC	0 V--	Replace Flight Control Unit C 57 Ref: 27-36-15, R/I						
		Replace static monitoring change over unit C 56 Ref: 27-37-12, R/I						

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Chart 110 (Sheet 1 of 2)

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# Concorde

## MAINTENANCE MANUAL

\*\*\*\*\*  
\*Look for cause of inhibition which prevents \*  
\*switching from MECHANICAL channel to BLUE channel \*  
\*- 1800 Hz generation warning (BLUE INVERTER FAIL \*  
\* indicator light, on Flight Control Unit, is \*  
\* illuminated). \*  
\*- Drop of BLUE pressure (BLUE L/PRESS indicator \*  
\* light, on SERVO CONTROLS unit, is illuminated). \*  
\*- BLUE channel comparison warning (on ICOVOL \*  
\* indicator the red warning lights of considered \*  
\* control surface assembly are illuminated) \*  
\*There is inhibition. \*  
\*\*\*\*\*

YES	NO-----	Replace static monitoring change over unit (C 56) Ref: 27-37-12, R/I
-----	-----	-----
-----	-----	Refer to trouble shooting corresponding to inhibition

Chart 110 (Sheet 2 of 2)

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## MAINTENANCE MANUAL

\*\*\*\*\*-----  
\*Magnetic indicators of an associated\*| GROUND EQUIPMENT REQUIRED |  
\*control surface assembly (inner, or \*-----  
\*outer and middle elevons or rudder \*| DESCRIPTION PART No. |  
\*surfaces) remain on B. \*|  
\*\*\*\*\*| Multimeter -----

\*\*\*\*\*  
\*On shelf 8-216, remove static monitoring change \*  
\*over unit (C 56) \*  
\* Ref: 27-37-12, R/I \*  
\*On circuit breaker panels 1-213 and 5-213 remove \*  
\*safety clips and set circuit breakers 1C 73 and \*  
\*2C 73 (Map ref: M15 and E11). \*  
\*On rack connector C 56, measure + 28 VDC voltage \*  
\*on pins: \*  
\*- C 56-AA-26 and 22 for outer and middle elevons \*  
\*- C 56-AB-26 and 22 for inner elevons \*  
\*- C 56-BA-26 and 22 for rudder surfaces \*  
\*\*\*\*\*

		----- Replace static monitoring change over unit C 56 Ref: 27-37-12, R/I -----
NOT OK	OK-----	

\*\*\*\*\*  
\*On overhead panel, remove Flight Control Unit (C 57)\*  
\* Ref: 27-36-15, R/I \*  
\*On circuit breaker panels 1-213 and 5-213 remove \*  
\*safety clips and set circuit breakers 1C 73 and \*  
\*2C 73 (Map ref: M15 and E11). \*  
\*Check Flight Control Unit (C 57) 28 VDC supply \*  
\*through circuit breakers : \*  
\*- 1C 55 and 2C 55 for outer and middle elevons \*  
\* (pins C 57-A-27 and C 57-B-27) \*  
\*- 1C 53 and 2C 53 for inner elevons (pins C 57-A- \*  
\* 36 and C 57-B-36) \*  
\*- 1C 62 and 2C 62 for rudder surfaces (pins C 57-A- \*  
\* 20 and C 57-B-20) \*  
\*\*\*\*\*

NOT OK	OK
Sheet 2	Sheet 2

Chart 111 (Sheet 1 of 2)

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## MAINTENANCE MANUAL

NOT OK	OK	Replace Flight Control Unit (C 57) Ref: 27-36-15, R/I
		Replace non conducting circuit breaker Ref: 24-50-00, R/I

Chart 111 (Sheet 2 of 2)

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## MAINTENANCE MANUAL

*****		
*Magnetic indicators of an associated*		GROUND EQUIPMENT REQUIRED
*control surface assembly (inner, or *		
*middle and outer elevons or rudder *		DESCRIPTION PART No.
*surfaces) change and display M. *		
*****		
*****		
*Switching from BLUE channel to MECHANICAL channel *		
*has occurred with PFC warning (on master warning *		
*panel) + gong, associated to: *		
*- A GREEN 1800 Hz generation warning (GREEN INVERTER*		
* FAIL indicator light on Flight Control Unit is *		
* illuminated) *		
*- A GREEN pressure drop warning (GREEN L/PRESS *		
* indicator light on SERVO CONTROLS unit is illumi- *		
* nated) *		
*- A GREEN channel comparison warning (on IC0VOL the *		
* red warning lights of the associated control *		
* surface assembly are illuminated) *		
*****		
YES	NO-----	Replace static monitoring change over unit C 56 Ref: 27-37-12, R/I
		Refer to trouble shooting corresponding to experienced warning.

Chart 112 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
 \*Magnetic indicators of an associated\* | GROUND EQUIPMENT REQUIRED |  
 \*control surface assembly (inner, or \*  
 \*outer and middle elevons or rudder \* | DESCRIPTION PART No. |  
 \*surfaces) remain on G. \*  
 \*\*\*\*\* | Multimeter |  
 \*\*\*\*\*

\*\*\*\*\*  
 \*On shelf 8-216, remove static monitoring change \*  
 \*over unit (C 56) \*  
 \* Ref: 27-37-12, R/I \*  
 \*On circuit breaker panels 1-213 and 5-213, remove \*  
 \*safety clips and set circuit breakers 1C 73 and \*  
 \*2C 73 (Map ref: M15 and E11). \*  
 \*On rack connector C 56, measure + 28 VDC voltage \*  
 \*on pins: \*  
 \*- C 56-AA-32 and 35 for outer and middle elevons \*  
 \*- C 56-AB-32 and 35 for inner elevons \*  
 \*- C 56-BA-32 and 35 for rudder surfaces. \*  
 \*\*\*\*\*

OK	NOT OK-----	Replace Flight Control Unit (C 57) Ref: 27-36-15, R/I
-----		Replace static monitoring change over unit (C 56) Ref: 27-37-12, R/I

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## MAINTENANCE MANUAL

### 4. Close-Up

Carry out close-up operations of Procedure to set Flight Controls in ELECTRICAL MODE (Ref: 27-00-00, Servicing).

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# *Concorde*

## MAINTENANCE MANUAL

### ELECTRICAL CONTROL CHANNELS - ADJUSTMENT/TEST

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN 24-00-00, SERVICING.

#### 1. Operational Test

##### A. Flight Controls System Test

###### (1) General

The purpose of this test is to check that the elevons as well as the rudders deflect in accordance with the displacements of the control wheel as well as with those of the control column, and the rudder pedals.

###### (2) Equipment and Materials

###### (3) Prepare

(a) Take the precautions described in the previous WARNING paragraph.

(b) Carry out operations of "Prepare" paragraph (Taking into account "Equipment and Materials paragraph" of Procedure to set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).

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## MAINTENANCE MANUAL

- (c) Make certain that the following circuit breakers are set.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LAT ACCELMTR 1 26V SUPPLY	2-213	1C 42	A 4
AUTO STAB 1 COMP SUP		1C 37	E 5

(4) Test

- (a) On overhead panel, on RELAY JACK unit.

- (a1) Press TEST push button of BLUE JAM then release.

Gong must sound.

BLUE JAM caption light must illuminate, then go off.

On overhead panel, on Master warning panel, PFC warning light must illuminate.

- (a2) Press then release PFC warning light.  
- it must go off.

- (a3) Press TEST push-button of GREEN JAM, then release.

- Gong must sound.

GREEN JAM caption light must illuminate then go off.

On Master warning panel, PFC warning light must illuminate.

- (a4) Press then release PFC warning light.  
- it must go off.

- (b) On SERVO CONTROLS unit, on overhead panel, press successively each T push-button of BLUE JAM and GREEN JAM.

Gong must sound each time a push button is pressed.

BLUE JAM or GREEN JAM caption light corresponding to push-button must illuminate then go off.

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## MAINTENANCE MANUAL

On Master warning panel, PFC warning light must illuminate when first push-button is pressed. Before pressing second push-button, press then release PFC warning light : it must go off.

PFC warning light must illuminate again when second push-button is pressed. Press then release PFC warning light : it must go off.

(c) On First Officer's instrument panel, on ICOVOL indicator (Flight Control Surface Position Indicator).

(c1) Press, and hold pressed, TEST push-button. The 8 red warning lights must flash.

(c2) Release push-button.

Gong must sound.

The 8 red warning lights must remain illuminated.

On overhead panel on Master warning panel, PFC warning light must illuminate.

(c3) Press then release RESET push-button.

On ICOVOL the 8 red warning lights must go off.

(c4) On Master warning panel, press, then release PFC warning light ;  
- It must go off.

(d) Pressurize Yellow hydraulic system (Ref. 29-21-00, Servicing).

(e) On SERVO CONTROLS unit, place lower switch in GREEN L-PRESS position.

- Elevons must deflect up to position zero. (Check on ICOVOL indicator).

- On overhead panel, on SERVO CONTROLS unit, GREEN L. PRESS caption light must go off. The two green BLUE ONLY and the two green YELLOW GREEN indicator lights must illuminate.

- On ICOVOL indicator the 8 magnetic indicators must display M..

(f) On overhead panel, on Flight Control Unit :

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- (f1) Press and release, MECH JAM indicator light
  - This indicator light must go off.
- (f2) Place BLUE INVERTER and GREEN INVERTER switches in ON position and O & M ELEVONS, IN ELEVONS and RUDDER switches in BLUE position ;
- (f3) Press and release RESET push-button (on RH side of each selector switch).
  - BLUE INVERTER and GREEN INVERTER FAIL indicator lights must go off.
  - On ICOVOL indicator, First Officer's instrument panel, the 8 magnetic indicators must display G.
- (g) On overhead panel, on RELAY JACK unit place switch in BLUE ONLY position.
- (h) Turn control handwheel 4° (maximum) in both directions
  - Load applied must be heavy.
  - On ICOVOL indicator, markers corresponding to the elevons of RH wing must indicate a 4° deflection, in opposite direction to that of LH wing.
- (i) On overhead panel
  - (i1) On AUTO STAB 1 unit, engage YAW switch
  - (i2) On RELAY JACK unit, place switch in NORM position.
- (j) Turn control wheel to the right, then to the left up to stops.
  - On ICOVOL indicator, check that markers corresponding to the elevons deflect in opposite direction for each wing and that markers corresponding to rudders deflect 4° to the right when control wheel is turned to the right up to stop. Check that markers corresponding to rudders deflect 4° to the left when control wheel is turned to the left up to stop.
  - Load applied must be less heavy than in (h) above.

NOTE : Operation (h) confirms that the control

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channel for elevons is in fact the Green electrical channel. Operation (j) confirms that the control channel for rudders is in fact the Green electrical channel.

- (k) On overhead panel, on SERVO CONTROLS unit, place lower switch in BLUE L. PRESS position.
- Gong must sound
  - On master warning panel, PFC warning light must illuminate
  - On SERVO CONTROLS unit, GREEN L. PRESS caption light must illuminate and BLUE L. PRESS caption light must go off ; Green BLUE ONLY and YELLOW GREEN indicator lights must go off and green GREEN ONLY and YELLOW BLUE indicator lights must illuminate.
  - On ICOVOL indicator the 8 magnetic indicators must display M.
- (l) On overhead panel :
- (l1) On Flight Control Unit, press and release each of the three RESET push buttons
    - On ICOVOL indicator the 8 magnetic indicators must display B.
  - (l2) On master warning panel, press and release PFC warning light.
    - This warning light must go off.
  - (l3) On RELAY JACK unit, place switch in GREEN ONLY position.
- (m) Repeat operation (h) above
- Results must be identical
- (n) On overhead panel, on RELAY JACK unit, place switch in NORM position.
- (o) Repeat operation (j) above.
- Results must be identical.

NOTE : Operation (m) confirms that the control channel for elevons is in Fact the Blue electrical channel. Operation (o) confirms that the control channel for rudders is in Fact the Blue electrical channel.

- (p) On overhead panel, disengage YAW switch on AUTO STAB1 unit.

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- OFF stencil must be visible on this switch.
- (q) Shut down yellow hydraulic power (Ref. 29-21-00) and pressurize Green and Blue hydraulic systems (Ref. 29-11-00 and 29-12-00, Servicing).
  - Gong must sound.
  - PFC warning light must illuminate
  - GREEN L-PRESS indicator light must illuminate
  - ICOVOL magnetic indicators must display M.
- (r) On SERVO CONTROLS unit, place lower switch in NORMAL position.
  - GREEN L-PRESS caption light must go off.
- (s) Press PFC warning light to extinguish it.
- (t) On Flight Control Unit, press successively the 3 RESET push-buttons.
  - On ICOVOL indicator, the 8 magnetic indicators must display B.
- (u) Move successively flight controls ; pitch, roll, pitch/roll combined, and yaw. Carry out these operations in stages up to stops in each direction  
Elevons and rudders must deflect in a correct direction, corresponding to orders given by flight controls, i.e :
  - Control column in nose down position  
The 6 elevons deflect downwards
  - Control column in nose up position  
The 6 elevons deflect upwards
  - Control handwheel turned to the right  
3 RH wing elevons deflect upwards  
3 LH wing elevons deflect downwards
  - Control handwheel turned to the left  
3 RH wing elevons deflect downwards  
3 LH wing elevons deflect upwards
  - Rudder pedals to the right  
Two rudders deflect on RH side
  - Rudder pedals to the left  
Two rudders deflect on LH side

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On ICOVOL indicator, position indicating markers must move in accordance with elevon and rudder deflections.

(v) On overhead panel, on Flight Control Unit :

Place the O & M ELEVONS, IN ELEVONS and RUDDER switches in GREEN position.

On ICOVOL indicator the 8 magnetic indicators must display G.

(w) Repeat operation (u) above.  
- Results must be identical.

(x) On Flight Control Unit, place O & M ELEVONS, IN ELEVONS and RUDDER switches in MECH position.  
- On ICOVOL, the 8 magnetic indicators must display M.

(y) Repeat operation (u) above  
- Results must be identical

(z) On overhead panel, on Flight Control Unit

(z1) Place O & M ELEVONS, IN ELEVONS and RUDDER switches in BLUE position then press successively the three RESET push-buttons.

On ICOVOL indicator, the 8 magnetic indicator lights must display B.

(aa) On overhead panel, on Flight Control Unit, place BLUE INVERTER switch in OFF INV position.  
- On ICOVOL, the 8 magnetic indicators must display G.

(ab) Repeat operation (v) above.  
- Results must be identical

(ac) On Flight Control Unit, place GREEN INVERTER switch in OFF INV position.  
- On ICOVOL indicator, the 8 magnetic indicators must display M.

(ad) Repeat operation (u) above.  
- Results must be identical.

(5) Close-Up

(a) On Flight Control Unit, place BLUE INVERTER and

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GREEN INVERTER switches in PWR OFF position.

The relevant FAIL warning lights must illuminate.

- (b) Shut down hydraulic power (Ref. 29-11-00 and 29-12-00, Servicing).
- (c) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).
- (d) On panel 2-213, Trip safety and tag circuit breaker :  
FLT CONT & NAV BUS 14XS (X355, Map ref. H2).

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### B. Outer Elevon Neutralization Test

#### (1) General

The purpose of this test is to check, from the front panel of each neutralization computer, the correct operation of both computers and their action on outer elevons position.

#### (2) Equipment and Materials

#### (3) Prepare

- (a) Take the precautions described in the previous WARNING paragraph.
- (b) Carry out operations of "Prepare" paragraph (taking into account "Equipment and Materials" paragraph) of Procedure to set Flight Controls in electrical mode. (Ref. 27-00-00, Servicing).
- (c) On centre console, make certain that ADC1 and ADC2 switches are in OFF position.
- (d) On shelf 8-215 and 8-216, unlock and lower indicating unit covers on units 1C45 and 2C45 (outer elevon neutralization computers), and make certain that on front panel of each unit ADC1 and ADC2 switches are in OFF position.
- (e) Pressurize Blue and Green hydraulic systems (Ref. 29-12-00, Servicing and 29-11-00, Servicing)
  - Elevons must deflect up to neutral position.
  - On ICOVOL indicator, magnetic indicators must display M and markers must indicate zero.

NOTE : Do not take into account aural or visual warnings which are not mentioned.
- (f) On overhead panel, on Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in ON position and O & M ELEVONS switch in BLUE position.
- (g) Press and release RESET push-button (RH side of O & M ELEVONS switch).
  - On ICOVOL indicator, the 4 magnetic indicators associated with outer and middle elevons must display B.

#### (4) Test

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- R  
R
- (a) On neutralization computer 2C45 then on computer 1C45, place TEST-LT-TEST switch in LT-TEST position, then release it.
- On each computer, C and M lights must illuminate, then go off.
- (b) Operate pitch trim wheel to give a 4 to 5° deflection order (check on ICOVOL indicator).
- On ICOVOL indicator, the four position indicating markers associated with outer and middle elevons must read the value displayed.
- R
- (c) On computer 2C45, while holding TEST-LT-TEST switch in TEST position, place ADC1 switch in Vc > VMO position.
- The two C and M lights must illuminate
  - The markers of the galvanometers on the computer panel must displace slowly in opposite direction till they stop moving and read the value corresponding to that selected by the trim wheel.
  - On ICOVOL indicator, the position indicating markers associated with LH and RH outer elevons must slowly return to zero (at the same speed as the markers of the galvanometer on the neutralization computer).  
The magnetic indicators associated with outer elevons must always display "B".
- R
- (d) On computer 2C45, place ADC1 switch in OFF position while holding TEST-LT-TEST switch in TEST position.
- The C and M lights must go off.
  - The markers of both galvanometers must slowly return to zero.
  - On ICOVOL indicator, the position indicating markers associated with outer elevons must return progressively to the initial position.
- NOTE : The following steps must be carried out with TEST-LT-TEST switch in TEST position.
- R
- (e) On computer 2C45, place ADC2 switch in Vc > VMO position.
- The C and M lights must illuminate.

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- R (f) On computer 2C45, place ADC2 switch in OFF position.
- The C and M lights must go off.
- R (g) On computer 2C45, place ADC1 and ADC2 switches in ON position.
- The C and M lights must remain off.
- R (h) On computer 2C45, place ADC1 switch in  $V_c > V_{M0}$  position.
- No result.
- R (i) On computer 2C45, place ADC2 switch in  $V_c > V_{M0}$  position.
- The C and M lights must illuminate
- R (j) On computer 2C45, place ADC2 switch in ON position then in  $V_c > V_{M0}$  position.
- The C and M lights must remain illuminated for both positions of the switch.
- R (k) On computer 2C45, place ADC1 switch in ON position
- The C and M lights must remain illuminated.
- R (l) On computer 2C45, place ADC2 switch in ON position
- The C and M lights must go off.
- R (m) On computer 2C45, place ADC1 and ADC2 switches in OFF position.
- (n) Release TEST-LT-TEST switch.
- (o) On overhead panel, on Flight Control Unit place O & M ELEVONS switch in GREEN position.
- On ICOVOL indicator, the magnetic indicators associated with outer and middle elevons must display G. The associated position indicating markers must read the same value as that selected by pitch trim wheel.
- R (p) On the front panel of computer 1C45 (on shelf  
R 8-215) place TEST-LT-TEST switch in TEST position and hold it. Place ADC1 switch in  $V_c > V_{M0}$  posi-

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tion.

- On computer 2C45 :
  - The C and M lights must illuminate
  - The markers of both galvanometers must displace slowly in opposite direction till they stop moving and read the value corresponding to that selected by the trim wheel.
- On ICOVOL indicator, the position indicating markers associated with LH and RH outer elevons must slowly return to zero. The magnetic indicators associated with outer elevons must always display "G".

NOTE : The following steps must be carried out with TEST-LT-TEST switch in TEST position.

- R (q) On computer 1C45, place ADC1 switch in OFF position.
- The C and M lights must go off.
  - The markers of both galvanometers must slowly return to zero.
  - On ICOVOL indicator, the position indicating markers associated with outer elevons must slowly return to the initial position (No change on magnetic indicators).
- R (r) On computer 1C45, place ADC2 switch in Vc > VMO position.
- The C and M lights must illuminate.
- R (s) On computer 1C45, place ADC2 switch in OFF position.
- The C and M lights must go off.
- R (t) On computer 1C45, place ADC1 and ADC2 switches in ON position.
- No change.
- R (u) On computer 1C45, place ADC1 in Vc > VMO position
- No change
- R (v) On computer 1C45, place ADC2 switch in Vc > VMO position.
- The C and M lights must illuminate.

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- R (w) On computer 1C45, place ADC2 switch in ON position  
- The C and M lights must remain illuminated.
- R (x) On computer 1C45, place ADC2 switch in  $V_c > V_{M0}$  position.  
- The C and M lights must remain illuminated
- R (y) On computer 1C45, place ADC1 switch in ON position  
- The C and M lights must remain illuminated.
- R (z) On computer 1C45, place ADC2 switch in ON position  
- The C and M lights must go off.
- R (aa) On computer 1C45, place ADC1 and ADC2 switches in OFF position.
- (ab) Release TEST-LT-TEST switch.

### (5) Close-Up

- (a) On shelves 8-215 and 8-216, close and lock indicating unit covers on computers 1C45 and 2C45.
- (b) Shut down pressurization of Blue and Green hydraulic systems (Ref. 29-12-00 and 29-11-00, Servicing).
- (c) At overhead panel, on Flight Control Unit place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position.  
- The two associated FAIL warning lights must illuminate.
- (d) De-energize the aircraft electrical network (Ref. 24-41-00, Servicing).
- (e) On panel 2-213, trip circuit breaker FLT CONT & NAV BUS 14XS (X355) Map ref. H2.

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### SYNCHRO PACK - REMOVAL/INSTALLATION

**WARNING :** MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

- A. Synchro packs transmit electrical orders to Power Flight Control Units (PFCU). They are located in zone 121, and access can be gained through panel 121FB.

#### 2. Synchro Pack

- A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins - Synchro Pack	D925252000
Rigging Template - Integral Trim	D921250000
Access Platform 3.22 m (10 ft. 7 in.)	
Circuit Breaker Safety Clips	

- B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.

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- (2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFCs INV GRN SUP	1-213	1C 66	P11
PFCs INV BLUE SUP	5-213	2C 66	B14
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

- (3) Place roll trim control in zero position.
- (4) Open access door 151DB and depressurize Green, Blue and Yellow hydraulic systems.
- (5) Open access panel 121DB and insert rigging pin of equipment D921250000 in roll artificial feel lever.
- (6) Open access panel 121FB allowing access to synchro packs.

**WARNING :** DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (7) Remove AP force limiter (1) (Ref. 27-11-19, Removal/Installation).

C. Remove  
(Ref. Fig. 401 )

- (1) Disconnect electrical connectors and loosen clamps attaching wire bundles to the chassis.
- (2) Remove cotters and unscrew nuts (8) ; remove washers (9) and bolts (10). Disconnect rods (11).

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**NOTE** : For removing or installing attachment bolts, it is necessary to press plunger on head of bolt to free the locking system balls.

- (3) Remove cotter and unscrew nut (5) ; remove washer (6), press edge of retaining spring blade and remove bolt (7).
- (4) Remove cotter and unscrew nut (2) ; remove washer (3).
- (5) Support the synchro pack and remove bolt (4). Remove synchro pack. To remove bolt (4), it is necessary to press edge of retaining spring blade.

**CAUTION** : HANDLE THIS COMPONENT WITH CARE.

### D. Preparation of Replacement Component (Ref. Fig. 402 )

Proceed with the following checks on replacement synchro pack.

- (1) Check that retaining spring blades are in correct condition.
- (2) Check that clearance A, between cotter pin tail and mounting plate, is within the following limits.  
Theoretical clearance 3 mm (0.1181 in.).  
Minimum clearance 2.16 mm (0.085 in.).
- (3) Check that clearance B, between cotter pin head and mounting plate, is within the following limits :  
Theoretical clearance 3 mm (0.1181 in.).  
Minimum clearance 1.27 mm (0.050 in.).

### E. Install

- (1) Position synchro pack and install bolts (4) and (7) from left to right. Install washers (3) and (6) and tighten nuts (2) and (5). Torque to between 75 and 85 lbf.in. (0.85 and 0.95 m.daN). Safety with cotters.

**NOTE** : To engage bolts (4) and (7), it is necessary to press edge of retaining spring blades.

- (2) Immobilize synchro pack in zero position using rigging pin D925252001.
- (3) Connect rods (11). Install bolts (10) and washers (9) ; tighten nuts (8). Torque to between 27 and 32 lbf.in.

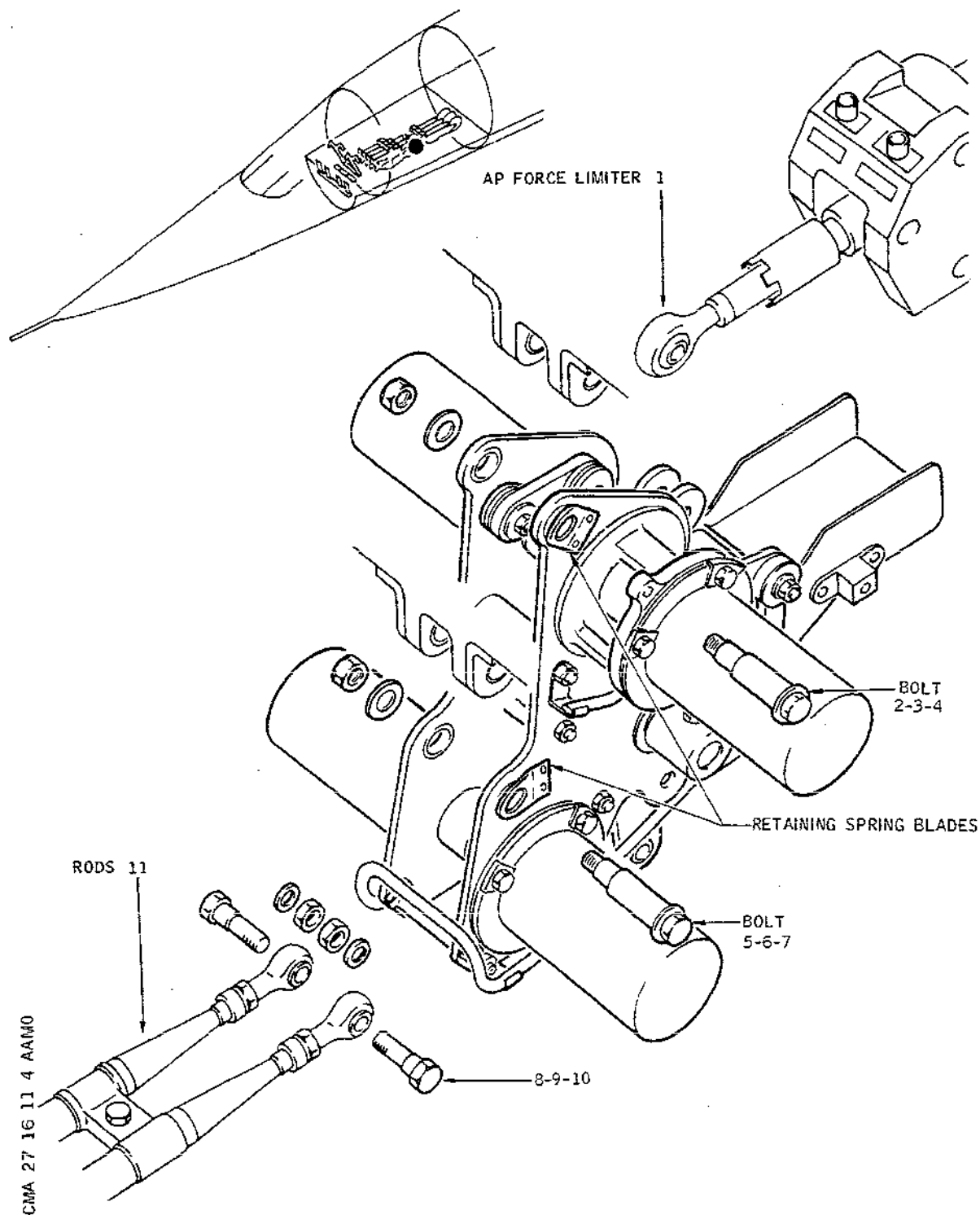
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Synchro Pack  
Figure 401

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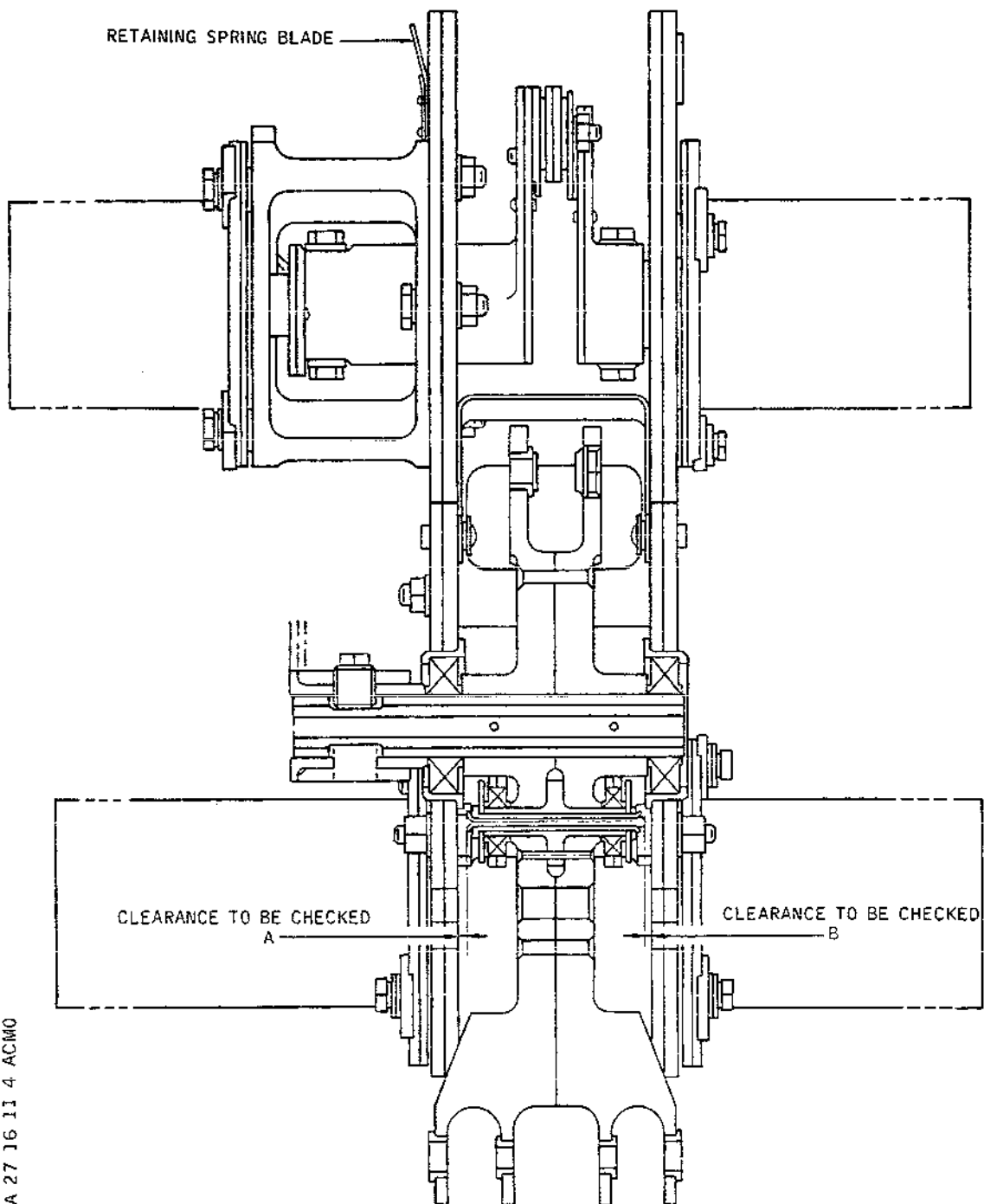
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Synchro Pack Assembly  
Figure 402

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(0.30 and 0.36 m.daN). Safety with cotter pin. If necessary adjust length of rods until they can be connected to synchro pack easily.

- (4) Connect the AP force limiter (1) (Ref. 27-11-19, Removal/Installation).
- (5) Tighten clamps attaching wire bundles to chassis and connect electrical connectors.
- (6) Check that rigging pin D925252001 can be easily removed from resolvers. If required adjust length of rods (11). Remove rigging pin.
- (7) Remove equipment D921250000.

### F. Tests

- (1) Carry out and operational test (Ref. 27-16-00, Adjustment/Test).
- (2) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access doors and panels 151DB, 121DB and 121FB.
- (3) Remove safety clips and tags and set the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFC5 INV GRN SUP	1-243	1C 66	P11
PFC5 INV BLUE SUP	5-213	2C 66	B14
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

- (4) Remove warning notices.
- (5) Remove access platform.

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### SYNCHRO PACK - INSPECTION/CHECK

#### 1. General

The purpose of the following procedure is to check the roll channel synchro pack.

#### 2. Synchro Pack

##### A. Equipment and Materials

DESCRIPTION	PART NO.
-------------	----------

Access Platform 3.672 m (12 ft)

##### B. Prepare

(1) Open door 121FB, giving access to synchro pack.

##### C. Check

(1) Check AP force limiter attachment to synchro pack bellcrank for absence of end play.

(2) Check synchro pack attachment to structure for absence of end play.

(3) Check twin rod attachment to synchro pack bellcrank for absence of end play.

(4) Check electrical routing attachment on the unit.

##### D. Tests

##### E. Close-Up

(1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2) Close door 121FB.

(3) Remove access platform.

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### ELECTRICAL MONITORING CHANNELS - DESCRIPTION AND OPERATION

#### 1. General

##### A. Purpose

Two electrical monitoring channels (Blue channel and Green channel) are associated with the control channels. The purpose of the monitoring channel is to detect a fault in the associated control channel and to cause a channel change-over. (This channel change-over only affects the associated control surface assembly, i.e : outer and middle elevons, or inner elevons or rudders).

The faults likely to affect a control channel are due to :

- Faulty operation of electrical or electronic components resulting in failure of elevons to achieve the order given by the flight controls.
- pressure drop of hydraulic system associated with the control channel in operation.
- A fault in the 26V 1800 Hz generation network associated with the control channel in operation.

In the first case :

The Blue monitoring channel is operative when the Blue control channel operates : if the latter is faulty the monitoring channel closes the Blue electrovalves and opens the Green electrovalves of the associated control surface assembly PFCU's affected by the fault.

In the other two cases :

The monitoring channel closes the Blue electrovalves and opens the Green electrovalves of all PFCU's.

The Green monitoring channel is operative when the Green control channel operates : if the latter is faulty the monitoring channel closes the Green electrovalves (the Blue ones being closed).

The electrical channels are then inhibited and the PFCU's are actuated in mechanical mode.

##### B. Principle

In the event of a drop in Blue or Green hydraulic pressure, or of a fault in Blue or Green 26V, 1800Hz generation network, the Blue (or Green) monitoring channel closes the Blue (or Green) electrovalves on the 6 elevons and the 2 rudder PFCU's.

The closing order is transmitted through the static monitoring change-over circuits controlled by :

- Low pressure switch in Blue (or Green) hydraulic system.
- Fault relay of Blue (or Green) 26V, 1800Hz generation

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network. (At the same time, opening of Green electrovalves is controlled if Blue control channel is the active channel).

When there is a difference in the position of one (at least) control surface of the associated control surface assembly and the position of the flight control, supply to Blue or Green electrovalves is cut off only at the level of the PFCU's of this assembly. However a tolerance of 2 degrees 75 is permissible.

The detection of any angular discrepancy is achieved by a synchro detection channel made up of CX resolvers or CDX differential resolvers (actuated by flight control) and CT resolvers (actuated by the PFCU) and connected electrically.

- If CT detector resolver (i.e. PFCU) is in the same position as CX transmitter resolver or as CDX differential resolver, there is no signal at terminals of this CT resolver.
- If not, a signal is generated at the CT resolver terminals. This signal is fed to a comparator which controls a control channel change-over by transmitting a signal to the static monitoring change-over unit. This unit causes Blue electrovalves to close and Green electrovalves to open if Blue control channel is operative (or Green electrovalves to close, the Blue valves remaining closed if Green channel is operative).

### C. Application of Principle (in Roll Control)

#### (1) Outer and Middle Elevons (Ref. Fig. 001 )

- A monitoring channel checks that angle of deflection of middle and outer elevons of each wing with respect to Neutral position, corresponds to the angle of rotation of control column wheel (with 2 degrees 75 tolerance).
- In the normal flight envelope (aircraft speed below maximum operational speed VMO), deflection of outer and middle elevons of each RH and LH wing is the same, but in the opposite direction.
- For each channel, the rotation of the control hand-wheel drives the rotor of two differential CDX resolvers (each being common to middle and outer elevons of each wing, their deflection being identical). These CDX resolvers are supplied by the output signal of a CX resolver common to the 4 elevons above (signal represents angle of control column deflection (Ref. 27-37-00)).
- The output signal of each CDX resolver (which is the

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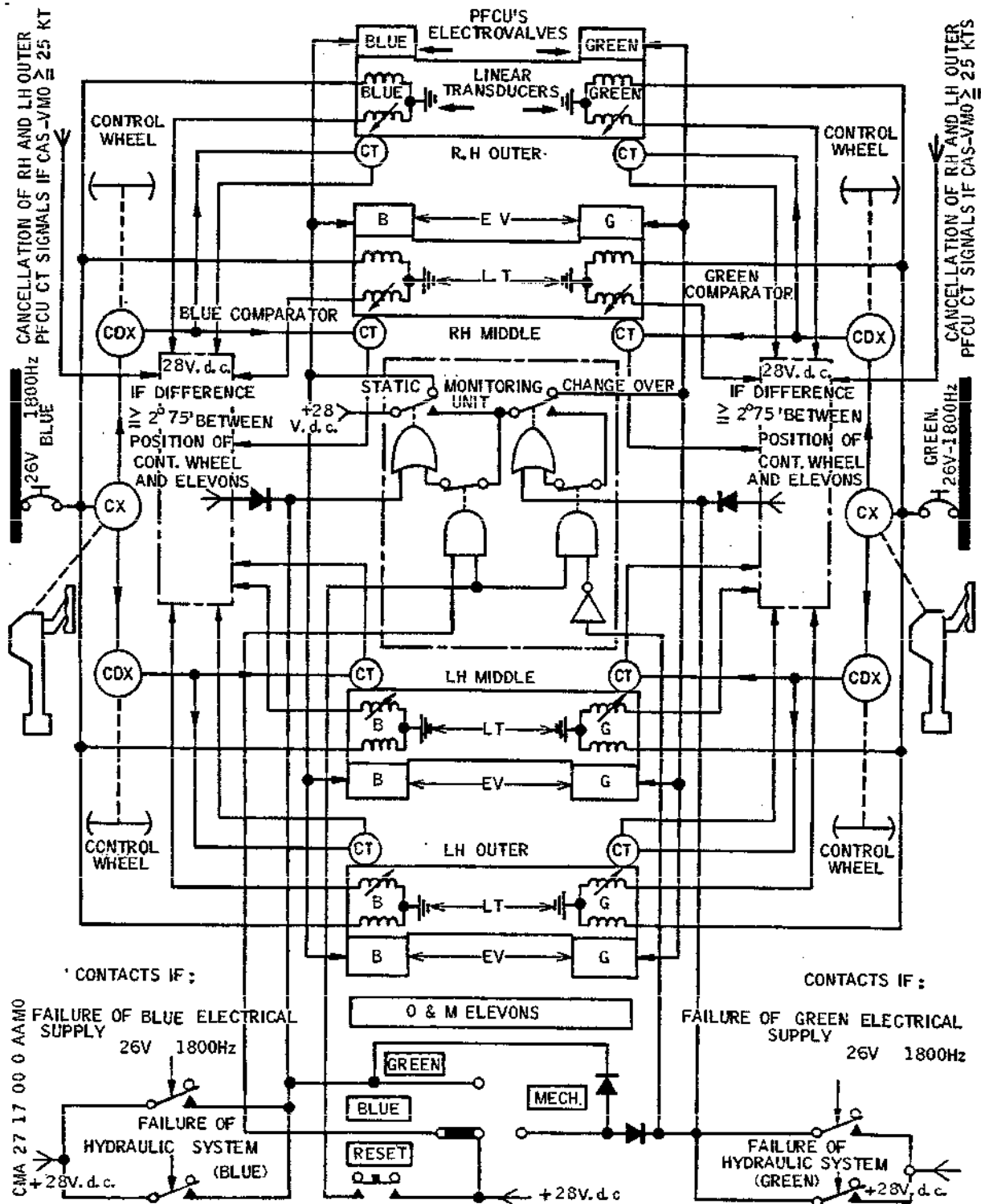
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Outer and Middle Elevons - Control  
Channel Switching Effected by Monitoring Channels  
Figure 001

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sum of roll and pitch orders) is fed in parallel to two CT resolvers integral with outer and middle elevon PFCU's of the corresponding wing.

- If displacement of the 4 PFCU's is in the correct position with respect to position selected by the control handwheel, there is no signal at output terminals of CT's.
- If displacement of one (at least) of the 4 PFCU's is not in the position selected by control handwheel, a signal appears at terminals of corresponding CT resolver.
- This signal is fed to a comparator which checks if the signal is within the  $2^{\circ}75$  tolerance admitted between control handwheel angle of rotation and PFCU deflection angle.  
If this signal is above the tolerance, a switching signal is sent to the static monitoring change-over unit.  
This unit causes closing of Blue (or Green) electrovalves of the four PFCU's of outer and middle elevons and at the same time, the opening of Green electrovalves if faulty control channel is the Blue one.
- Whenever outer elevons are neutralized due to VMO being exceeded, (Ref. 27-16-00), a signal generated by neutralization computer is fed into the comparator. The purpose of this signal is to neutralize the fault "detected" by the comparator : in fact, outer elevons no longer being in the selected position, the comparator would detect this as a fault and would cause channel switching.

### (2) Inner Elevons (Ref. Fig. 002 )

The monitoring system for inner elevons is similar to the outer and middle elevons system.  
For each channel, the rotation of the control wheel drives the rotor of two differential CDX resolvers (one for each inner elevon on PFCU) supplied by the output signal of a CX resolver common to the two inner elevons and used for pitch monitoring control (Ref. 27-37-00).

- The output signal of each CDX resolver (a roll order which can be summed up with pitch order) is fed into a CT detector resolver, the rotor of which is driven during displacement of its associated PFCU.
- If displacement of PFCU is correct with respect to handwheel position, the output signal is null.
- If not, the signal at CT resolver terminals is sent

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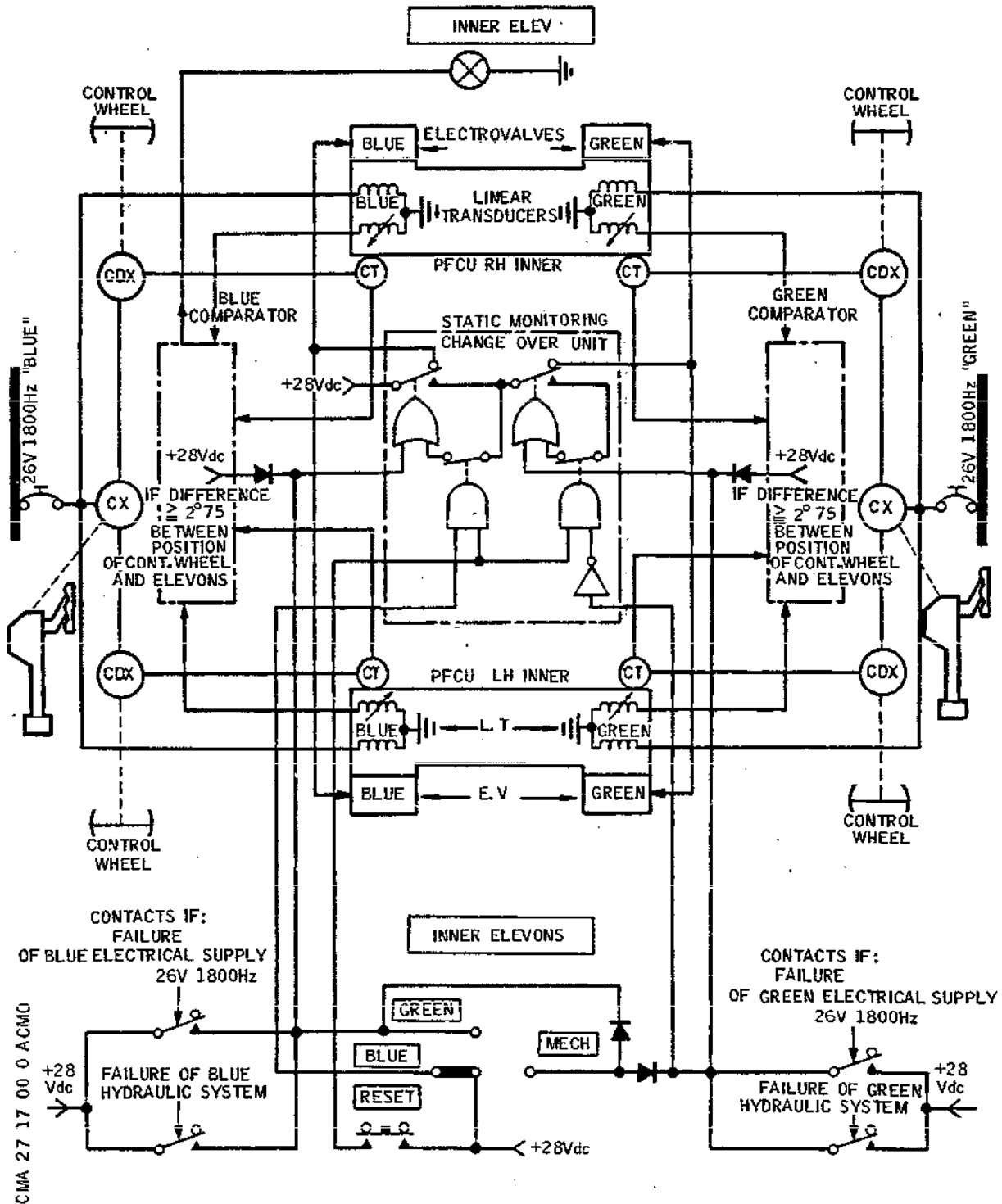
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Inner Elevons - Control Channel Switching  
Through Monitoring Channels  
Figure 002

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to a comparator which checks whether this signal is above the 2°75 tolerance.  
If it is above tolerance, a switching signal is sent to the static monitoring change-over unit which then provokes closing of Blue (or Green) electrovalves of the two inner elevons PFCU's, and simultaneously the opening of Green electrovalves if faulty control channel is the Blue one.

- In the event of de-synchronization of inner elevon PFCU spool valve displacement (due to excessive aerodynamic loads exerted on these elevons, or to jamming of one of the spool valves, or to mechanical linkage breaking between the two spool valves), the INNER ELEV warning light, located above the ICOVOL indicator illuminates, informing the crew that a special procedure must be adopted.

### 2. Description (Ref. Fig. 003 )

#### A. Monitoring Channel Make-Up

The monitoring channel mainly consists of :

- A detection channel (composed of resolvers).
  - Comparators.
  - A static monitoring change-over unit enabling the necessary switchings for control channel change-over. The detection channel is of the same type as the control channel.
  - For outer and middle elevons, LH wing CDX resolver and RH wing CDX resolver are grouped in a single unit installed on the roll synchro pack.
  - For inner elevons, LH and RH elevons CDX resolvers are also grouped in a single unit installed on the roll synchro pack.
- Both single units contain also the control channel CDX resolvers (Ref. 27-16-00).  
The two CDX resolvers of outer and middle elevons are supplied in parallel by output signals from pitch monitoring CX resolvers associated with the four outer and middle elevons.
- The two CDX resolvers of inner elevons are supplied in parallel by output signals from pitch monitoring CX resolvers associated with the two inner elevons.
- Each CDX resolver of outer and middle elevons sends an output signal in parallel to outer and middle elevon CT resolver of corresponding wing.  
Each inner elevon CDX resolver sends its output signal directly to the corresponding CT resolver of inner elevon.  
If one of the 6 elevons is not in the correct position

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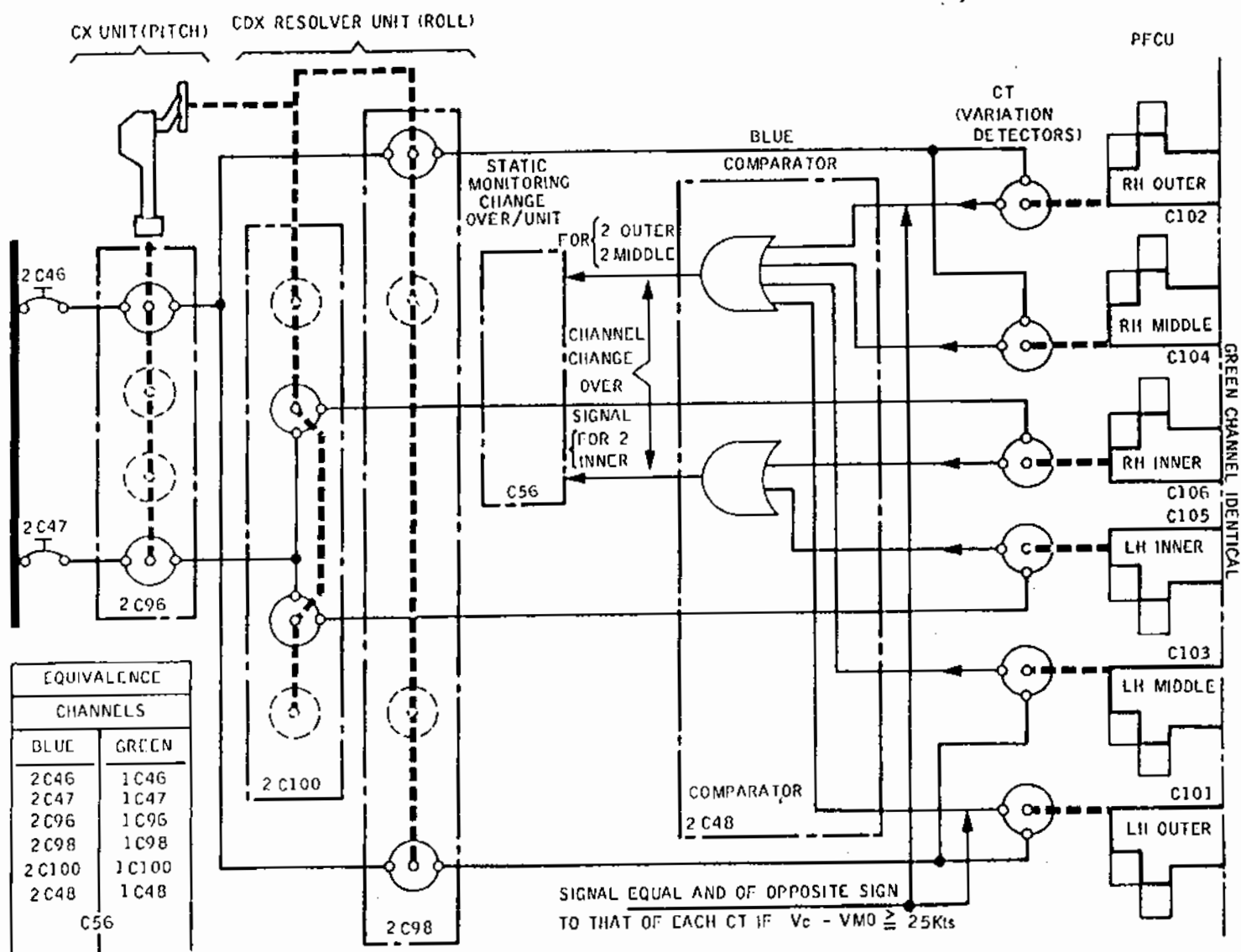
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CMA 27 17 00 0 AEMO



Blue Monitoring Channel Diagram  
(Green Channel Identical)  
Figure 003

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with respect to the Flight control, the signal at corresponding CT resolver terminals is fed to the comparator stage associated with control surface assembly which includes the CT resolver (outer and middle elevons, inner elevons).

This stage checks if the CT resolver signal is different from the signal which corresponds to the  $2^{\circ}75$  variation (tolerance) between the position of the flight control and the position of the faulty elevon.

- If this signal is above tolerance, an electrical order is sent to the stage of the static monitoring change-over unit corresponding to the associated control surface assembly including faulty elevon.

The static monitoring change-over unit sends a signal which closes the elevon PFCU electrovalves of the associated control surface assembly.

If the Blue control channel is operating, the monitoring channel closes the Blue electrovalves and opens the Green electrovalves.

### B. Controls and Indicating

A control channel change-over induced by the associated monitoring channel is signalled by :

- The gong sounding
- A change in indication of the ICOVOL magnetic indicators (on First Officer's instrument panel) corresponding to the PFCU affected by the change of channel.
- Illumination of the red warning lights (on the ICOVOL) corresponding to the PFCUs affected by the channel change-over, but only if this change-over is a consequence of a fault in PFCU displacement.  
However, the flashing of the red warning lights does not indicate a channel change-over, but that the elevons corresponding to the warning lights are vibrating at a frequency above 8 Hz.
- The illumination of P.F.C. warning light on overhead panel.

If the fault which has caused a control channel change-over disappears, it is possible to revert to the Blue control channel.

To do this, move back the O & M ELEVONS (or IN ELEVONS) switch on the flight control unit to BLUE position, then press the RESET push-button on RH side of switch.

De-synchronization of the inner elevons PFCU spool valves causes the illumination of the INNER ELEV warning light (located above the ICOVOL), the illumination of the P.F.C. warning light on the master warning panel and the operation

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R

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of the gong.

### 3. Resolvers

#### A. Synchro Pack (Ref. Fig. 004 )

The roll synchro pack is a chassis on which are assembled two flanges facing each other.  
On each flange are mounted 2 single units associated with a channel (Blue or Green).  
One unit contains :

- The two CDX resolvers of the LH and RH inner elevons (and the two CDX resolvers affected to the control channel of these elevons).

The other unit contains :

- The two CDX resolvers of the outer and middle elevons (1 for each wing), and the two CDX resolvers of the control channel of these elevons).
- The two single units of each channel are assembled facing each other, which enables them to be actuated by two rods linked to the control bellcrank, which is operated by the linkage of the control handwheel.

EFFECTIVITY: ALL

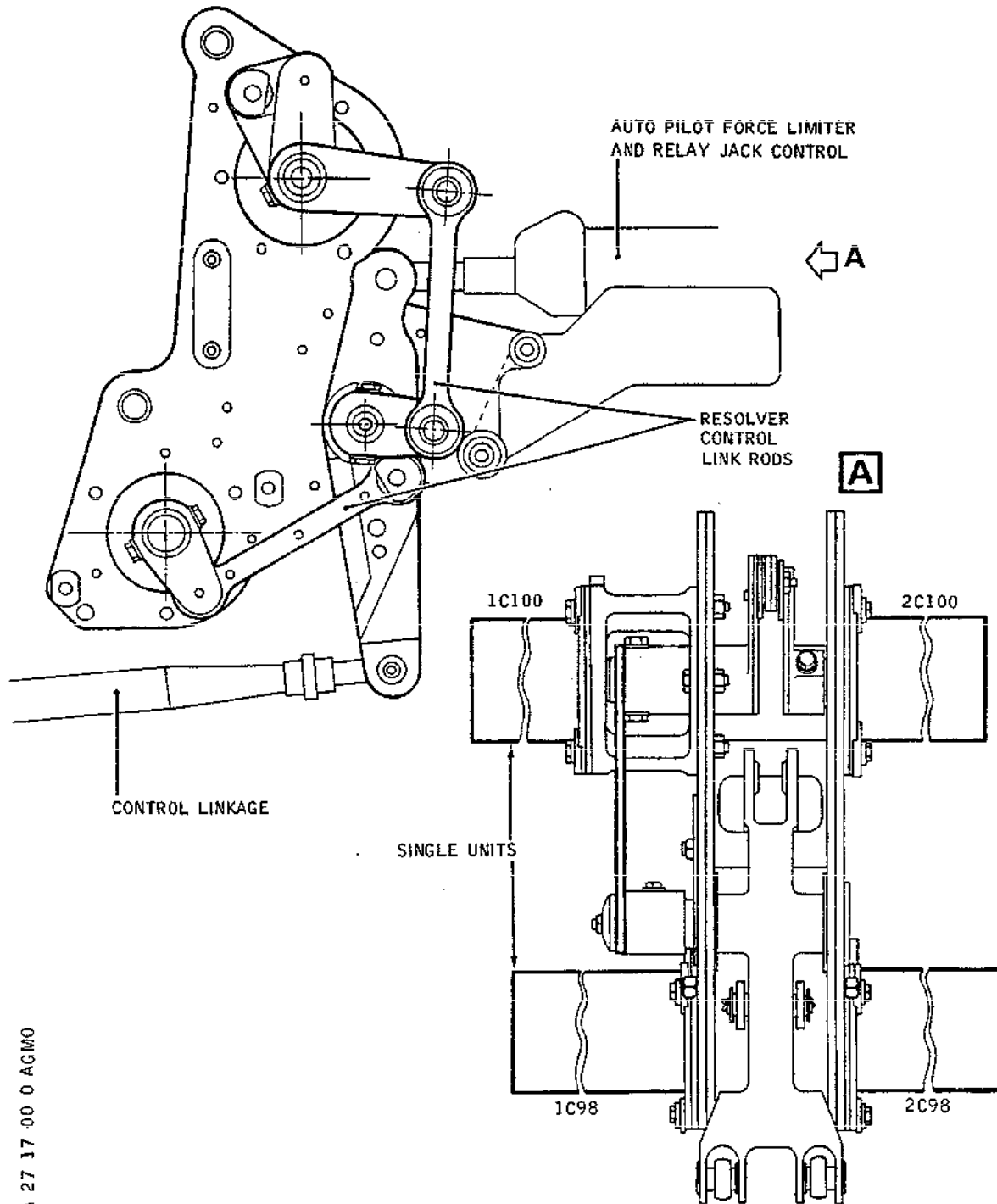
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CMA 27 17 00 0 AGMO

Roll Synchro Pack  
Figure 004

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### B. CT Resolvers on PFCUs

- R On each PFCU is mounted a unit containing 5 resolvers. Two  
CT detector resolvers mounted in "pan-cake" installation,  
are affected, one to the Blue monitoring channel and the  
other to the Green channel.
- R Two other CT resolvers are affected to each of the two  
control channels, and the fifth resolver to the ICOVOL indi-  
cator. The spindles of these resolvers are actuated simul-  
taneously, during PFCU displacement, by a rod and lever  
system. The rod end is attached to the aircraft structure.

### 4. Transducers - Linear Displacement

- R Two linear displacement transducers (one for each channel) are  
incorporated in each PFCU.
- R The linear displacement transducer is an inductance the value of  
which changes according to the corresponding spool valve dis-  
placement.
- R The purpose of the linear displacement transducers is :
- To anticipate a channel change-over during the detection of a  
variation between elevons and control column position equal  
to or greater than 2°75.
  - To prevent a channel change-over in the event of a position  
discrepancy due to excessive aerodynamic loads on one elevon.
  - For the inner elevons : to deliver a signal in the event of  
desynchronization between the two spool valves of each  
elevon PFCU, this signal activates illumination of INNER  
ELEV warning light located above the ICOVOL.
- R The signals from each linear displacement transducer (Blue  
transducers only) applied to a card in the comparator where  
they are summed with the signals of the associated CT resolver  
driven by the PFCU with which both the transducer and the  
CT resolver are associated.

### 5. Comparators (Ref. Fig. 005 )

- R A monitoring comparator is assigned to each channel.
- R The Blue comparator (2C48) is located on shelf 8-216, and the  
Green comparator (1C48) on shelf 8-215.
- R Each includes mainly twenty one electronic cards.
- Two cards adapt the aircraft 28VDC voltage to the supply of  
the comparison cards, and process the comparison card output  
signals before sending them to the static monitoring change-  
over unit.
  - Three cards modulate the autostabilization signals by a  
1800 Hz signal. These signals are then applied to the compa-  
rison cards.

R EFFECTIVITY: ALL

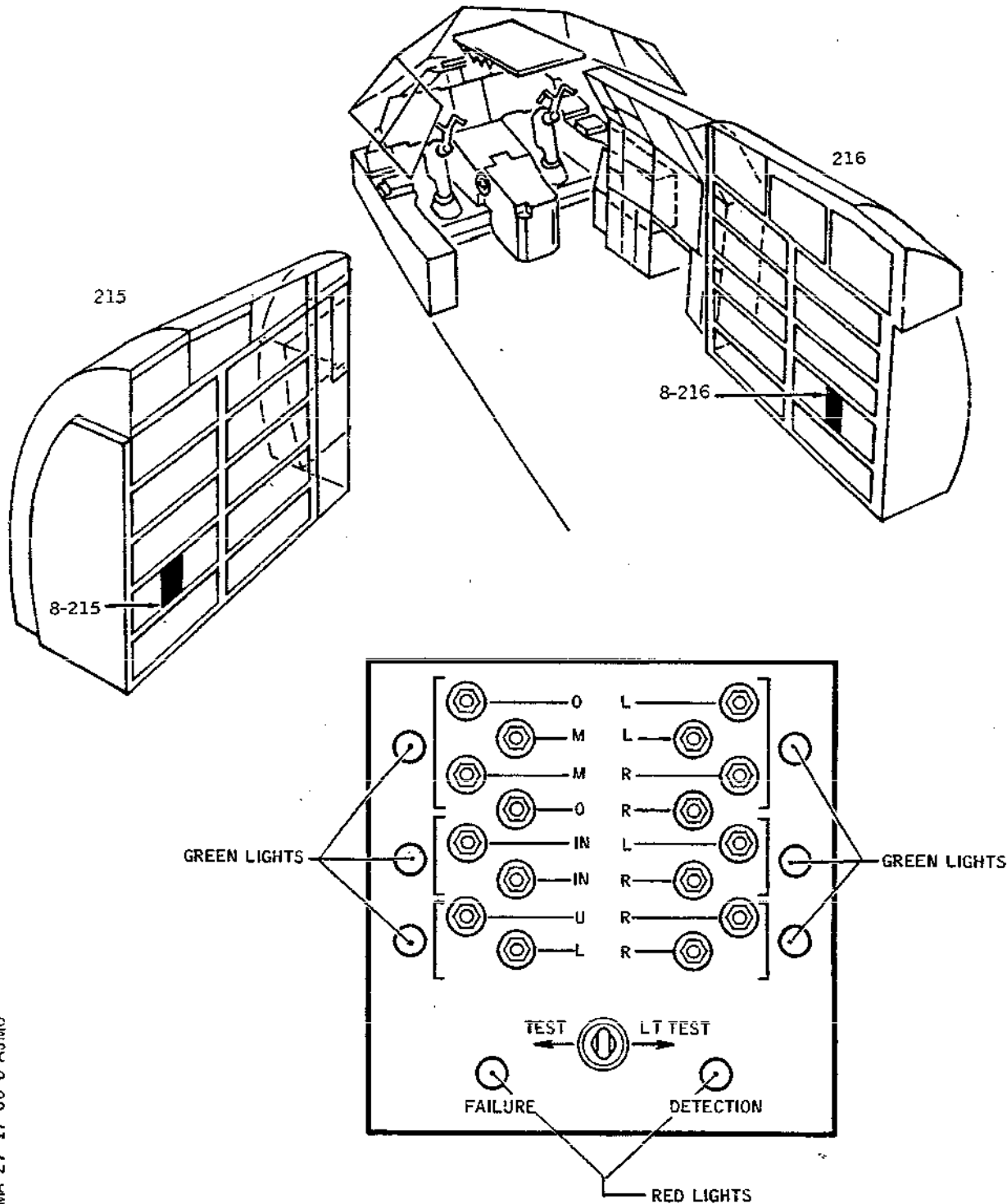
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Comparators - Location-Front View  
Figure 005

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- Sixteen cards (comparison cards) :  
Two cards are assigned to each elevon and rudder as a safety precaution. Each card processes the signals from the CT resolver, the linear transducers, and the autostabilization signals modulated by 1800 Hz.  
If the resulting signal is greater than the signal (generated by each card) which would correspond to a variation of  $2.75^\circ$  between order given by handwheel and the position of at least one of the two inner elevons or one at least of the four outer and middle elevons, a control channel change-over order is sent to the static monitoring change-over unit.
- Other cards are used :
  - For processing the signal from the neutralization computer associated with the comparator (Ref. 27-16-00, Description and Operation)  
This signal neutralizes the channel change-over signal for outer and middle elevons which would be generated by the comparator if a pitch or roll order was given ; when VMO is exceeded ( $V_c - VMO$  equal to or greater than 25 Kts) a roll (or pitch) order is cancelled for the outer elevons.  
The comparator would thus "perceive" the cancellation of this order as a fault and would send a signal to the static monitoring change-over unit to change the channel for outer and middle elevons.
  - For processing the signals from the Blue linear transducers of each inner elevon PFCU (The green comparator does not perform this processing).  
The signal resulting from this processing causes the illumination of the INNER ELEV warning light (above the ICOVOL indicator) indicating a de-synchronization of the inner elevon PFCU spool valves.
- Inside the indicating unit attached to the comparator front panel are arranged the following items :
  - 6 Green lights associated with 16 push-buttons
  - a three-position switch with a self-holding intermediate position and two manually-held TEST and LT.TEST positions
  - one red FAILURE and one red DETECTION warning lights

Four Green lights and twelve push-buttons are associated with the elevons (two lights and six buttons for each wing). A visual check of the lights before and after pressing the push-buttons enables to determine whether a control channel change-over is due to a defect in the comparator or to a malfunction of another monitoring channel component.

When the switch is placed in LT.TEST position, all lights must illuminate. With switch held in TEST position, press successively each push-button to check the operation of both comparison cards associated with each elevon. When card functioning is correct, the Green light corresponding to the associated control

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surface assembly illuminates.

### 6. Change-Over Unit - Static Monitoring (Ref. Fig. 006 )

The purpose of this unit is to close the electrovalves of one (or more) associated control surface assembly(ies) when it receives signals from :

- The Blue or Green comparators.
- R - The PFCU Blue or Green jam detection microswitches.
- The Blue or Green hydraulic low pressure switches.
- The Blue or Green inverter protection units.
- R (In the two last cases above, the channel change-over is effective on the 6 elevon PFCUs and on the 2 rudder PFCUs).
- R - This unit (C 56) is located on shelf 8-216.
- R It consists of 14 electronic cards :
  - R - Blue power supply card
  - R - Green power supply card
  - Outer and middle elevon Blue logic card
  - Inner elevon Blue logic card
  - Upper and lower rudder Blue logic card
  - Outer and middle elevon Green logic card
  - Inner elevon Green logic card
  - Upper and lower rudder Green logic card
  - Jam detection card
  - R - Outer and middle elevon power card
  - R - Inner elevon power card
  - R - Rudder power card
  - ICVOL card
  - R - Indicator light control card.
- R - The Blue and Green power supply cards receive respectively
- R 28VDC supplies from the Blue bar (4P-S) and Green bar
- R (3P-S) assigned only to the Flight Control circuits and
- R energized when the control switches of the 26V - 1800 Hz
- R Blue and Green inverters are in OFF.INV or in ON position.
- R Each card adapts the corresponding 28VDC supply for use on
- R the other cards of the unit.
- R - Each logic card, assigned to an associated control surface
- R assembly (outer and middle elevons, inner elevons, rudders)
- R receives the failure signals listed in the beginning of the
- R paragraph and concerning this control surface assembly.
- R After processing these signals, the output signal is applied
- R to :
  - R - the power cards of the concerned control surface assembly
  - R bly

R EFFECTIVITY: ALL

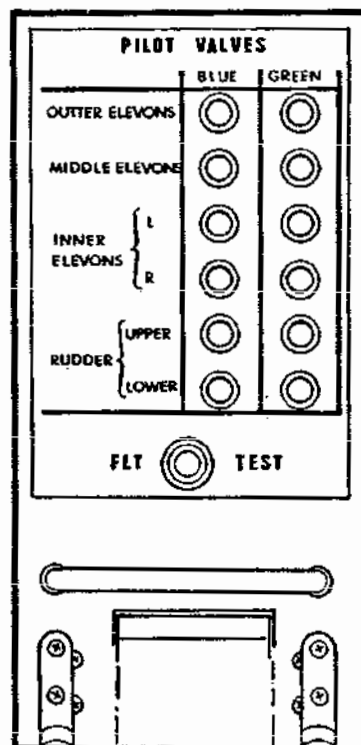
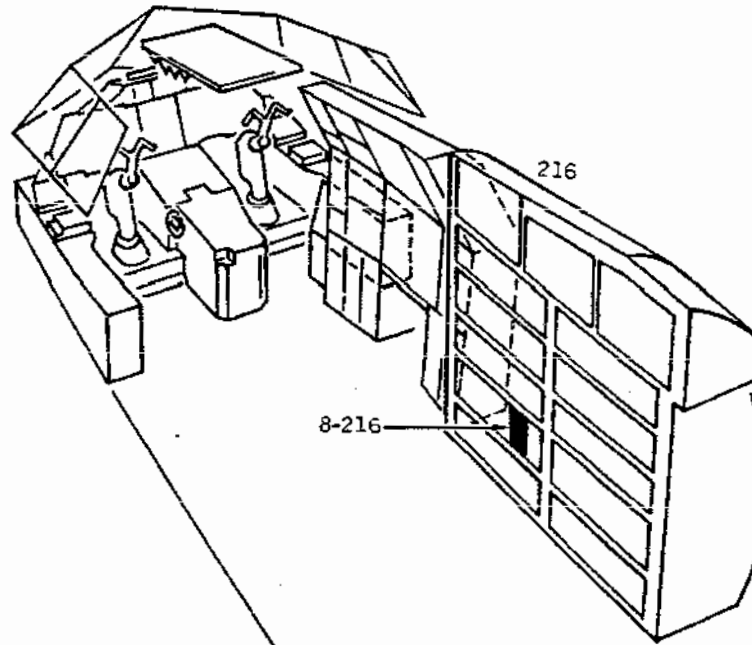
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Static Monitoring Change-Over Unit - Location  
And Front View  
Figure 006

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- R - the ICOVOL card
- R - the card assigned to the lights of the indicating unit
- R corresponding to the same assembly
  
- R - Each power card which receives signals from the logic cards
- R of the control surface assembly concerned generates the
- R signal which controls the closing of the Blue electroval-
- R ves and the opening of the Green electrovalves of the
- R PFCU's, if the Blue channel was in operation ; or the clo-
- R sing of the Green electrovalves (the Blue remaining closed)
- R if the Green channel was in operation.
- R - From the ICOVOL card is sent the signal indicating a chan-
- R nel change-over (magnetic indicators and, possibly, illumi-
- R nation of the red warning lights on ICOVOL indicator).
  
- R - From the light control card are sent the signals controlling
- R illumination or extinguishing of indicator lights located
- R on the indicating unit of the housing. (These lights illu-
- R minate or extinguish during the opening or the closing of
- R the appropriate PFCU electrovalves).
- R - On the front panel of the unit, inside the indicating unit,
- R 12 indicator lights identify the opening controls of the PFCU
- R electrovalves : 6 indicator lights for the Blue electrovalves
- R and 6 indicator lights for the Green electrovalves :
  
- R - 1 indicator light for the RH and LH outer elevon PFCU
- R electrovalves.
- R - 1 indicator light for the RH and LH middle elevon PFCU
- R electrovalves.
- R - 1 indicator light for the RH inner elevon PFCU electrovalve
- R - 1 indicator light for the LH inner elevon PFCU electrovalve
- R - 1 indicator light for the upper rudder PFCU electrovalve.
- R - 1 indicator light for the lower rudder PFCU electrovalve.

R Below these indicator lights, a test button checks the lamp filament.

### R 7. Indicator - Flight Control Surface Position (ICOVOL) (Ref. Fig. 007 )

R The ICOVOL indicator is a control surface position indicator, located on the First Officer's instrument panel, which informs the crew members of the monitoring channel operation. A discrepancy in the associated control surface deflection, detected by the Blue (or Green) monitoring channel causes a change in the magnetic indicators display corresponding to these control surfaces and provokes the illumination of the corresponding red warning lights. If vibrations above the 8 Hz frequency level are detected on one elevon of the associated control surface assembly, the above red warning lights on the ICOVOL flash at 2 Hz frequen-

R EFFECTIVITY: ALL

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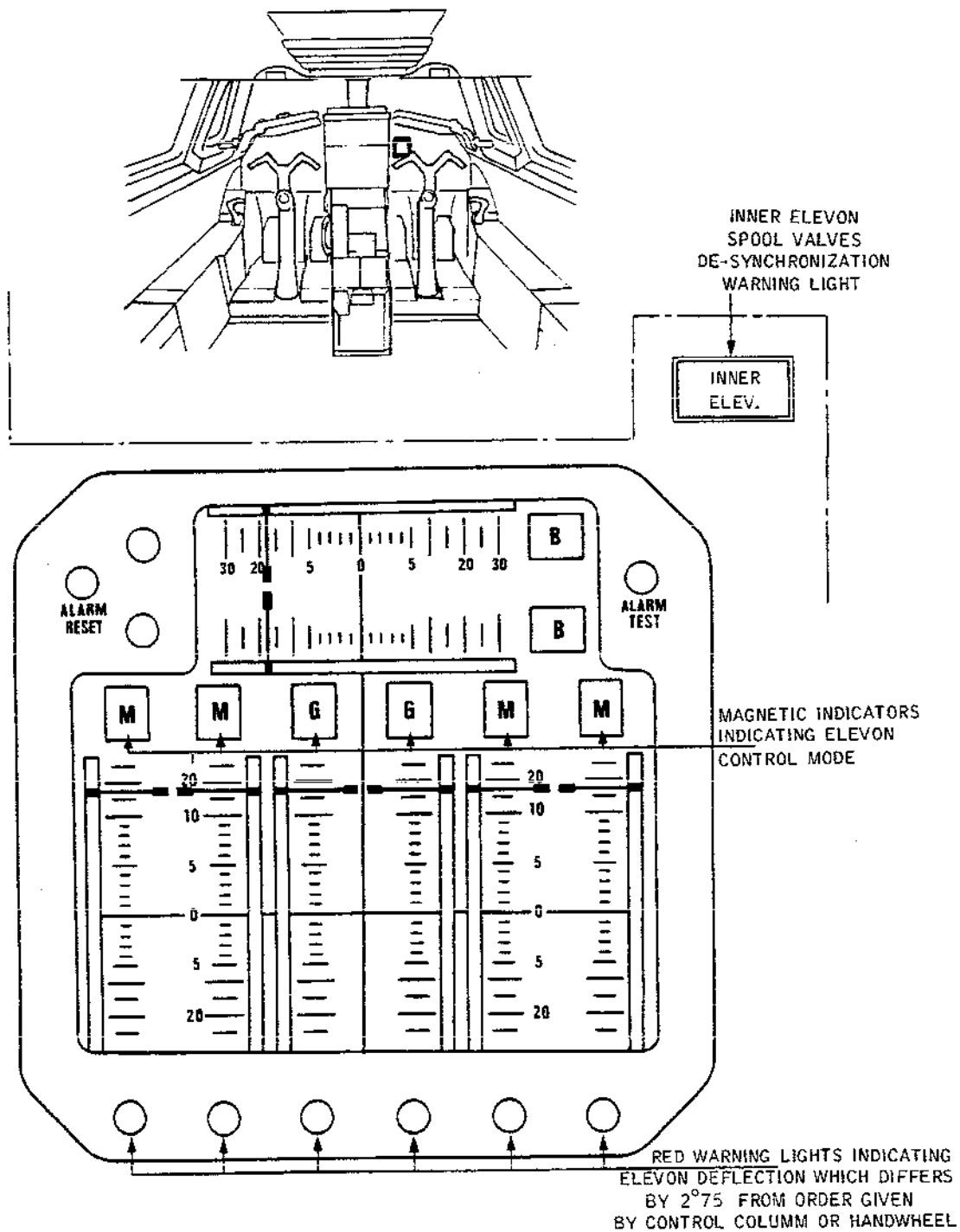
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View of IC0VOL Indicator  
Figure 007

R

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cy approximately.

A faulty operation of Blue or Green 26V, 1800Hz generation network, or a drop in Blue or Green hydraulic pressure causes change in the 8 magnetic indicators display, but without illumination of the red warning lights.

R The INNER ELEV caption light, located on RH side and at the  
R upper part of the ICOVOL indicator, illuminates in the event  
R of ; de-synchronization of the inner elevon spool valves,  
R excessive aerodynamic loads, or jamming of a PFCU spool valve  
R on one of these elevons.

### 8. Electrical Supply

R The resolvers in each Blue or Green monitoring channel are  
R powered by means of 26VAC, 1800Hz busbars. The Blue and Green  
R comparators and the static monitoring change-over unit are  
R powered by means of two 28VDC busbars.

R The resolvers in the ICOVOL synchro detection channel are  
R powered by means of a 26VAC, 400Hz busbar.  
The ICOVOL indicator also receives a 28VDC power supply.  
The following table gives the various location of the busbars  
in circuit breaker panels

	SERVICE	BUSBAR	C/B PANEL
R	ICOVOL indicator	"A" ESSENTIAL, 28VDC, 3P	1-213
	Green comparator and static monitoring change over unit	"A" ESSENTIAL, 28VDC, 3PS	1-213
	Resolvers in Green monitoring channel	"A" FLYING CONTROL, 26VAC, 1800Hz, 22X	2-213
	Resolvers in Blue monitoring channel	"B" FLYING CONTROL, 26VAC, 1800Hz, 23X	2-213
	Resolvers in ICOVOL channel	"A" ESSENTIAL, 26VAC, 1800Hz 14X	2-213
	Blue comparator and static monitoring change-over unit	"B" ESSENTIAL, 28VDC, 4PS	5-213

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### ELECTRICAL MONITORING CHANNELS - TROUBLE SHOOTING

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN 24-00-00, SERVICING.

#### 1. General

- A. The following Trouble Shooting procedure is common to Pitch and Roll axes.

It is divided in two parts :

- Trouble Shooting of elevon Flight Control electrical channels (control and monitoring channels)
- Trouble Shooting of outer elevon neutralization system.

- B. The following information is intended to enable faults found in flight or on the ground to be quickly rectified. This information is given in the form of fault analysis synoptic charts.

The fault can be isolated with the aid of the trouble shooting procedures and traced through OK and NOT OK paths to the appropriate charts or other specified rectification action as may be necessary. If a fault occurs perform the appropriate rectification action, then repeat the operation at which the fault was encountered to ensure the operation is OK.

Bracketed numbers in the procedures and charts indicate

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items on the component identification tables (located at the end of each part).

The tables provide information, including component location, required for rectification. The electrical wiring is assumed to be serviceable (if the component fault is not found, check the wiring in accordance with the Wiring Diagram Manual).

However, when Trouble Shooting procedure leads to component removals which imply long Removal/Installation operations and long grounding period (Servo Controls for example), wiring faults are considered and checked).

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### 2. Trouble Shooting of Elevon Flight Control Electrical Channels

#### A. General

The following trouble shooting procedure is common to the monitoring and control channels of roll and pitch axes. It groups all "perceptible" faults of elevon flight control electrical channels ; "concealed" faults are dealt with by means of the Flight Controls Electrical Circuits Test Set (P/N 31-56-100) in 27-10-00, Trouble Shooting.

This trouble shooting is carried out assuming that :

- Flight mechanical controls operate correctly (If not, ref. 27-11-00, Trouble Shooting).

R - Flight Control hydraulic systems are correct.  
(If not, ref. 27-14-00, Trouble Shooting).

- 26 Volt 1800 Hz generation system is correct.  
(If not, ref. 27-15-00, Trouble Shooting)

R - Control surface position indicating circuit is correct.  
(If not, ref. 27-16-00, Trouble Shooting).

#### B. Prepare

(1) Take the precautions described in the previous WARNING paragraph.

(2) Carry out Prepare paragraph of Procedure to set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).

(3) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SAFETY FLT CONT No.1 SUP	1-213	1C 651	S20
LAT ACCELMTR 1 26V SUP	2-213	1C 42	A 4
AUTO STAB 1 COMP SUP		1C 37	E 5
SAFETY FLT CONT No.2 SUP	5-213	2C 651	D17
SAFETY FLT CONT COMP	13-215	1C 652	E 6
No.1 115V SUP			
SAFETY FLT CONT COMP		1C 653	F 6
No.1 26V SUP			
LAT ACCELMTR 2 26V SUP	13-216	2C 42	B16

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SAFETY FLT CONT COMP No.2 26V SUP		2C 653	C16
SAFETY FLT CONT COMP No.2 115V SUP		2C 652	C17
(4) Pressurize Blue and Green hydraulic systems. (Ref. 29-11-00 and 29-12-00, Servicing).			
(5) On overhead panel, on Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in ON position ; the corresponding FAIL warning lights must go off.			
(6) On overhead panel, on AUTOSTAB unit No.2 engage PITCH and ROLL switches.			

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### C. Trouble Shooting

\*\*\*\*\*  
 \* Check on ICOVOL indicator (Flight Control Surface \*  
 \* Position Indicator) (First Officer's instrument \*  
 \* panel) that elevon magnetic indicators display M \*  
 \* and that elevon position indication corresponds to \*  
 \* zero. \*  
 \*\*\*\*\*

R  
R

OK	NOT OK--	Make certain that elevons are at neutral then refer to trouble shooting procedure for elevon position indicating circuit (Ref 27-16-00, T/S) If not, refer to mechanical channel trouble shooting (Ref. 27-11-00, Trouble Shooting)

\*\*\*\*\*  
 \* On overhead panel, on Flight Control Unit, place \*  
 \* O & M ELEVONS and IN ELEVONS switches in BLUE \*  
 \* position then press and release RESET push buttons \*  
 \* located on RH side of switches. \*  
 \* On ICOVOL indicator (First Officer's instrument \*  
 \* panel), the 6 elevon magnetic indicators must \*  
 \* display B \*  
 \*\*\*\*\*

OK	NOT OK--	RESET impossible : on ICOVOL indicator both inner elevon magnetic indicators still display M. Ref. Chart 101
OK	NOT OK--	RESET impossible : on ICOVOL indicator the 4 outer and middle elevon magnetic indicators still display M Ref. Chart 102
OK	NOT OK--	RESET impossible with comparison warning : on ICOVOL indicator both inner elevon magnetic indicators display G (or M) and both red warning lights are illuminated. Ref. Chart 103
OK	NOT OK--	RESET impossible with comparison warning : on ICOVOL indicator the 4 outer and middle elevon magnetic indicators display G (or M) and the 4 red warning lights are illuminated. Ref. Chart 104

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OK

NOT OK--

RESET impossible : for any other indication displayed on ICOVOL indicator refer to trouble shooting procedure for elevon position indicating circuit (Ref. 27-16-00, Trouble Shooting)

\*\*\*\*\*

\* To immobilize Pitch and Roll Relay Jacks, carry \*  
\* out operations of Prepare paragraph relating to \*  
\* engagement of AP2 (Ref 22-10-00, Servicing), then \*  
\* engage Autopilot No.2. \*

R \* At Captain's control handwheel yoke press Emergen- \*  
\* cy Flight Control system test button and hold it \*  
\* pressed (EMERG CONT caption light on Captain's \*  
\* handwheel yoke must illuminate). \*

\* Apply a force to Captain's control column and hand- \*  
\* wheel (Do not apply too much force in order to \*  
\* avoid disconnecting AP2). \*

\* Check on ICOVOL indicator (First Officer's instru- \*  
\* ment panel) that the 6 elevons deflect accordingly \*  
\* in pitch and roll configuration. \*

\*\*\*\*\*

OK

NOT OK--

With Flight Controls in Blue electrical mode,  
one inner elevon fails to deflect  
Ref. Chart 105

OK

NOT OK--

With Flight Controls in Blue electrical mode,  
one outer or middle elevon fails to deflect  
Ref. Chart 106

OK

NOT OK--

With Flight Controls in Blue electrical mode,  
the two inner elevons or the 4 outer and middle  
elevons fail to deflect.  
Replace autostabilization computer No.2  
2C31 [2].

OK

NOT OK--

When force is applied in Emergency Flight  
Control mode, the 6 elevons fail to deflect  
Ref. 27-39-00, T/S paragraph 5, Emergency  
Flight Control mode trouble shooting.

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OK	NOT OK--	With Flight Controls in Blue electrical mode, one elevon lags. Ref. Chart 107
	NOT OK--	With Flight Controls in Blue electrical mode, the two outer and middle elevons on the same wing lag. Ref. Chart 108

\*\*\*\*\*  
 \* On AFCS control unit disengage AP2 switch \*  
 \* On overhead panel, on AUTOSTAB unit No.2 disengage \*  
 \* PITCH and ROLL switches then on AUTOSTAB unit No.1 \*  
 \* engage PITCH and ROLL switches. \*  
 \* On overhead panel, on Flight Control Unit, place \*  
 \* O & M ELEVONS and IN ELEVONS switches in GREEN \*  
 \* position \*  
 \* On ICOVOL indicator (First Officer's instrument \*  
 \* panel) the 6 elevon magnetic indicators must \*  
 \* display G. \*  
 \*\*\*\*\*

R	OK	NOT OK--	Incorrect change over to Green electrical channel. On ICOVOL indicator the two inner elevon magnetic indicators still display B Ref. Chart 109
R	OK	NOT OK--	Incorrect change over to Green electrical channel. On ICOVOL indicator the 4 outer and middle elevon magnetic indicators still display B. Ref. Chart 110
R	OK	NOT OK--	Incorrect change over to Green electrical channel with comparison warning. On ICOVOL indicator, the two inner elevons magnetic indicators change from B to M and the two red warning lights are illuminated Ref. Chart 111
R	OK	NOT OK--	Incorrect change over to Green electrical channel with comparison warning. On ICOVOL indicator, the 4 outer and middle elevon magnetic indicators change from B to M and the 4 red warning lights are illuminated. Ref. Chart 112

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## MAINTENANCE MANUAL

OK

NOT OK--

Incorrect change over to Green electrical channel. For any other indication displayed on ICOVOL indicator, refer to trouble shooting procedure for elevon position indicating circuit (Ref. 27-16-00 Trouble Shooting).

\*\*\*\*\*  
 \* To immobilize Pitch and Roll Relay Jacks carry \*  
 \* out operations of Prepare paragraph relating to AP1\*  
 \* engagement : (Ref. 22-10-00, Servicing) then engage\*  
 R \* Autopilot No.1. \*  
 \* At Captain's control handwheel yoke press Emergen- \*  
 \* cy Flight Control Test button and hold it pressed \*  
 \* (EMERG CONT caption light must illuminate at \*  
 \* Captain's handwheel yoke) \*  
 \* Apply a force to Captain's control column and hand- \*  
 \* wheel (do not apply too much force to avoid discon- \*  
 \* necting AP1). On ICOVOL indicator (First Officer's \*  
 \* instrument panel) check that the 6 elevons deflect \*  
 \* accordingly in Pitch and Roll configuration. \*  
 \*\*\*\*\*

OK

NOT OK--

With Flight Controls in Green electrical mode, one inner elevon fails to deflect  
 Ref. Chart 113

OK

NOT OK--

With Flight Controls in Green electrical mode, one outer or middle elevon fails to deflect  
 Ref. Chart 114

OK

NOT OK--

With Flight Controls in Green electrical mode, the two inner elevons or the four outer and middle elevons fail to deflect.  
 Replace autostabilization computer No.2 2C31 [2]

OK

NOT OK--

When force is applied in Emergency Flight Control mode the 6 elevons fail to deflect  
 Ref. 27-39-00 T/S, paragraph 5, Emergency Flight Control mode trouble shooting.

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OK	NOT OK--	With Flight Controls in Green electrical mode, one elevon lags Ref. Chart 115
OK	NOT OK--	With Flight Controls in Green electrical mode, the two outer and middle elevons on the same wing lag. Ref. Chart 116

\*\*\*\*\*  
 \* On AFCS control unit disengage AP1 switch. \*  
 \* On overhead panel, on AUTOSTAB unit No.1 disengage \*  
 \* PITCH and ROLL switches and on Flight Control Unit \*  
 \* place O & M ELEVONS and IN ELEVONS switches in \*  
 \* MECH position. \*  
 \* On ICOVOL indicator (First Officer's instrument \*  
 \* panel) the 6 elevon magnetic indicators must \*  
 \* display M. \*  
 \*\*\*\*\*

OK	NOT OK--	Incorrect change over to mechanical channel. On ICOVOL indicator, the two inner elevons magnetic indicators still display G. Ref. Chart 117
OK	NOT OK--	Incorrect change over to mechanical channel On ICOVOL indicator, the 4 outer and middle elevon magnetic indicators still display G. Ref. Chart 118
OK	NOT OK--	Incorrect change over to mechanical channel. For any other indication displayed on ICOVOL indicator refer to trouble shooting procedure for the elevon position indicating circuit (Ref. 27-16-00, Trouble Shooting)

\*\*\*\*\*  
 \* Carry out a full displacement of Captain's then \*  
 \* First Officer's control column from stop to stop \*  
 \* and check on ICOVOL indicator that outer, middle \*  
 \* and inner elevons deflect correctly without \*  
 \* applying abnormal force to control column, and \*  
 \* that return to neutral is correct. \*  
 \*\*\*\*\*

OK NOT OK

R

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R	OK	NOT OK--	Abnormal force is applied. Refer to trouble shooting of mechanical channels ; paragraph "Resistance encountered when moving Flight Controls" (ref. 27-11-00,T/S)
	OK	NOT OK--	Incorrect return to neutral Refer to mechanical channel trouble shooting, paragraph "Elevons do not return to neutral" (Ref. 27-11-00, Trouble Shooting)
	OK	NOT OK--	Incorrect elevon travel. If the elevons fail to deflect in the correct direction or if travel is faulty, refer to Flight Controls adjustment procedure (Ref. 27-11-00, Adjustment/Test)

\*\*\*\*\*  
 \* Turn Captain's then First Officer's control \*  
 \* handwheel from stop to stop and check on ICOVOL \*  
 \* indicator that outer, middle and inner elevons \*  
 \* deflect correctly, without applying abnormal force \*  
 \* to control handwheel and that return to neutral \*  
 \* is correct. \*  
 \*\*\*\*\*

R	OK	NOT OK--	Abnormal force is applied Refer to trouble shooting of mechanical channels, paragraph : "Resistance encountered when moving Flight Controls" (Ref. 27-11-00, T/S)
	OK	NOT OK--	Incorrect return to neutral. Refer to trouble shooting of mechanical channels, paragraph: "Elevons do not return to neutral" (Ref. 27-11-00. Trouble Shooting)
	OK	NOT OK--	Elevon incorrect deflection If elevons do not deflect in the right direction or if travel is incorrect refer to Flight Controls adjustment procedure (Ref. 27-11-00, Adjustment/Test)

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||  
OK  
||

\*\*\*\*\*  
 \* On overhead panel, on Flight Control Unit, place \*  
 \* O & M ELEVONS and IN ELEVONS switches in BLUE posi- \*  
 \* tion then press and release RESET push buttons \*  
 \* located on RH side of switches. Check on ICOVOL \*  
 \* indicator that the 6 elevon magnetic indicators \*  
 \* display B. \*  
 \* Repeat deflection tests in Pitch and Roll \*  
 \* as above \*  
 \* On ICOVOL indicator, check that: \*  
 \* - Outer, middle and inner elevons deflect correct- \*  
 \* ly without applying abnormal force to control \*  
 \* column or handwheel, and that return to neutral is \*  
 \* correct \*  
 \* - There is no channel change over from Blue to \*  
 \* Green (or mechanical) \*  
 \*\*\*\*\*

OK	NOT OK--	For the same symptoms as above refer to the same trouble shooting procedures
OK	NOT OK--	Channel change over for outer and middle elevons with comparison warning: on ICOVOL indicator the 4 outer and middle elevon magnetic indicators display G (or M) and the 4 red warning lights are illuminated. Ref. Chart 119
OK	NOT OK--	Channel change over for inner elevons with comparison warning: on ICOVOL indicator, the 2 inner elevon magnetic indicators display G (or M) and the 2 red warning lights are illuminated. Connect Flight Controls Electrical Circuits Test Set (31-56-100) and check linear transducers of inner elevon PFCUs for correct operation by performing the first test series. Ref. 27-10-00, Trouble Shooting

R

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* On overhead panel, on Flight Control Unit, place \*  
\* O & M ELEVONS and IN ELEVON switches in GREEN \*  
\* position. Check on ICOVOL indicator that the 6 \*  
\* elevon magnetic indicators display G \*  
\* Repeat deflection tests in Pitch and Roll \*  
\* as above. \*  
\* On ICOVOL indicator, check that: \*  
\* - Outer, middle and inner elevons deflect correct- \*  
\* ly without applying abnormal force to control \*  
\* column or handwheel, and that return to neutral is \*  
\* correct \*  
\* - There is no channel change over from Green to \*  
\* mechanical. \*  
\*\*\*\*\*

R R	OK	NOT OK--	For the same symptoms as above refer to the same trouble shooting procedures
	OK	NOT OK--	Channel change over for outer and middle elevons with comparison warning: on ICOVOL indicator the 4 outer and middle elevon magnetic indicators display M and the 4 red warning lights are illuminated Ref. Chart 120
	OK	NOT OK--	Channel change over for inner elevons with comparison warning: on ICOVOL indicator the 2 inner elevon magnetic indicators display M and the 2 red warning lights are illuminated. Connect Flight Controls Electrical Circuits Test Set (31-56-100) and check linear transducers of inner elevon PFCUs for correct operation by performing the First Test series Ref. 27-10-00, Trouble Shooting

\*\*\*\*\*  
\* End of trouble shooting of elevon electrical \*  
\* channel perceptible faults. \*  
\*\*\*\*\*

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## MAINTENANCE MANUAL

*****		-----
* RESET IMPOSSIBLE: ON ICOVOL INDICA-	*	GROUND EQUIPMENT REQUIRED
* TOR BOTH INNER ELEVON MAGNETIC	*	-----
* INDICATORS STILL DISPLAY M	*	DESCRIPTION PART NO.
*****		-----
		MULTIMETER
		CIRCUIT BREAKER
		SAFETY CLIPS
		-----

\*\*\*\*\*  
 \* On ICOVOL indicator (First Officer's instrument \*  
 \* panel) the 4 outer and middle elevon magnetic \*  
 \* indicators display B \*  
 \*\*\*\*\*

R			-----
	YES	NO----	Check 28 VDC supply of RESET buttons through circuit breakers PFCS ALL SURFACES MON GRN SUP 1C54 and PFCS ALL SURFACES MON BLUE SUP 2C54 (circuit breaker panels 1-213 and 5-213 : Map Ref. N13 and E12). Check grounding.
-----			

\*\*\*\*\*  
 \* On shelf 8-216, remove static monitoring change \*  
 \* over unit C56 [7] \*  
 \* On circuit breaker panel 1-213, remove safety clip \*  
 \* and tag and set circuit breaker PFCS INV GRN FAIL \*  
 \* IND 1C73 (Map Ref. M15) \*  
 \* On rack connector C56, check by pressing IN ELEV- \*  
 \* ON RESET push button on Flight Control Unit, that \*  
 \* voltage measured between pins C56-AB-33 and C56- \*  
 \* AB-34 (ground) is 28VDC \*  
 \*\*\*\*\*

R			-----
	YES	NO----	Replace Flight Control Unit C57 [8]
-----			

\*\*\*\*\*  
 \* On rack connector C56, check that voltage measu- \*  
 \* red between pins C56-AB-35 and C56-BA-14 \*  
 \* (ground) then C56-AB-32 and C56-BA-14 (ground) \*  
 \* is null \*  
 \*\*\*\*\*

R			-----
	YES	NO----	Replace Flight Control Unit C57 [8]
-----			
R			-----
	-----	-----	Replace static monitoring change over unit C56 [7]
-----			

Chart 101 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****		-----
* RESET IMPOSSIBLE: ON ICOVOL INDICA--	*	GROUND EQUIPMENT REQUIRED
* TOR THE 4 OUTER AND MIDDLE ELEVON *	*	-----
* MAGNETIC INDICATORS STILL DISPLAY *	*	DESCRIPTION PART NO.
* M *	*	-----
*****		MULTIMETER
		CIRCUIT BREAKER
		SAFETY CLIPS
		-----

\*\*\*\*\*  
 \* On ICOVOL indicator (First Officer's instrument \*  
 \* panel) both inner elevon magnetic indicators \*  
 \* display B \*  
 \*\*\*\*\*

R			-----	Check 28 VDC supply of RESET push buttons
	YES	NO----		through circuit breakers PFCS ALL SURFACES MON
				GRN SUP 1C54 and PFCS ALL SURFACES MON BLUE SUP
				2C54 (circuit breaker panels 1-213 and 5-213 :
				Map Ref. N13 and E12). Check grounding
				-----

\*\*\*\*\*  
 \* On shelf 8-216, remove static monitoring change \*  
 \* over unit C56 [7] \*  
 \* On circuit breaker panel 1-213, remove safety clip \*  
 \* and tag and set circuit breaker PFCS INV GRN FAIL \*  
 \* IND 1C73 (Map Ref. M15). \*  
 \* On rack connector C56, check by pressing O & M \*  
 \* ELEVONS RESET push button of Flight Control Unit \*  
 \* that voltage measured between pins C56-AA-33 and \*  
 \* C56-AA-34 (ground) is 28VDC \*  
 \*\*\*\*\*

R			-----	Replace Flight Control Unit C57 [8]
	YES	NO----		
				-----

R \* On rack connector C56, check that voltage measu- \*  
 \* red between pins C56-AA-35 and C56-BA-14 \*  
 \* (ground) then C56-AA-32 and C56-BA-14 (ground) \*  
 R \* is null \*

R			-----	Replace Flight Control Unit C57 [8]
	YES	NO----		
				-----
R	-----			Replace static monitoring change over unit C56
				[7]
				-----

Chart 102 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****	
* RESET IMPOSSIBLE WITH COMPARISON	* GROUND EQUIPMENT REQUIRED
* WARNING: ON ICOVOL INDICATOR BOTH	* -----
* INNER ELEVON MAGNETIC INDICATORS	* DESCRIPTION PART NO.
* DISPLAY G (OR M) AND THE TWO RED	* -----
* WARNING LIGHTS ARE ILLUMINATED	* MULTIMETER
*****	
	* CIRCUIT BREAKER
	* SAFETY CLIPS
	* ACCESS PLATFORM
	* 3.220 M (10 FT. 7IN.)
	* FLIGHT CONTROLS
	* ELECTRICAL CIRCUITS
	* TEST SET 31-56-100
*****	

\*\*\*\*\*  
 \* On overhead panel, on AUTO STAB unit No.2 disengage\*  
 \* PITCH and ROLL switches. \*  
 \* On ICOVOL indicator (First Officer's instrument \*  
 \* panel) extinguish the two red warning lights by \*  
 \* pressing and releasing ALARM RESET push button. \*  
 \* On overhead panel, on Flight Control Unit press and\*  
 \* release IN ELEVONS RESET push button. \*  
 \* On ICOVOL indicator, both inner elevon magnetic \*  
 \* indicators must display B. \*

\*\*\*\*\*  
 ||| | \*\*\*\*\*  
 ||| | \* On overhead panel, on AUTO STAB unit No.2 enga-\*  
 ||| | \* ge PITCH and ROLL switches. \*  
 NO YES---\* On ICOVOL indicator both inner elevon magne- \*  
 ||| | \* tic indicators still display B and both red \*  
 ||| | \* warning lights are off. \*  
 ||| | \*\*\*\*\*  
			YES NO---	Replace autostabilization
				computer No.2 2C31 [2]
			\*\*\*\*\*	

\*\*\*\*\*  
 R \* On PITCH TRIM wheel (centre console) select 5 \*  
 \* degrees. \*  
 R \* On ICOVOL indicator, both inner elevon magnetic \*  
 \* indicators still display B and the two red warning \*  
 \* lights are off. \*  
 \*\*\*\*\*

||| |  
 YES NO  
 ||| |  
Sheet 2

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## MAINTENANCE MANUAL

Continued From

Sheet 1

R

YES

NO

\*\*\*\*\*  
\* On shelf 8-216, on front panel of Blue monitor- \*  
\* ring comparator (2C48), both Green indicator \*  
\* lights corresponding to inner elevons and the 2 \*  
\* red FAILURE DETECTION warning lights are \*  
\* illuminated. \*

YES

NO

Sheet 6

Sheet 10

\*\*\*\*\*  
\* To immobilize Pitch and Roll relay jacks, carry \*  
\* out operations of Prepare paragraph for \*  
\* AP2 engagement : Ref. 22-10-00, Servicing, then en- \*  
\* gage Autopilot No.2,. At Captain's control hand- \*  
\* wheel yoke press Emergency Flight Control test \*  
\* button and hold it pressed (EMERG CONT caption \*  
\* light must illuminate on Captain's control column) \*  
\* Apply a force to Captain's control column (Do not \*  
\* apply too much force to avoid disconnecting AP2) \*  
\* Check on ICOVOL indicator, that the 2 inner \*  
\* elevons deflect in pitch configuration \*

R

YES

NO

\*\*\*\*\*  
\* One inner elevon does not deflect \*

Sheet 4

NO

\*\*\*\*\*  
\* The 2 inner elevons do not deflect \*

\*\*\*\*\*  
\* The 4 outer and middle elevons deflect \*

Sheet 3

NO

YES

Replace autostabilization  
computer No.2 2C31 [2]

R

Ref 27-39-00, T/S, paragraph 5: "Emergency  
Flight Control mode trouble shooting"

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## MAINTENANCE MANUAL

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Sheet 2

YES

\*\*\*\*\*  
\* On shelf 8-216, replace the Blue monitoring compa- \*  
\* rator 2C48 [4] \*  
\* Repeat Emergency Flight Control system \*  
\* tests. \*  
\* On shelf 8-216, on front panel of Blue monitoring \*  
\* comparator 2C48, both Green indicator lights \*  
\* corresponding to inner elevons illuminate during \*  
\* actuation of Flight Controls \*  
\*\*\*\*\*

NO

YES--| Replace autostabilization computer No.2 2C31  
| [2]

\*\*\*\*\*  
\* Repeat Emergency Flight Control system tests, \*  
\* making a fast Pitch movement on control column. \*  
\* On shelf 8-216, on front panel of Blue monitoring \*  
\* comparator 2C48, both Green indicator lights \*  
\* corresponding to inner elevons illuminate immedia- \*  
\* tely \*  
\*\*\*\*\*

YES

NO---| Replaced Blue monitoring comparator was faulty.|

\*\*\*\*\*  
\* Connect Flight Controls Electrical Circuits Test \*  
\* Set (31-56-100) and check linear transducers of \*  
\* inner elevon PFCUs for correct operation by \*  
\* carrying out the first test series \*  
\* Ref. 27-10-00, Trouble Shooting \*  
\*\*\*\*\*

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## MAINTENANCE MANUAL

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Sheet 2

\*\*\*\*\*  
\* On shelf 8-216, replace autostabilization computer \*  
\* No.2 2C31 [2] \*  
\* Repeat Emergency Flight Control System \*  
\* tests. \*  
\* Check on ICOVOL indicator that the two inner \*  
\* elevons deflect in Pitch configuration \*  
\*\*\*\*\*

		-----
NO	YES--	Replaced autostabilization computer was faulty.
		-----

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in \*  
\* 27-34-53, Removal/Installation. \*  
\* Depending on the LH or RH inner elevon which did \*  
\* not deflect, open fairing 551LL or 651LL and on \*  
\* PFCU C105 or C106 disconnect connector A, then: \*  
\* 1° Check electrovalve impedance (approximately \*  
\* 1500 Ohms) measured between pins A-q and A-r then \*  
\* A-q and A-p. \*  
\* 2° Check continuity between pins A-p and A-t \*  
\*\*\*\*\*

		-----
OK	NOT OK--	Replace Blue electrovalve on PFCU C105 [13] or
		C106 [14]
		-----

\*\*\*\*\*  
\* On shelf 8-216, replace static monitoring change \*  
\* over unit C56 [7] \*  
\* Repeat Emergency Flight Control system tests \*  
\* Check on ICOVOL indicator that both inner elevons \*  
\* deflect in Pitch configuration. \*  
\*\*\*\*\*

		-----
OK	NOT OK--	Check continuity between static monitoring
		change over unit C56 and electrovalves of
		relevant PFCU (Ref. WDM. 27-37-02)
		-----
-----		Replaced static monitoring change over unit
		was faulty.
		-----

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## MAINTENANCE MANUAL

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Sheet 1

||  
NO  
||

\*\*\*\*\*  
R \* On ICOVOL indicator, extinguish the two red \*  
\* warning lights by pressing and releasing ALARM \*  
\* RESET push button. \*  
\* On overhead panel, on Flight Control Unit, press \*  
\* and release IN ELEVONS RESET push button, and at \*  
\* the same time check on ICOVOL indicator, that one \*  
\* or both inner elevons deflect during the reset. \*  
\*\*\*\*\*

||  
YES NO--- \*\*\*\*\*  
\* On shelf 8-216, on front panel of Blue monitor \*  
\* ring comparator 2C48, the two Green indicator \*  
\* lights corresponding to inner elevons and \*  
\* the two red FAILURE DETECTION warning lights \*  
\* are illuminated. \*  
\*\*\*\*\*

||  
YES NO---  
R \* Replace static monitoring \*  
\* change over unit C56 [7] \*  
\*\*\*\*\*  
Sheet 6

\*\*\*\*\*  
R \* On shelf 8-216, replace autostabilization computer \*  
\* No.2 (2C31) [2] \*  
\* Repeat tests which led to the fault \*  
\* On ICOVOL indicator, the 2 inner elevon magnetic \*  
\* indicators display B \*  
\*\*\*\*\*

||  
NO YES---  
\* Replaced autostabilization computer was faulty \*  
\*\*\*\*\*

||  
Sheet 10

Chart 103 (Sheet 5 of 11)

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## MAINTENANCE MANUAL

From Sheets 2 & 5

||  
YES  
||

\*\*\*\*\*

- R \* On shelf 8-216, replace Blue monitoring comparator \*  
\* 2C48 [4] \*  
\* Repeat tests which led to the fault \*  
R \* On IC0VOL indicator, the two inner elevon magne- \*  
\* tic indicators display B \*

\*\*\*\*\*

- R || NO YES---| Replaced Blue monitoring comparator was faulty |  
||

\*\*\*\*\*

- \* On shelf 8-216, on front panel of Blue monitoring \*  
\* comparator (2C48), press and release the two \*  
\* INNER LEFT (IN.L.) push buttons. The 2 red \*  
\* FAILURE DETECTION warning lights go off. \*

\*\*\*\*\*

|| NO YES  
||  
||

Sheet 8

\*\*\*\*\*

- \* On shelf 8-216, on front panel of Blue monitoring \*  
\* comparator (2C48), press and release the two \*  
\* INNER RIGHT (IN.R.) push buttons. The 2 red \*  
\* FAILURE DETECTION warning lights go off \*

\*\*\*\*\*

|| NO YES  
||  
||

Sheet 9

\*\*\*\*\*

- R \* On shelf 8-216, remove Blue monitoring comparator \*  
\* 2C48 [4] \*  
\* On rack connectors, shunt pins 2 C48-AA-62 and 2C \*  
\* 48-AB-60 \*  
\* On circuit breaker panel 5-213, remove safety \*  
\* clips and tags and set circuit breakers PFCS INV \*  
\* BLUE SUP 2C66 and PFCS INV BLUE FAIL IND 2C73 (Map \*  
\* Ref. B14 and E11) \*  
\* on rack connector 2C48-AA, voltage measured \*  
\* between pins 64 and 13 must be 26VAC 1800 Hz. \*

\*\*\*\*\*

- || YES NO---| Replace circuit breaker INNER ELEVON BLUE CONT |  
|| | SUP 2C94 [22] |  
Sheet 7

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## MAINTENANCE MANUAL

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Sheet 6

||  
YES  
||

\*\*\*\*\*  
\* At zone 121, open access door 121FB. \*  
\* Trip, safety and tag circuit breakers INNER ELEVON \*  
\* MON BLUE SUP 2C47 and MID & OUTER ELEVON MON BLUE \*  
\* SUP 2C46 on circuit breaker panel 2-213 (Map Ref. \*  
\* D1 and D2) On synchro pack 2C96, disconnect connec- \*  
\* tor B. \*  
\* Remove safety clip and tag and reset circuit \*  
\* breaker INNER ELEVON MON BLUE SUP 2C47 \*  
\* Check that voltage measured between pins 2C96-B-D \*  
\* and 2C96-B-E is 26VAC 1800 Hz. \*  
\*\*\*\*\*

|| NO---| Replace circuit breaker INNER ELEVON MON BLUE |  
YES || SUP 2C47 [25] |  
|| -----|

\*\*\*\*\*  
\* On synchro pack 2C96, confirm fault of Blue \*  
\* monitoring resolver by checking: \*  
\* 1°) rotor resistance measured between pins 2C96-B \*  
\* -D and 2C96-B-E (This resistance must be 3.8 \*  
\* Ohms approximately) \*  
\* 2°) stator resistance measured between pins 2C96- \*  
\* -B-F and 2C96-B-H then 2C96-B-G and 2C96-B-J \*  
\* (This resistance must be 5 Ohms approximately) \*  
\*\*\*\*\*

	OK NOT OK---	Replace Pitch synchro pack [15]
	-----	
	-----	
	-----	Check aircraft wiring between connectors 2C96-
	-----	B and 2C100-B. (Ref. WDM. 27-37-06)
	-----	

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## MAINTENANCE MANUAL

Continued From  
Sheet 6

YES

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in \*  
\* 27-34-53, Removal/Installation \*  
\* Open fairing 551LL and on PFCU C105, disconnect \*  
\* connector A, then : \*  
\* 1°) Check rotor resistance of Blue monitoring \*  
\* resolver measured between pins A-G and A-b ; this \*  
\* resistance must be 120 ohms approximately. \*  
\* 2°) Check stator resistance of Blue monitoring \*  
\* resolver, measured between pins A-E and A-a then \*  
\* A-F and A-a : This resistance must be 105 ohms \*  
\* approximately. \*  
\*\*\*\*\*

		-----
OK	NOT OK--	Replace synchro pack on PFCU C105 [13]
		-----

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in \*  
\* 27-16-11, Removal/Installation. \*  
\* At zone 121, open access door 121FB. \*  
\* On synchro pack 2C100 disconnect connector B \*  
\* then : \*  
\* 1°) Check rotor resistance of LH inner elevon Blue \*  
\* monitoring resolver measured between pins B-D and \*  
\* B-B then B-C and B-P : this resistance must be 15.1 \*  
\* Ohms approximately. \*  
\* 2°) Check stator resistance of LH inner elevon \*  
\* Blue monitoring resolver measured between pins B-A \*  
\* and B-M then B-L and B-N : this resistance must be \*  
\* 20.1 Ohms approximately. \*  
\*\*\*\*\*

		-----
OK	NOT OK--	Replace Roll synchro pack [16]
		-----

-----	Check aircraft wiring between Blue monitoring resolver 2C96 and Blue monitoring comparator 2C48 (Ref. WDM. 27-37-06)
-------	--

R

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## MAINTENANCE MANUAL

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Sheet 6

YES

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in \*  
\* 27-34-53, Removal/Installation. \*  
\* Open fairing 651LL and on PFCU C106, disconnect \*  
\* connector A, then : \*  
\* 1°) Check rotor resistance of Blue monitoring \*  
\* resolver, measured between pins A-G and A-b : this \*  
\* resistance must be 120 Ohms approximately. \*  
\* 2°) Check stator resistance of Blue monitoring \*  
\* resolver, measured between pins A-E and A-a then \*  
\* A-F and A-a : this resistance must be 105 Ohms \*  
\* approximately. \*  
\*\*\*\*\*

OK	NOT OK--	Replace synchro pack on PFCU C106 [14]
----	----------	--

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in \*  
\* 27-16-11, Removal/Installation. \*  
\* At zone 121, open access door 121FB. \*  
\* On synchro pack 2C100 disconnect connector B \*  
\* then : \*  
\* 1°) Check rotor resistance of RH inner elevon Blue \*  
\* monitoring resolver, measured between pins B-J and \*  
\* B-T then B-H and B-K : this resistance must be 15.1 \*  
\* Ohms approximately. \*  
\* 2°) Check stator resistance of RH inner elevon \*  
\* Blue monitoring resolver, measured between pins \*  
\* B-E and B-G then B-F and B-S : this resistance must \*  
\* be 20.1 Ohms approximately. \*  
\*\*\*\*\*

OK	NOT OK--	Replace Roll synchro pack [16]
----	----------	--------------------------------

Check aircraft wiring between Blue monitoring resolver 2C96 and Blue monitoring comparator 2C48 (Ref. WDM. 27-37-06)	
--	--

Chart 103 (Sheet 9 of 11)

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## MAINTENANCE MANUAL

Continued From  
Sheet 5

Continued From  
Sheet 2

R

NO  
||

NO  
|

\*\*\*\*\*  
\* On overhead panel, on Flight Control Unit, press \*  
\* and release IN ELEVONS RESET push button and note \*  
\* on ICOVOL indicator displacement of inner elevons. \*  
\* Two cases are possible \*  
\* Case No.1: Only one inner elevon deflects \*  
\* Case No.2: Both inner elevons deflect \*  
\*\*\*\*\*

Case No.1

Case No.2-

\*\*\*\*\*  
\* At zone 121, open access door 121FB \*  
\* Trip, safety and tag circuit breakers listed in \*  
\* 27-36-11, Removal/Installation. \*  
\* On synchro pack 2C96, disconnect connector A \*  
\* then : \*  
\* 1°) Check rotor resistance of Blue control \*  
\* resolver measured between pins A-D and A-E \*  
\* this resistance must be 3.8 Ohms approximately \*  
\* 2°) Check stator resistance of Blue control \*  
\* resolver measured between pins A-F and A-H \*  
\* then A-G and A-J : this resistance must be 5 \*  
\* Ohms approximately. \*  
\*\*\*\*\*

OK

NOT OK--

Replace Pitch synchro pack  
[15]

-----  
| Check aircraft wiring between circuit breaker |  
| 2C94 and autostabilization computer 2C31 then |  
| between circuit breaker 2C94 and synchro pack |  
2C100 (Ref. WDM. 27-36-02)

Sheet 11

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Sheet 10

case No.1

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in \*  
R \* 27-34-53, Removal/Installation. Depending on \*  
R \* which inner elevon deflected, open elevon fairing \*  
\* 551LL or 651LL and on PFCU C105 or C106 discon- \*  
\* nect connector A, then : \*  
\* 1° Check rotor resistance of Blue control resolv- \*  
\* er, measured between pins A-X and A-Y : this resis- \*  
\* tance must be 23.3 Ohms approximately. \*  
\* 2° Check stator resistance of Blue control resol- \*  
\* ver, measured between pins A-C and A-B then A-A \*  
\* and A-B : this resistance must be 35 Ohms approxi- \*  
\* mately. \*

\*\*\*\*\*

OK	NOT OK--	Replace synchro pack on PFCU C105 [13] or C106 [14].
----	----------	--

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in \*  
\* 27-16-11, Removal/Installation. At zone 121, open \*  
\* access door 121FB. On synchro pack 2C100 discon- \*  
\* nect connector A, then : \*  
\* 1° Check rotor resistance of LH (or RH) inner \*  
\* elevon Blue control resolver, measured between \*  
\* pins A-B and A-D (or A-H and A-K) then A-C and A-P \*  
\* (or A-J and A-T) : this resistance must be 15.1 \*  
\* Ohms approximately. \*  
\* 2° Check stator resistance of LH (or RH) inner \*  
\* elevon Blue control resolver, measured between \*  
\* pins A-A and A-M (or A-E and A-G) then A-L and A-N \*  
\* (or A-F and A-S) : this resistance must be 20.1 \*  
\* Ohms approximately. \*

\*\*\*\*\*

OK	NOT OK--	Replace Roll synchro pack [16].
----	----------	---------------------------------

R	Check aircraft wiring between control resolver 2C96 and servovalve of LH (or RH) inner elevon PFCU. Ref. WDM. 27-36-02.
---	---

Chart 103 (Sheet 11 of 11)

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## MAINTENANCE MANUAL

*****		-----	
* RESET IMPOSSIBLE WITH COMPARISON	*	GROUND EQUIPMENT REQUIRED	
* WARNING: ON ICOVOL INDICATOR THE 4	*	-----	
* OUTER and MIDDLE ELEVON MAGNETIC	*	DESCRIPTION	PART NO.
* INDICATORS DISPLAY G (OR M) AND THE	*	-----	
* 4 RED WARNING LIGHTS ARE ILLUMINA-	*	MULTIMETER	_____
* TED.	*	CIRCUIT BREAKER	_____
*****		SAFETY CLIPS	_____
		ACCESS PLATFORM	_____
		3.220 M (10 FT 7 IN.)	_____
		FLIGHT CONTROLS	_____
		ELECTRICAL CIRCUITS	_____
		TEST SET	31-56-100
		-----	

\*\*\*\*\*

R \* On overhead panel, on AUTO STAB unit No.2 disengage\*

\* PITCH and ROLL switches. \*

R \* On ICOVOL indicator (First Officer's instrument \*

\* panel) extinguish the 4 red warning lights by \*

\* pressing and releasing ALARM RESET push button. \*

R \* On overhead panel, on Flight Control Unit press and\*

\* release O & M ELEVON RESET push button. \*

\* On ICOVOL indicator, the 4 outer and middle elevon \*

\* magnetic indicators must display B. \*

\*\*\*\*\*

		-----	
	NO	YES--	On overhead panel, on AUTOSTAB unit No2 engage PITCH and ROLL switches
			On ICOVOL indicator the 4 outer and middle elevon magnetic indicators still display B and the 4 red warning lights are off.
		-----	
	YES	NO---	Replace autostabilization
			computer No.2 2C31 [2]
		-----	

Sheet 5

\*\*\*\*\*

R \* On PITCH TRIM wheel (centre console) select 5 \*

\* degrees. \*

\* On ICOVOL indicator, the 4 outer and middle elevon \*

\* magnetic indicators still display B and the 4 red \*

\* warning lights are off. \*

\*\*\*\*\*

||

YES NO

||

Sheet 2

Chart 104 (Sheet 1 of 14)

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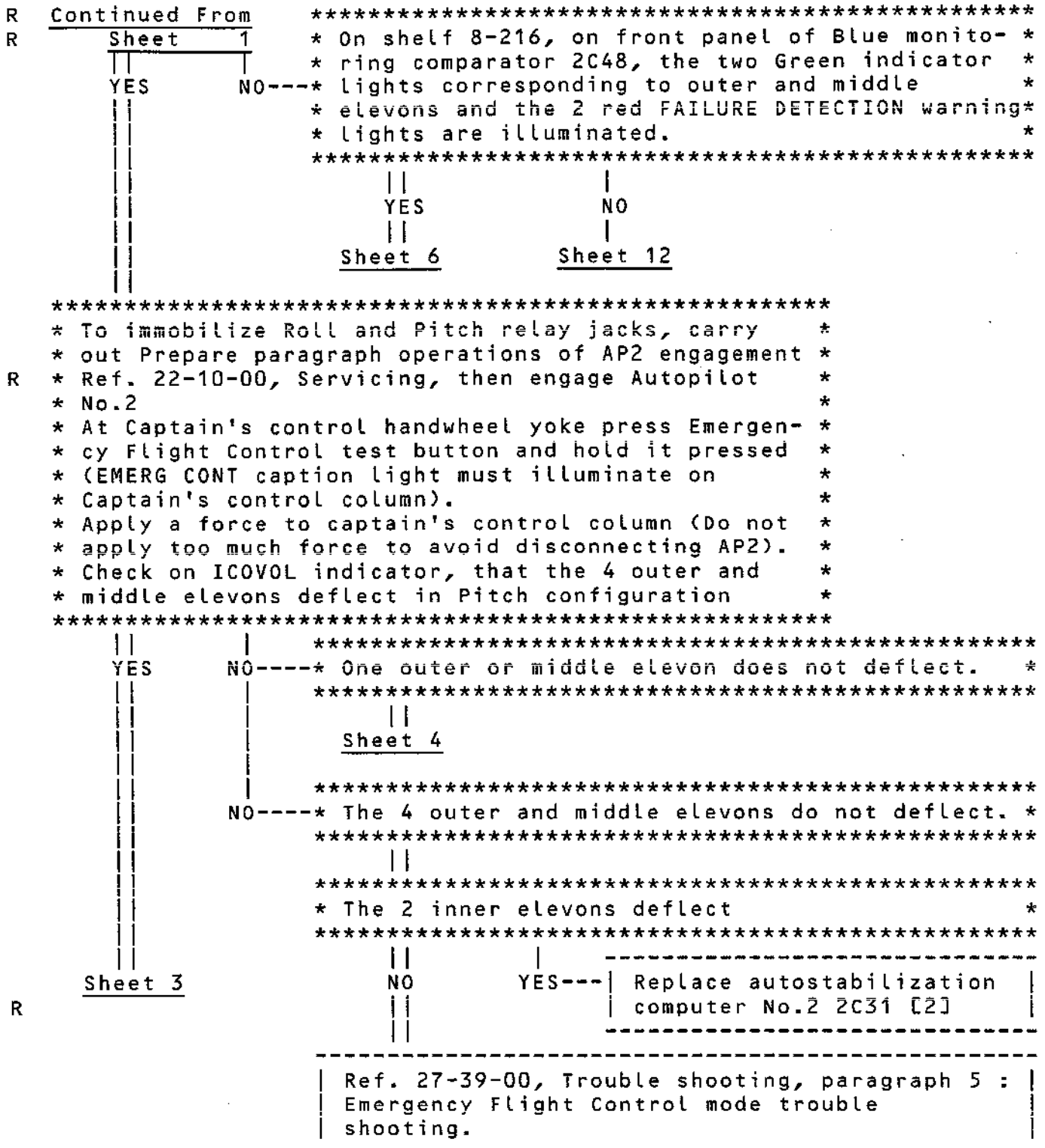


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## MAINTENANCE MANUAL

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YES

\*\*\*\*\*  
\* On shelf 8-216, replace Blue monitoring comparator \*  
R \* 2C48 [4] \*  
\* Repeat Emergency Flight Control System tests. \*  
\* On shelf 8-216, on front panel of Blue monitoring \*  
\* comparator 2C48, the two Green indicator lights \*  
\* corresponding to outer and middle elevons illumina- \*  
\* te during operation. \*  
\*\*\*\*\*

NO

YES---| Replace autostabilization computer No.2 2C31  
[2].

\*\*\*\*\*  
\* Repeat Emergency Flight Control System tests, \*  
\* making a fast Pitch movement on control column \*  
\* On shelf 8-216, on front panel of Blue monitoring \*  
\* comparator 2C48, both Green indicator lights \*  
\* corresponding to outer and middle elevons illumina- \*  
\* te immediately. \*  
\*\*\*\*\*

YES

NO----| Replaced Blue monitoring comparator was faulty |  
-----|

\*\*\*\*\*  
\* Connect Flight Controls Electrical Circuit Test \*  
\* Set (31-56-100) and check linear transducers of \*  
\* outer and middle elevon PFCUs for correct operat- \*  
\* ion by carrying out the first test series \*  
\* Ref. 27-10-00, Trouble Shooting \*  
\*\*\*\*\*

Chart 104 (Sheet 3 of 14)

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Sheet 2

\*\*\*\*\*  
\* On shelf 8-216, replace autostabilization computer \*  
\* No.2 2C31 [2]. \*  
\* Repeat Emergency Flight Control System tests. \*  
\* Check on ICOVOL indicator that the 4 outer and \*  
\* middle elevons deflect in Pitch configuration. \*  
\*\*\*\*\*

NO	YES---	Replaced autostabilization computer was faulty.
----	--------	---

\*\*\*\*\*  
\* Trip, safety and tag circuit breaker listed in \*  
\* 27-34-52, Removal/Installation. Depending on the \*  
\* LH or RH outer or middle elevon which did not \*  
\* deflect, open fairing 553LL, 653LL, 552LL or 652 \*  
\* LL and on PFCU C101, C102, C103, or C104 discon- \*  
\* nect connector A, then : \*  
\* 1°) Check electrovalve impedance (1500 Ohms approx \*  
\* imately) measured between pins A-h and A-f then \*  
\* A-h and A-j \*  
\* 2°) Check continuity between pins A-g and A-f \*  
\*\*\*\*\*

R	OK	NOT OK--	Replace Blue electrovalve on PFCU C101 [9], C102 [10], C103 [11] or C104 [12].
---	----	----------	--

\*\*\*\*\*  
\* On shelf 8-216, replace static monitoring change \*  
\* over unit C56 [7]. \*  
\* Repeat Emergency Flight Control System tests. \*  
\* Check on ICOVOL indicator that the 4 outer and \*  
\* middle elevons deflect in Pitch configuration. \*  
\*\*\*\*\*

OK	NOT OK--	Check continuity between static monitoring change over unit C56 and electrovalve of relevant PFCU (Ref. WDM. 27-37-01)
		Replaced static monitoring change over unit was faulty.

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## MAINTENANCE MANUAL

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Sheet 1

NO

\*\*\*\*\*  
\* On ICOVOL indicator, extinguish the 4 red warning \*  
\* lights by pressing and releasing ALARM RESET push \*  
\* button. On overhead panel, on Flight Control Unit \*  
\* press and release O & M ELEVONS RESET push button, \*  
\* and at the same time check, on ICOVOL indicator, \*  
\* that one or several outer and middle elevons de- \*  
\* flect during reset. \*

\*\*\*\*\*

YES

NO---

\*\*\*\*\*  
\* On shelf 8-216, on front panel of Blue monitor- \*  
\* ing comparator 2C48, both Green indicator \*  
\* lights corresponding to outer and middle \*  
\* elevons and the two red FAILURE DETECTION \*  
\* warning lights are illuminated. \*

\*\*\*\*\*

YES

NO---

Replace static monitoring  
change over unit C56 [7]

Sheet 6

\*\*\*\*\*  
\* On shelf 8-216, replace autostabilization computer \*  
\* No.2 2C31 [2]. \*  
\* Repeat tests which led to the fault. \*  
\* On ICOVOL indicator, the 4 outer and middle elevon \*  
\* magnetic indicators display B. \*

\*\*\*\*\*

NO

YES---

Replaced autostabilization computer was faulty

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Sheet 2 & 5

YES

\*\*\*\*\*  
\* On shelf 8-216, replace Blue monitoring comparator \*  
\* 2C48 [4] \*  
\* Repeat tests which led to the fault. \*  
\* On ICOVOL indicator, the 4 outer and middle elevon \*  
\* magnetic indicators display B. \*  
\*\*\*\*\*

NO YES--| Replaced Blue monitoring comparator was faulty |

\*\*\*\*\*  
\* On shelf 8-216, on front panel of Blue monitoring \*  
\* comparator (2C48), press the two OUTER LEFT (O.L) \*  
\* push buttons simultaneously. Both red FAILURE \*  
\* DETECTION warning lights go off. \*  
\*\*\*\*\*

NO YES--|  
\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed \*  
\* in 27-34-52, Removal/Installation. \*  
\* Open fairing 553LL and on PFCU C101, discon- \*  
\* nect connector A, then : \*  
\* 1°) Check rotor resistance of Blue monitoring \*  
\* resolver, measured between pins A-L and A-N : \*  
\* this resistance must be 120 ohms approximately \*  
\* 2°) Check stator resistance of Blue monitoring \*  
\* resolver, measured between pins A-b and A-a \*  
\* then A-c and A-a : this resistance must be 105 \*  
\* Ohms approximately. \*  
\*\*\*\*\*

OK NOT OK--| Replace synchro pack on  
PFCU C101 [9]

Check aircraft wiring between LH outer and  
middle elevon blue monitoring resolver (2C98)  
and Blue monitoring comparator 2C48  
(Ref. WDM. 27-37-04)

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## MAINTENANCE MANUAL

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Sheet 6

NO

\*\*\*\*\*  
\* On shelf 8-216, on front panel of Blue monitoring \*  
\* comparator (2C48), press the two MIDDLE LEFT \*  
\* (M.L) push buttons simultaneously. Both red \*  
\* FAILURE DETECTION warning lights go off. \*  
\*\*\*\*\*

NO

YES---

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in \*  
\* 27-34-52, Removal/Installation \*  
\* Open fairing 552LL and on PFCU C103, discon- \*  
\* nect connector A, then : \*  
\* 1°) Check rotor resistance of Blue monitoring \*  
\* resolver, measured between pins A-L and A-N : \*  
\* This resistance must be 120 Ohms approximately.\*  
\* 2°) Check stator resistance of Blue monitoring \*  
\* resolver, measured between pins A-b and A-a \*  
\* then A-c and A-a : this resistance must be 105 \*  
\* ohms approximately. \*  
\*\*\*\*\*

OK

NOT OK--

Replace synchro pack on  
PFCU C103 [11]

Check aircraft wiring between LH outer and  
middle elevon Blue monitoring resolver (2C98)  
and Blue monitoring comparator (2C48)  
(Ref. WDM. 27-37-04).

\*\*\*\*\*  
\* On shelf 8-216, on front panel of Blue monitoring \*  
\* comparator (2C48), press the 4 OUTER LEFT and \*  
\* MIDDLE LEFT (O.L and M.L) push buttons simultaneou \*  
\* sly. Both red FAILURE DETECTION warning lights go \*  
\* off. \*  
\*\*\*\*\*

NO

YES

Sheet

8

R

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## MAINTENANCE MANUAL

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R Sheet 7

NO

YES--

\*\*\*\*\*  
 \* Trip, safety and tag circuit breakers listed \*  
 \* in 27-16-11, Removal/Installation. \*  
 \* At zone 121, open access door 121FB. On synchro \*  
 \* pack 2C98, disconnect connector B, then \*  
 \* 1°) Check rotor resistance of LH outer and \*  
 \* middle elevon Blue monitoring resolver, measu- \*  
 \* red between pins B-D and B-B then B-C and B-P: \*  
 \* This resistance must be 15.1 Ohms approximately \*  
 \* 2°) Check stator resistance of LH outer and \*  
 \* middle elevon Blue monitoring resolver, measu- \*  
 \* red between pins B-A and B-M then B-L and B-N : \*  
 \* this resistance must be 20.1 Ohms approximately \*  
 \*\*\*\*\*

OK

NOT OK--

Replace Roll synchro pack  
 [16]

Check aircraft wiring between Blue monitoring  
 resolver (2C96) and PFCUs C101 and C103  
 (Ref. WDM. 27-37-04)

\*\*\*\*\*  
 \* On shelf 8-216, on front panel of Blue monitoring \*  
 \* comparator (2C48), press the two OUTER RIGHT \*  
 \* (O.R) push buttons simultaneously. \*  
 \* Both red FAILURE DETECTION warning lights go off. \*  
 \*\*\*\*\*

NO

YES--

\*\*\*\*\*  
 \* Trip, safety and tag circuit breakers listed in \*  
 \* 27-34-52, Removal/Installation. \*  
 \* Open fairing 653LL and on PFCU C102 disconn- \*  
 \* ect connector A then : \*  
 \* 1°) Check rotor resistance of blue monitoring \*  
 \* resolver, measured between pins A-L and A-N : \*  
 \* This resistance must be 120 Ohms approximately. \*  
 \* 2°) Check stator resistance of Blue monitoring \*  
 \* resolver, measured between pins A-b and A-a \*  
 \* then A-c and A-a : this resistance must be 105 \*  
 \* Ohms approximately. \*  
 \*\*\*\*\*

OK

NOT OK--

Replace synchro pack on  
 PFCU C102 [10]

R Sheet 9

Sheet 9

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## MAINTENANCE MANUAL

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R

NO	OK
Check aircraft wiring between RH outer and middle elevon Blue monitoring resolver (2C98) and Blue monitoring comparator (2C48) (Ref. WDM. 27-37-04)	

\*\*\*\*\*  
\* On shelf 8-216, on front panel of Blue monitoring \*  
\* comparator (2C48) press the two MIDDLE RIGHT \*  
\* (M.R) push buttons simultaneously. \*  
\* Both red FAILURE DETECTION warning lights go off \*  
\*\*\*\*\*

NO	YES	***** * Trip, safety and tag circuit breakers listed in * * 27-34-52, Removal/Installation. * * Open fairing 652LL and on PFCU C104 discon- * * nect connector A, then : * * 1°) Check rotor resistance of Blue monitoring * * resolver, measured between pins A-L and A-N : * * This resistance must be 120 Ohms approximately * * 2°) Check stator resistance of Blue monitoring * * resolver, measured between pins A-b and A-a * * then A-c and A-a : this resistance must be 105 * * Ohms approximately. * *****
	OK	NOT OK--
		Replace synchro pack on PFCU C104 [12]

Check aircraft wiring between RH outer and middle elevon blue monitoring resolver (2C98) and Blue monitoring comparator (2C48) (Ref. WDM. 27-37-04).	
--	--

\*\*\*\*\*  
\* On shelf 8-216, on front panel of Blue monitoring \*  
\* comparator (2C48) press the 4 OUTER RIGHT and \*  
\* MIDDLE RIGHT (O.R and M.R) push buttons simulta- \*  
\* neously. \*  
\* Both red FAILURE DETECTION warning lights go off. \*  
\*\*\*\*\*

NO	YES
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## MAINTENANCE MANUAL

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R Sheet 9

NO

YES--

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in\*  
\* 27-16-11, Removal/Installation. \*  
\* At zone 121, open access door 121FB. \*  
\* On synchro pack 2C98 disconnect connector B, \*  
\* then : \*  
\* 1°) Check rotor resistance of RH outer and \*  
\* middle elevon Blue monitoring resolver, measu- \*  
\* red between pins B-H and B-K then B-J and B-T: \*  
\* This resistance must be 15.1 Ohms approximately\*  
\* 2°) Check stator resistance of RH outer and \*  
\* middle elevon Blue monitoring resolver, measured\*  
\* between pins B-E and B-G then B-S and B-F: this\*  
\* resistance must be 20.1 Ohms approximately. \*  
\*\*\*\*\*

||  
OK  
||  
||

|  
NOT OK--  
|

-----  
Replace Roll synchro pack  
[16]  
-----

Check aircraft wiring between Blue monitoring  
resolver (2C96) and PFCUs C102 and C104  
(Ref. WDM. 27-37-04)

\*\*\*\*\*  
\* On shelf 8-216, remove Blue monitoring comparator \*  
\* 2C48 [4] \*  
\* On rack connector, shunt pins 2C48-AA-62 and 2C \*  
\* 48-AB-60. \*  
\* On circuit breaker panel 5-213, remove safety \*  
\* clips and tags and set circuit breakers PFCS INV \*  
\* BLUE SUP 2C66 and PFCS INV BLUE FAIL IND 2C73 (Map \*  
\* Ref. B14 and E11). \*  
\* On rack connector 2C48-AB, voltage measured \*  
\* between pins 63 and 13 must be 26VAC 1800 Hz. \*  
\*\*\*\*\*

||  
YES  
||  
||

|  
NO--  
|

-----  
Replace circuit breaker OUTER ELEVON AMP BLUE  
SUP 2C44 [21].  
-----

\*\*\*\*\*  
\* On rack connector 2C48-AB, voltage measured betwe- \*  
\* en pins 64 and 13 must be 26VAC 1800 Hz \*  
\*\*\*\*\*

||  
YES  
||  
||

|  
NO--  
|

-----  
Replace circuit breaker MID ELEVON AMP BLUE SUP  
2C93 [23]  
-----

Sheet 11

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## MAINTENANCE MANUAL

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Sheet 10

YES

\*\*\*\*\*  
\* On rack connector 2C48-AB, voltage measured between pins 65 and 13 must be 26VAC 1800 Hz. \*  
\*\*\*\*\*

YES

NO---

Replace circuit breaker MID & OUTER ELEVON BLUE  
CONT SUP 2C92 [24].

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers INNER ELEVON \*  
\* MON BLUE SUP 2C47 and MID & OUTER ELEVON MON BLUE \*  
\* SUP 2C46 on circuit breaker panel 2-213 (Map Ref. \*  
\* D1 and D2). \*  
\* At zone 121, open access door 121FB. \*  
\* On synchro pack 2C96 disconnect connector B. \*  
\* Remove safety clip and tag and set circuit breaker \*  
\* MID & OUTER ELEVON MON BLUE SUP 2C46. \*  
\* Check that voltage measured between pins 2C96-B-A \*  
\* and 2C96-B-B is 26VAC 1800 Hz. \*  
\*\*\*\*\*

YES

NO---

Replace circuit breaker MID & OUTER ELEVON MON  
BLUE SUP 2C46 [26].

\*\*\*\*\*  
\* On synchro pack 2C96, confirm fault of Blue \*  
\* monitoring resolver by checking: \*  
\* 1°) Rotor resistance measured between pins 2C96-B- \*  
\* A and 2C96-B-B: this resistance must be 3.8 Ohms \*  
\* approximately. \*  
\* 2°) Stator resistance measured between pins 2C96-B- \*  
\* M and 2C96-B-R then 2C96-B-N and 2C96-B-L: \*  
\* this resistance must be 5 Ohms approximately. \*  
\*\*\*\*\*

OK

NOT OK--

Replace Pitch synchro pack [15].

Check aircraft wiring between connectors 2C96-  
B and 2C98-B (Ref. WDM. 27-37-04).

R

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## MAINTENANCE MANUAL

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||  
NO  
||

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Sheet 2

|  
NO  
|

\*\*\*\*\*  
\* On overhead panel, on Flight Control unit, press \*  
\* and release O & M ELEVONS RESET push button and \*  
\* note on IC0VOL indicator displacement of outer and \*  
\* middle elevons. \*  
\* Four cases are possible : \*  
\* Case No.1 : Only one outer or middle elevon deflects \*  
\* Case No.2 : The two LH outer and middle elevons \*  
\* deflect \*  
\* Case No.3 : The two RH outer and middle elevons \*  
\* deflect \*  
\* Case No.4 : The 4 outer and middle elevons deflect \*  
\*\*\*\*\*

R  
R

R

--Case No.1--

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in \*  
\* 27-34-52, Removal/Installation. \*  
\* Depending on which elevon deflected open \*  
\* fairing 553LL, 552LL, 653LL or 652LL and on \*  
\* PFCU C101, C103, C102 or C104 disconnect \*  
\* connector A, then: \*  
\* 1°) Check rotor resistance of Blue control \*  
\* resolver, measured between pins A-U and A-V: \*  
\* this resistance must be 23.3 Ohms approximately \*  
\* 2°) Check stator resistance of Blue control \*  
\* resolver, measured between pins A-B and A-A \*  
\* then A-A and A-T. \*  
\*\*\*\*\*

R

||  
OK  
||

|  
NOT OK--  
|

-----  
Replace synchro pack on  
PFCU C101 [9], C103 [11],  
C102 [10] or C104 [12].  
-----

-----  
Check aircraft wiring between synchro pack 2C  
98 and servovalve of relevant PFCU (Ref. WDM.  
27-36-02).  
-----

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Sheet 12

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in\*  
\* 27-16-11, Removal/Installation. \*  
\* At zone 121, open access door 121FB. \*  
\* On synchro pack 2C98 disconnect connector A \*  
\* then : \*  
\* 1°) Check rotor resistance of LH outer and \*  
--Case No.2-\* middle elevon Blue control resolver, measured \*  
\* between pins A-B and A-D then A-C and A-P : \*  
\* this resistance must be 15.1 Ohms approximately\*  
\* 2°) Check stator resistance of LH outer and \*  
\* middle elevon Blue control resolver, measured \*  
\* between pins A-A and A-M, then A-L and A-N : \*  
\* this resistance must be 20.1 Ohms approximately\*  
\*\*\*\*\*

OK	NOT OK--	Replace Roll synchro pack [16].
----	----------	---------------------------------

Check aircraft wiring between synchro pack 2C  
96 and PFCU C101 and C103 : control channel  
(Ref WDM: 27-36-02)

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed \*  
\* in 27-16-11, Removal/Installation. \*  
\* At zone 121, open access door 121FB. \*  
\* On synchro pack 2C98 disconnect connector A \*  
\* then : \*  
--Case No.3-\* 1°) Check rotor resistance of RH outer and \*  
\* middle elevon Blue control resolver, measured \*  
\* between pins A-H and A-K then A-J and A-T : \*  
\* this resistance must be 15.1 Ohms approximately\*  
\* 2°) Check stator resistance of RH outer and \*  
\* middle elevon Blue control resolver, measured \*  
\* between pins A-E and A-G then A-F and A-S : \*  
\* this resistance must be 20.1 Ohms approximately\*  
\*\*\*\*\*

OK	NOT OK--	Replace Roll synchro pack [16].
----	----------	---------------------------------

Sheet 14

Sheet 14

Chart 104 (Sheet 13 of 14)

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## MAINTENANCE MANUAL

Continued From  
Sheet 13

OK

Continued From  
Sheet 13

OK

Check aircraft wiring between synchro pack 2C 96 and PFCU C102 and C104 ; control channel (Ref. WDM. 27-36-02).

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in \*  
\* 27-36-11, Removal/Installation. \*  
\* At zone 121, open door 121FB. \*  
\* On synchro pack 2C96, disconnect connector A, \*  
\* then : \*  
\* 1°) Check rotor resistance of Blue control \*  
\* resolver, measured between pins A-A and A-B: \*  
\* this resistance must be 3.8 Ohms approximately. \*  
\* 2°) Check stator resistance of Blue control \*  
\* resolver, measured between pins A-R and A-M \*  
\* then A-L and A-N : this resistance must be 5 \*  
\* Ohms approximately. \*  
\*\*\*\*\*

-----Case No.4-

OK

NOT OK--

Replace Pitch synchro pack  
[15]

Check aircraft wiring between circuit breaker 2C92 and synchro pack 2C98 (Ref. WDM. 27-36-02).

Chart 104 (Sheet 14 of 14)

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R

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## MAINTENANCE MANUAL

\*\*\*\*\*  
 \* WITH FLIGHT CONTROLS IN BLUE  
 \* ELECTRICAL MODE, ONE INNER ELEVON  
 \* FAILS TO DEFLECT.  
 \*\*\*\*\*

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
MULTIMETER	_____
CIRCUIT BREAKER	_____
SAFETY CLIPS	_____
ACCESS PLATFORM	_____
3.220 M (10 FT. 7 IN.)	_____

\*\*\*\*\*  
 \* On shelf 8-216, replace autostabilization computer \*  
 \* No.2 2C31 [2] \*  
 \* Repeat Emergency Flight Control system tests. \*  
 \* Check on ICOVOL indicator that the two inner \*  
 \* elevons deflect in Pitch configuration. \*  
 \*\*\*\*\*

NO	YES---	Replaced autostabilization computer was faulty.
----	--------	---

\*\*\*\*\*  
 \* Trip, safety and tag circuit breakers listed in 27-\*  
 \* 34-53, Removal/Installation. \*  
 \* Depending on the LH or RH inner elevon which did \*  
 \* not deflect, open fairing 551LL or 651LL and on \*  
 \* PFCU C105 or C106 disconnect connector A, then : \*  
 \* 1° Check electrovalve impedance (1500 Ohms approx \*  
 \* imately) measured between pins A-q and A-r \*  
 \* then A-q and A-p. \*  
 \* 2° Check continuity between pins A-p and A-t \*  
 \*\*\*\*\*

OK	NOT OK--	Replace Blue electrovalve on PFCU C105 [13] or C106 [14].
----	----------	---

Sheet 2

Chart 105 (Sheet 1 of 2)

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* On shelf 8-216, remove static monitoring change \*  
\* over unit C56 [7]. \*  
R \* On circuit breaker panel 5-213, remove safety clip \*  
\* and tag and set circuit breaker PFCS INV BLUE FAIL \*  
\* IND 2C73 (Map Ref. E11). \*  
\* On rack connector C65, check that voltage measu- \*  
\* red between pins AB-29 and AA-14 (Ground) is 28 \*  
\* VDC. \*

\*\*\*\*\*

		-----	Replace circuit breaker INNER ELEVEN CONT & MON
YES	NO----		BLUE SUP 2 2C59 [36].

\*\*\*\*\*

\* On rack connector C56, check that voltage \*  
\* measured between pins AB-39 and AA-14 (Ground) is \*  
\* 28 VDC. \*

\*\*\*\*\*

		-----	Replace circuit breaker INNER ELEVEN CONT & MON
YES	NO----		BLUE SUP 1 2C53 [33].
-----			Replace static monitoring change over unit C56
			[7]

Chart 105 (Sheet 2 of 2)

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## MAINTENANCE MANUAL

*****		-----	
* WITH FLIGHT CONTROLS IN BLUE	*	GROUND EQUIPMENT REQUIRED	
* ELECTRICAL MODE, ONE OUTER OR	*	-----	
* MIDDLE ELEVON FAILS TO DEFLECT	*	DESCRIPTION	PART NO.
*****		-----	
		MULTIMETER	_____
		CIRCUIT BREAKER	_____
		SAFETY CLIPS	_____
		ACCESS PLATFORM	_____
		3.220 M (10 FT. 7 IN.)	_____
		-----	

\*\*\*\*\*  
\* On shelf 8-216, replace autostabilization computer \*  
R \* No.2 2C31 [2]. \*  
\* Repeat Emergency Flight Control system tests \*  
\* Check on IC0VOL indicator that the 4 outer and \*  
\* middle elevons deflect in pitch configuration \*  
\*\*\*\*\*

		-----	
NO	YES---	Replaced autostabilization computer was faulty	
		-----	

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in 27-\*  
\* 34-52, Removal/Installation. Depending on the LH \*  
\* or RH outer or middle elevon which did not \*  
\* deflect, open fairing 553LL, 653LL, 552LL or \*  
\* 652LL and on PFCU C101, C102, C103 or C104 \*  
\* disconnect connector A then : \*  
\* 1°) Check electrovalve impedance (1500 Ohms appr- \*  
\* oximately) measured between pins A-h and A-f \*  
\* then A-h and A-j. \*  
\* 2°) Check continuity between pins A-g and A-f. \*  
\*\*\*\*\*

R			-----	
R	OK	NOT OK--	Replace Blue electrovalve on PFCU C101 [9],	
			C102 [10], C103 [11] or C104 [12].	
			-----	

Sheet 2

Chart 106 (Sheet 1 of 2)

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# Concorde

## MAINTENANCE MANUAL

||  
OK  
||

```
*****
* On shelf 8-216, remove static monitoring change *
* over unit C56 [7]. *
R * On circuit breaker panel 5-213, remove safety *
* clip and tag and set circuit breaker PFCS INV BLUE *
* FAIL IND 2C73 (Map Ref. E11). *
* On rack connector C56, check that voltage measu- *
* red between pins AA-29 and AA-14 (ground) is 28 *
* VDC. *
*****
```

R	YES	NO---	Replace circuit breaker OUTER ELEVON NEUTRLN BLUE SUP 2C58 [35]
---	-----	-------	--

```
*****
* On rack connector C56, check that voltage measu- *
* red between pins AA-39 and AA-14 (ground) is 28 *
* VDC. *
*****
```

R	YES	NO---	Replace circuit breaker MID & OUTER ELEVON CONT & MON BLUE SUP 2C55 [34].
			Replace static monitoring change over unit C56 [7].

Chart 106 (Sheet 2 of 2)

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## MAINTENANCE MANUAL

*****		-----	
* WITH FLIGHT CONTROLS IN BLUE	*	GROUND EQUIPMENT REQUIRED	
* ELECTRICAL MODE, ONE ELEVON LAGS	*	-----	
*****		DESCRIPTION	PART NO.
		-----	
		MULTIMETER	_____
		CIRCUIT BREAKER	_____
		SAFETY CLIPS	_____
		ACCESS PLATFORM	_____
		3.220 m (10 ft. 7 in.)	_____
		-----	

\*\*\*\*\*  
 \* Repeat tests which led to the fault and visually \*  
 \* check that elevon lags. \*  
 \*\*\*\*\*

		-----	
		Refer to trouble shooting dealing with the elevon position indicating system (27-16 -00 T/S)	
YES	NO-----		
		-----	

\*\*\*\*\*  
 \* On AFCS control unit, disengage AP2 switch. \*  
 \* On overhead panel : \*  
 \* - On AUTOSTAB unit No.2 disengage PITCH and ROLL \*  
 \* switches. \*  
 \* - On Flight Control Unit, place ANTISTALL SYSTEM 2\*  
 \* switch in OFF position, then place O & M ELEVONS \*  
 \* and IN ELEVONS switches in MECH position (on \*  
 \* ICOVOL indicator (First Officer's instrument \*  
 \* panel) the 6 elevon magnetic indicators must dis- \*  
 \* play M). \*  
 \* Move control column and handwheel : elevon lags \*  
 \*\*\*\*\*

R        ||        |  
          YES       NO  
          ||        |  
 R        ||        |  
                 Sheet 3

\*\*\*\*\*  
 \* On overhead panel, on SERVO CONTROLS unit, place \*  
 \* upper selector switch in GREEN JAM (BLUE ONLY) \*  
 \* position. \*  
 \* Move control column and handwheel ; elevon lags \*  
 \*\*\*\*\*

R        ||        |  
          YES       NO  
          ||        |  
 R        ||        |  
          Sheet     2

Chart 107 (Sheet 1 of 5)

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## MAINTENANCE MANUAL

Continued From

R	Sheet	1	*****	
			* Replace Green shuttle valve block on PFCU *	
			* associated with the elevon which lags : C101 *	
R	YES	NO---	* [9], C102 [10], C103 [11], C104 [12], C105 *	
			* [13] or C106 [14] *	
			* Repeat action on control column and handwheel ; *	
			* elevon lags. *	
			*****	
			YES	NO---
				Replaced Green shuttle valve block was faulty
				-----
R			Replace PFCU associated with the elevon which lags : C101 [9], C102 [10], C103 [11], C104 [12], C105 [13] or C106 [14].	
			-----	
*****				
* On overhead panel, on SERVO CONTROLS unit, place *				
* upper selector switch in BLUE JAM (GREEN ONLY) *				
* position. *				
* Move control column and handwheel ; elevon lags. *				
*****				
R	YES	NO---	*****	
			* Replace Blue shuttle valve block on PFCU *	
			* associated with the elevon which lags ; C101 *	
			* [9], C102 [10], C103 [11], C104 [12], C105 *	
			* [13] or C106 [14]. *	
			* Repeat action on control column and handwheel ; *	
			* elevon lags. *	
			*****	
			YES	NO---
				Replaced Blue shuttle valve block was faulty
				-----
R			Replace PFCU associated with the elevon which lags ; C101 [9], C102 [10], C103 [11], C104 [12], C105 [13] or C106 [14].	
			-----	

Chart 107 (Sheet 2 of 5)

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# Concorde

## MAINTENANCE MANUAL

Continued From Sheet 1

		*****	
		* On overhead panel, on Flight Control Unit, *	
		* place O & M ELEVONS and IN ELEVONS switches *	
		* in BLUE position, then press and release RESET *	
		* push buttons on RH side of switches (on *	
		* ICOVOL indicator (First Officer's instrument *	
		* panel) the 6 magnetic indicators corresponding *	
R	NO---	* to elevons must display B) *	
		* When actuating control column and handwheel *	
		* check on PFCU associated with the elevon which *	
		* lags that input lever is disengaged. *	
		* NOTE : For this check refer to figure given *	
		* in sheet 5 of 5 of this chart *	
		*****	
R		NO	YES
R			Sheet 4
		*****	
		* On shelf 8-216, on front face of static monitoring*	
		* change over unit C56, check that PILOT VALVES *	
		* BLUE indicator light corresponding to the elevon *	
		* which lags, is illuminated *	
		*****	
R	YES	NO---	Replace static monitoring change over unit C56
			[7]
		*****	
		* Replace Blue electrovalve on PFCU associated with *	
R		* the elevon which lags ; C101 [9], C102 [10], *	
		* C103 [11], C104 [12], C105 [13] or C106 [14] *	
		* Repeat action on control column and handwheel and *	
		* check on PFCU associated with the elevon which *	
		* lags that input lever is disengaged. *	
		*****	
R	YES	NO---	Replace PFCU associated with elevon which lags;
			C101 [9], C102 [10], C103 [11], C104 [12],
			C105 [13], C106 [14].
		*****	
		-----	
		Replaced Blue electrovalve was faulty.	
		-----	

Chart 107 (Sheet 3 of 5)

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## MAINTENANCE MANUAL

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Sheet 3

YES

```
*****
R * Replace autostabilization computer No.2 2C31 [2] *
  * Repeat tests which led to the fault. *
  * Move control column and handwheel ; elevon lags *
  *****
    || | -----
    YES NO---| Replaced autostabilization computer was faulty.|
    || | -----
*****
R * Replace PFCU associated with the elevon which *
  * lags ; C101 [9], C102 [10], C103 [11], C104 [12], *
  * C105 [13], C106 [14] (faulty servovalve) *
  * Repeat tests which led to the fault. *
  * Move control column and handwheel ; elevon lags. *
  *****
    || | -----
    YES NO---| Replaced PFCU was faulty |
    || | -----
*****
R * Check that there is no interference between the *
  * two Blue and Green 26V 1800 Hz generation *
  * systems by shutting off the Green generation sys- *
  * tem *
  * Check electrical wiring between the elevon which *
  * lags and the Flight Controls (Control column and *
  * handwheel) with reference to the Wiring Diagram *
  * Manual *
  *****
```

Chart 107 (Sheet 4 of 5)

EFFECTIVITY: ALL

BA

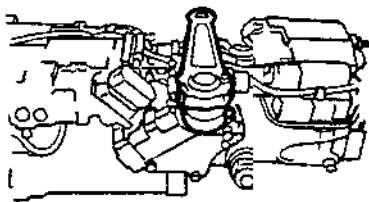
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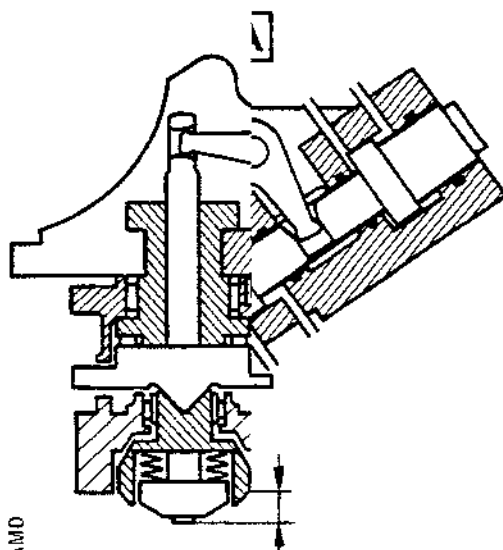
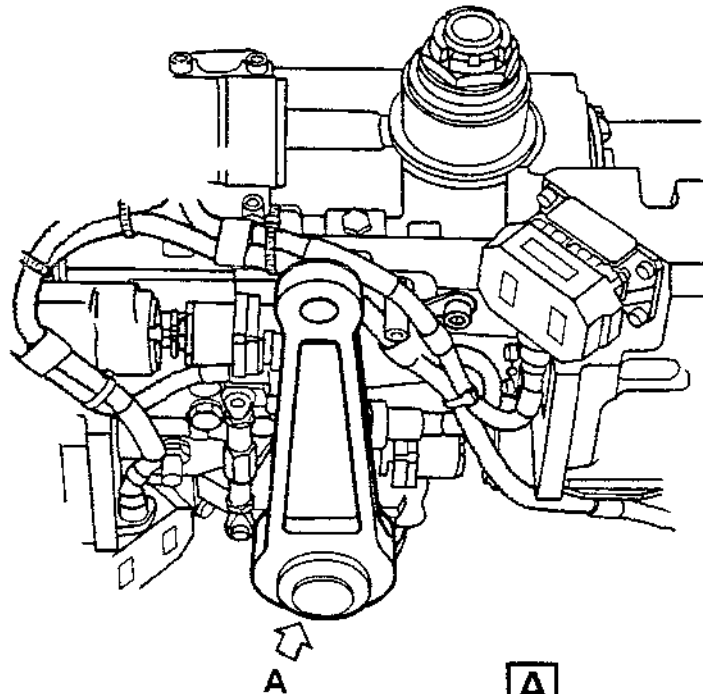
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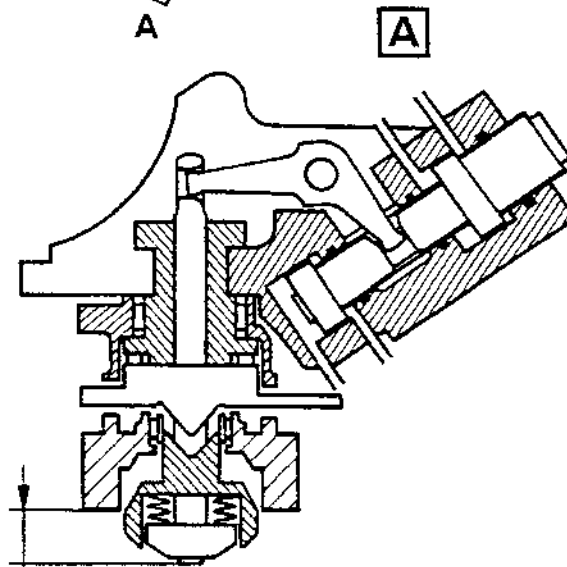
## MAINTENANCE MANUAL



LOC



1 ENGAGED  
(2 ELECTROVALVES CLOSED)



LEVER DISENGAGED 1 ELECTROVALVE  
(BLUE OR GREEN) OPEN

POWER CONTROL UNIT - ENGAGEMENT/DISENGAGEMENT OF INPUT LEVER

CMA 27 17 00 1 AAMD

Chart 107 (Sheet 5 of 5)  
Figure 101

EFFECTIVITY: ALL

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R

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## MAINTENANCE MANUAL

*****		-----	
* WITH FLIGHT CONTROLS IN GREEN	*	GROUND EQUIPMENT REQUIRED	
* ELECTRICAL MODE, THE TWO OUTER AND	*	-----	
* MIDDLE ELEVONS ON THE SAME WING	*	DESCRIPTION	PART NO.
* LAG.	*	-----	
*****		MULTIMETER	
		-----	

\*\*\*\*\*

R \* Check that there is no interference between the \*

\* two Blue and Green 26V 1800 Hz generation systems \*

\* by shutting down the Green generation system \*

R \* Check electrical wiring between the elevons which \*

R \* lag and the Flight Controls (control column and \*

\* handwheel) with reference to the Wiring \*

\* Diagram Manual \*

\*\*\*\*\*

Chart 108 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****		
* INCORRECT CHANGE OVER TO GREEN	*	GROUND EQUIPMENT REQUIRED
* ELECTRICAL CHANNEL, ON ICOVOL INDI-	*	
* CATOR THE TWO INNER ELEVEN MAGNET-	*	DESCRIPTION PART NO.
* IC INDICATORS STILL DISPLAY B	*	
*****		
		MULTIMETER
		CIRCUIT BREAKER
		SAFETY CLIPS

\*\*\*\*\*  
\* On shelf 8-216, on front panel of static monito- \*  
\* ring change over unit (C56), PILOT VALVE-BLUE- \*  
\* L and R INNER ELEVEN indicator lights are illumi- \*  
\* nated. \*  
\*\*\*\*\*

*****		
		GREEN indicator lights are illuminated
R	YES NO---	Replace static monitoring change over unit C56 [7].
*****		

\*\*\*\*\*  
\* On shelf 8-216, remove static monitoring change \*  
\* over unit C56 [7]. \*  
\* On circuit breaker panels 1-213 and 5-213, remove \*  
\* safety clips and tags and set circuit breakers \*  
\* PFCS INV GRN FAIL IND 1C73 and PFCS INV BLUE FAIL \*  
\* IND 2C73 (Map Ref. M15 and E11). \*  
\* On rack connector C56, check that voltage measu- \*  
\* red between pins AB-26 and AA-14 (ground), then \*  
\* AB-22 and AA-14 (ground) is 28VDC. \*  
\*\*\*\*\*

*****		
R	YES NO---	Replace Flight Control unit C57 [8].
*****		
R		Replace static monitoring change over unit C56 [7].
*****		

Chart 109 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****	
* INCORRECT CHANGE OVER TO GREEN ELE-*	GROUND EQUIPMENT REQUIRED
* CTICAL CHANNEL. ON ICOVOL INDICA- *	
* TOR THE 4 OUTER AND MIDDLE ELEVON *	DESCRIPTION PART NO.
* MAGNETIC INDICATORS STILL DISPLAY B*	
*****	
	MULTIMETER
	CIRCUIT BREAKER
	SAFETY CLIPS
*****	

\*\*\*\*\*  
\* On shelf 8-216, on front panel of static monito- \*  
\* ring change over unit C56, PILOT VALVES-BLUE- \*  
\* OUTER ELEVONS and MIDDLE ELEVONS indicator lights \*  
\* are illuminated. \*  
\*\*\*\*\*

		GREEN indicator lights are illuminated.
R	YES NO---	Replace static monitoring change over unit C56 [7].
		-----

\*\*\*\*\*  
\* On shelf 8-216, remove static monitoring change \*  
\* over unit C56 [7]. \*  
\* On circuit breaker panels 1-213 and 5-213, remove \*  
\* safety clips and tags and set circuit breakers \*  
\* PFCS INV GREEN FAIL IND 1C73 and PFCS INV BLUE \*  
\* FAIL IND 2C73 (Map Ref. M15 and E11). \*  
\* On rack connector C56, check that voltage measu- \*  
\* red between pins AA-26 and AA-14 (ground), then \*  
\* AA-22 and AA-14 (ground) is 28VDC. \*  
\*\*\*\*\*

R	YES NO---	Replace Flight Control Unit C57 [8].
		-----
R		Replace static monitoring change over unit C56 [7].
		-----

Chart 110 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
 \* INCORRECT CHANGE OVER TO GREEN ELE- \*  
 \* CTICAL CHANNEL WITH COMPARISON WAR \*  
 \* NING. ON ICOVOL INDICATOR, THE TWO \*  
 \* INNER ELEVON MAGNETIC INDICATORS \*  
 \* CHANGE FROM B TO M AND THE TWO RED \*  
 \* WARNING LIGHTS ARE ILLUMINATED. \*  
 \*\*\*\*\*

### GROUND EQUIPMENT REQUIRED

DESCRIPTION	PART NO.
MULTIMETER	_____
CIRCUIT BREAKER	_____
SAFETY CLIPS	_____
ACCESS PLATFORM	_____
3.220 M (10 FT. 7 IN.)	_____
FLIGHT CONTROLS	_____
ELECTRICAL CIRCUITS	_____
TEST SET	31-56-100

\*\*\*\*\*  
 \* On overhead panel, on AUTO STAB unit No.1 disengage \*  
 \* PITCH and ROLL switches. \*  
 \* On ICOVOL indicator (First Officer's instrument \*  
 R \* panel) extinguish the two red warning lights by \*  
 \* pressing and releasing ALARM RESET button. \*  
 \* On overhead panel, on Flight Control Unit, press \*  
 \* and release IN ELEVON RESET push button. \*  
 \* On ICOVOL indicator, the two inner elevon magnetic \*  
 \* indicators must display B. \*  
 \*\*\*\*\*

||  
 ||  
 NO  
 ||  
 ||  
Sheet 5

\*\*\*\*\*  
 \* On overhead panel, on AUTO STAB unit No1 engage \*  
 \* PITCH and ROLL switches. \*  
 YES-- \* On ICOVOL indicator, the two inner elevon mag- \*  
 \* netic indicators still display G and the two \*  
 \* red warning lights are off. \*  
 \*\*\*\*\*

||  
 YES  
 ||  
 ||

NO---| Replace autostabilization |  
computer No1 1C31 [1].

\*\*\*\*\*  
 R \* On PITCH TRIM wheel (centre console) select 5 \*  
 \* degrees. \*  
 \* On ICOVOL indicator, the two inner elevon magnetic \*  
 \* indicators still display B and the two red warning \*  
 \* lights are off. \*  
 \*\*\*\*\*

||  
 YES  
 ||  
 ||  
Sheet 2

Chart 111 (Sheet 1 of 11)

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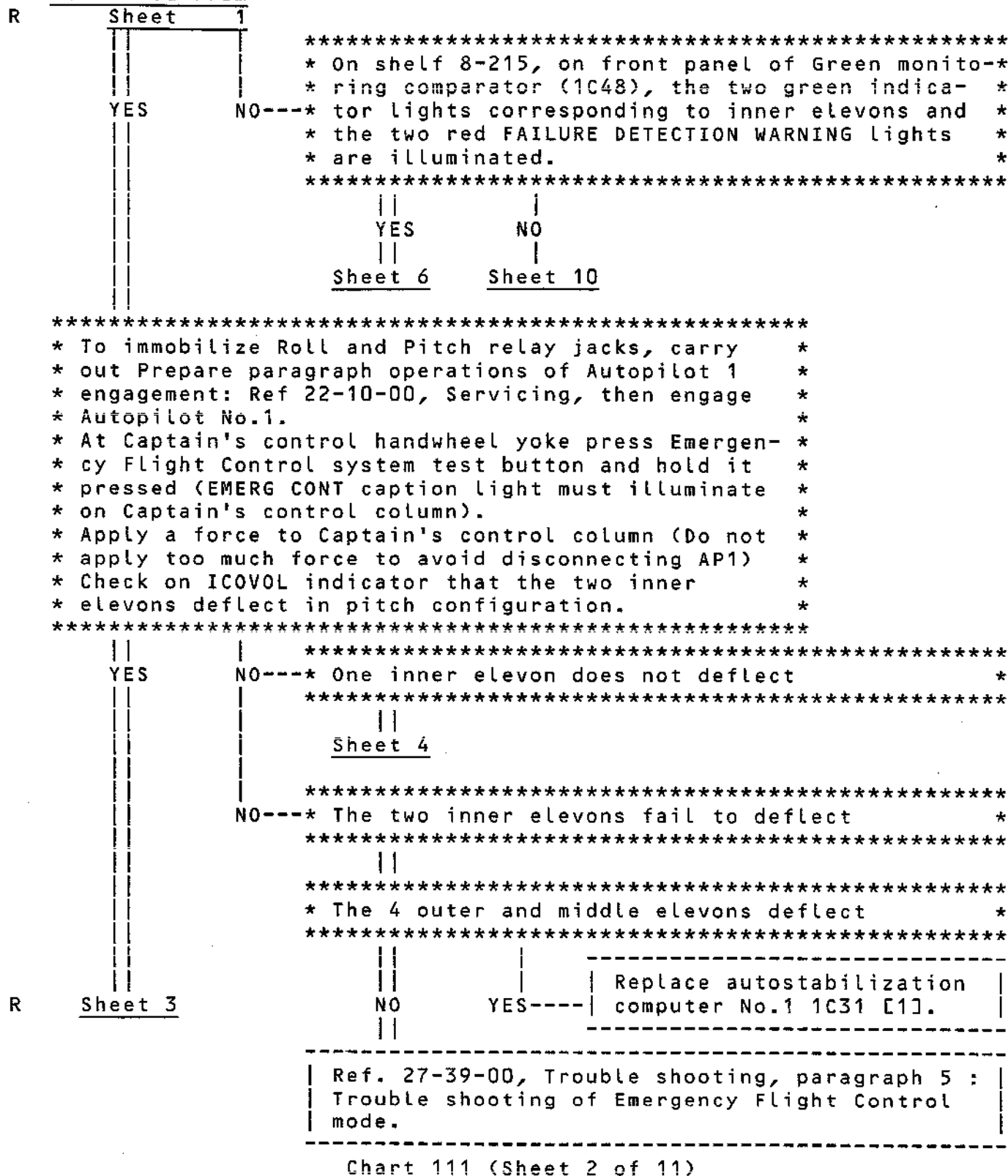
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## MAINTENANCE MANUAL

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## MAINTENANCE MANUAL

Continued From

Sheet 2

||  
YES  
||

\*\*\*\*\*  
\* On shelf 8-215, replace Green monitoring compara- \*  
R \* tor 1C48 [3]. \*  
\* Repeat Emergency Flight Control System tests \*  
\* On shelf 8-215, on front panel of Green monitoring \*  
\* comparator 1C48, the 2 Green indicator lights \*  
\* corresponding to inner elevons illuminate during \*  
\* operation. \*

\*\*\*\*\*

||  
NO  
||

-----  
| Replace autostabilization computer No.1 1C31 |  
R YES--| [1]. |  
-----

\*\*\*\*\*  
\* Repeat Emergency Flight Control system tests \*  
\* making a fast Pitch movement on control column. \*  
\* On shelf 8-215, on front panel of Green monitoring \*  
\* comparator 1C48, the 2 Green indicator lights \*  
\* corresponding to inner elevons illuminate immedia- \*  
\* tely. \*

\*\*\*\*\*

||  
YES  
||

-----  
| Replaced Green monitoring comparator was faulty|  
NO---

\*\*\*\*\*

R \* Connect Flight Controls Electrical Circuits Test \*  
R \* Set (31-56-100) and check linear transducers of \*  
\* inner elevon PFCUs for correct operation by \*  
\* carrying out the first test series. \*  
\* Ref 27-10-00, Trouble Shooting \*

\*\*\*\*\*

Chart 111 (Sheet 3 of 11)

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## MAINTENANCE MANUAL

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Sheet 2

\*\*\*\*\*  
\* On shelf 8-215, replace autostabilization computer \*  
\* No.1, 1C31 [1]. \*  
\* Repeat Emergency Flight Control System tests \*  
\* Check on ICOVOL indicator that the two inner elev- \*  
\* ons deflect in Pitch configuration. \*  
\*\*\*\*\*

|| |  
NO YES--| Replaced autostabilization computer was faulty.|  
|| |

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in 27-\*  
\* 34-53, Removal/Installation. \*  
\* Depending on the LH or RH inner elevon which did \*  
\* not deflect, open fairing 551LR or 651LR and on \*  
\* PFCU C105 or C106 disconnect connector B, then : \*  
\* 1° Check electrovalve impedance (1500 Ohms appro- \*  
\* ximately) measured between pins B-q and B-r then \*  
\* B-q and B-p. \*  
\* 2° Check continuity between pins A-p and A-t. \*  
\*\*\*\*\*

|| |  
OK NOT OK--| Replace Green electrovalve on PFCU C105 [13] or |  
|| | C106 [14]. |

\*\*\*\*\*  
\* On shelf 8-216, replace static monitoring change \*  
\* over unit C56 [7]. \*  
\* Repeat Emergency Flight Control System tests \*  
\* Check on ICOVOL indicator that the two inner elev- \*  
\* ons deflect in Pitch configuration. \*  
\*\*\*\*\*

|| |  
OK NOT OK--| Check continuity between static monitoring |  
		change over unit C56 and electrovalves of rele-
		vant PFCU (Ref. WDM. 27-37-02).
		Replaced static monitoring change over unit was
		faulty.

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## MAINTENANCE MANUAL

Continued From  
Sheet 1

NO

\*\*\*\*\*  
\* On ICOVOL indicator extinguish the two red warning \*  
\* lights by pressing and releasing ALARM RESET push \*  
\* button. \*  
\* On overhead panel, on Flight Control Unit, press \*  
\* and release IN ELEVONS RESET push button, and at \*  
\* the same time check, on ICOVOL indicator, that one \*  
\* or both inner elevons deflect during reset. \*  
\*\*\*\*\*

YES

NO---

\*\*\*\*\*  
\* On shelf 8-215, on front panel of Green monito-\*  
\* ring comparator 1C48, the 2 Green indicator \*  
\* lights corresponding to inner elevons and the \*  
\* two red FAILURE DETECTION warning lights are \*  
\* illuminated. \*  
\*\*\*\*\*

YES

NO---

Replace static monitoring  
change over unit C56 [7]

Sheet 6

\*\*\*\*\*  
\* On shelf 8-215, replace autostabilization computer \*  
\* No.1 1C3 [1]. \*  
\* Repeat tests which led to the fault. \*  
\* On ICOVOL indicator, the two inner elevon magnetic \*  
\* indicators display G. \*  
\*\*\*\*\*

NO

YES---

Replaced autostabilization computer was faulty.

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YES

```
* On shelf 8-215, replace Green monitoring comparat- *
* or 1C48 [3]. *

```

```
* Repeat tests which led to the fault. *
* On IC0VOL indicator, the two inner elevon magnetic *
* indicators display G. *

```

```

|| |
NO YES--| Replaced Green monitoring comparator was faulty|

```

```
* On shelf 8-215, on front panel of Green monitoring *
* comparator 1048, press and release the two INNER *
* LEFT (IN.L.) push buttons. The two red FAILURE *
* DETECTION warning lights go off. *
```

NO YES  
Sheet

Sheet 8

\* On shelf 8-215, on front panel of Green monitoring \*  
\* comparator 1C48 press and release the 2 INNER \*  
\* RIGHT (IN.R.) push buttons. The two red FAILURE \*  
\* DETECTION warning lights go off. \*

NO YES  
Sheet

Sheet 9

```
* On shelf 8-215, remove Green monitoring comparator *
* 1C48 [3]. *

```

\* On rack connector, shunt pins 1C48-AA-62 and 1C  
\* 48-AB-60.  
\*

\* On circuit breaker panel 1-213, remove safety \*  
\* clips and tags and set circuit breakers PFCS INV \*  
\* GRN FAIL IND 1C73 and PFCS INV GRN SUP 1C66 (Map \*  
\* Ref. M15 and P11). \*

\* On rack connector 1C48-AA, voltage measured betw- \*  
\* een pins 64 and 13 must be 26VAC 1800 Hz. \*

```

||      |-----|
YES    NO---| Replace circuit breaker INNER ELEVEN GRN
||          | CONT SUP 1C94 [30].

```

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||  
YES  
||

\*\*\*\*\*  
\* At zone 121, open access door 121FB. \*  
\* On circuit breaker panel 2-213, trip, safety and \*  
\* tag circuit breakers INNER ELEVON MON GRN SUP and \*  
\* MID & OUTER ELEVON MON GRN SUP ( Map Ref. G1 and \*  
\* G2). \*  
\* On synchro pack 1C96 disconnect connector B. \*  
\* Remove safety clip and tag and set circuit breaker \*  
\* INNER ELEVON MON GRN SUP. \*  
\* Check that voltage measured between pins 1C96-B-D \*  
\* and 1C96-B-E is 26VAC 1800 Hz. \*  
\*\*\*\*\*

||  
YES  
||

NO--

-----  
| Replace circuit breaker INNER ELEVON MON GRN |  
SUP 1C47 [27].

\*\*\*\*\*  
\* On synchro pack 1C96, confirm fault of Green moni- \*  
\* toring resolver by checking : \*  
\* 1° Rotor resistance measured between pins 1C96-B- \*  
\* D and 1C96-B-E : this resistance must be 9.8 Ohms \*  
\* approximately. \*  
\* 2° Stator resistance measured between pins 1C96- \*  
\* B-F and 1C96-B-H then 1C96-B-G and 1C96-B-J : \*  
\* this resistance must be 5 Ohms approximately. \*  
\*\*\*\*\*

||  
OK  
||

NOT OK--

-----  
Replace Pitch synchro pack [15].

-----  
| Check aircraft wiring between connectors 1C96- |  
B and 1C100-B. (Ref. WDM. 27-37-05)

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Sheet 6

YES

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed \*  
\* in 27-34-53, Removal/Installation. \*  
\* Open fairing 551LR and on PFCU C105 disconn- \*  
\* ect connector B, then : \*  
\* 1°) Check rotor resistance of Green monitor- \*  
\* ing resolver, measured between pins B-G and \*  
\* B-b : this resistance must be 120 Ohms approxi \*  
\* mately. \*  
\* 2°) Check stator resistance of Green monito- \*  
\* ring resolver, measured between pins B-E and \*  
\* B-a then B-F and B-a : this resistance must \*  
\* be 105 Ohms approximately. \*  
\*\*\*\*\*

|| | -----  
OK NOT OK--| Replace synchro pack on PFCU C105 [13]. |  
|| | -----

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed \*  
\* in 27-16-11, Removal/Installation. \*  
\* At zone 121, open access door 121FB. \*  
\* On synchro pack 1C100 disconnect connector B \*  
\* then : \*  
\* 1°) Check rotor resistance of LH inner elevon \*  
\* Green monitoring resolver, measured between \*  
\* pins B-D and B-B then B-C and B-P : this \*  
\* resistance must be 15.1 Ohms approximately \*  
\* 2°) Check stator resistance of LH inner \*  
\* elevon Green monitoring resolver, measured \*  
\* between pins B-A and B-M then B-L and B-N : \*  
\* This resistance must be 20.1 Ohms approximate- \*  
\* ly. \*  
\*\*\*\*\*

|| | -----  
OK NOT OK--| Replace Roll synchro Pack [16]. |  
|| | -----

-----  
| Check aircraft wiring between Green monitoring  
| resolver 1C96 and the Green monitoring compara  
tor 1C48 (Ref. WDM. 27-37-05).

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YES

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in 27-  
\* 37-53, Removal/Installation. \*  
\* Open fairing 651 LR and on PFCU C106 disconnect \*  
\* connector B, then : \*  
\* 1°) Check rotor resistance of Green monitoring \*  
\* resolver, measured between pins B-G and B-b : \*  
\* This resistance must be 120 Ohms approximately \*  
\* 2°) Check stator resistance of Green monitoring \*  
\* resolver, measured between pins B-E and B-a then \*  
\* B-F and B-a ; this resistance must be 105 Ohms app- \*  
\* roximately. \*  
\*\*\*\*\*

|| | -----  
OK NOT OK--| Replace synchro pack on PFCU C106 [14]. |  
|| | -----

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in 27-  
\* 16-11, Removal/Installation. \*  
\* At zone 121, open access door 121FB. \*  
\* On synchro pack 1C100, disconnect connector B \*  
\* then : \*  
\* 1°) Check rotor resistance of RH inner elevon \*  
\* Green monitoring resolver, measured between pins \*  
\* B-J and B-T then B-H and B-K : this resistance \*  
\* must be 15.1 Ohms approximately. \*  
\* 2°) Check stator resistance of RH inner elevon \*  
\* Green monitoring resolver, measured between pins \*  
\* B-E and B-G, then B-F and B-S : this resistance \*  
\* must be 20.1 Ohms approximately. \*  
\*\*\*\*\*

|| | -----  
OK NOT OK--| Replace Roll synchro pack [16]. |  
|| | -----

-----| Check aircraft wiring between Green monitoring  
resolver 1C96 and Green monitoring comparator  
1C48 (Ref. WDM. 27-37-05).

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Sheet 5

NO

Continued From  
Sheet 2

NO

\*\*\*\*\*  
\* On overhead panel, on Flight control unit, press \*  
\* and release IN ELEVONS RESET push button and note \*  
\* on IC0VOL indicator displacement of inner elevons \*  
\* Two cases are possible. \*  
\* Case No.1 : Only one inner elevon deflects. \*  
\* Case No.2 : Both inner elevons deflect. \*

\*\*\*\*\*

Case No.1	***** * At zone 121, open access door 121FB. * * Trip, safety and tag circuit breakers listed in * * 27-36-11, Removal/Installation. * * On synchro pack 1C96 disconnect connector A, * * then : * * 1°) Check rotor resistance of Green control * Case No.2=* resolver, measured between pins A=D and A=E : * * this resistance must be 3.8 Ohms approximately.* * 2°) Check stator resistance of Green control * * resolver, measured between pins A-F and A-H * * then A-G and A-J : this resistance must be 5 * * Ohms approximately. *
-----------	---

\*\*\*\*\*

OK	NOT OK--	----- Replace Pitch synchro pack [15]. -----
----	----------	---

-----  
Check aircraft wiring between circuit breaker  
1C94 and autostabilization computer 1C31 then  
between circuit breaker 1C94 and synchro pack  
1C100 (Ref. WDM. 27-36-01).  
-----

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Case No.1

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in 27-  
\* 34-53, Removal/Installation. \*  
R \* Depending on which inner elevon deflected, \*  
\* open elevon fairing 551LR or 651LR and on PFCU \*  
\* C105 or C106 disconnect connector B, then : \*  
\* 1° Check rotor resistance of Green control resol- \*  
\* ver, measured between pins B-X and B-Y : this \*  
\* resistance must be 23.3 Ohms. \*  
\* 2° Check stator resistance of Green control reso- \*  
\* lver, measured between pins B-c and B-B then B-A \*  
\* and B-B : this resistance must be 35 Ohms approxi- \*  
\* mately. \*

\*\*\*\*\*

OK	NOT OK--	Replace synchro pack on PFCU C105 [13] or C106 [14].
----	----------	--

\*\*\*\*\*  
\* Trip, safety and tag circuit breaker listed in 27- \*  
\* 16-11, Removal/Installation. \*  
\* At zone 121, open access door 121FB. \*  
\* On synchro pack 1C100 disconnect connector A, \*  
\* then : \*  
\* 1° Check rotor resistance of LH (or RH) inner \*  
\* elevon Green control resolver, measured between \*  
\* pins A-B and A-D (or A-H and A-K) then A-C and A-P \*  
\* (or A-J and A-T) : this resistance must be 15.1 \*  
\* Ohms approximately. \*  
\* 2° Check stator resistance of LH (or RH) inner \*  
\* elevon Green control resolver, measured between \*  
\* pins A-A and A-M (or A-E and A-G) then A-L and A-N \*  
\* (or A-F and A-S) : this resistance must be 20.1 \*  
\* Ohms approximately. \*

\*\*\*\*\*

OK	NOT OK--	Replace Roll synchro pack [16].
----	----------	---------------------------------

Check aircraft wiring between control resolver 1C96 and LH (or RH) inner elevon PFCU servo-valve. Ref. WDM. 27-36-01.
---

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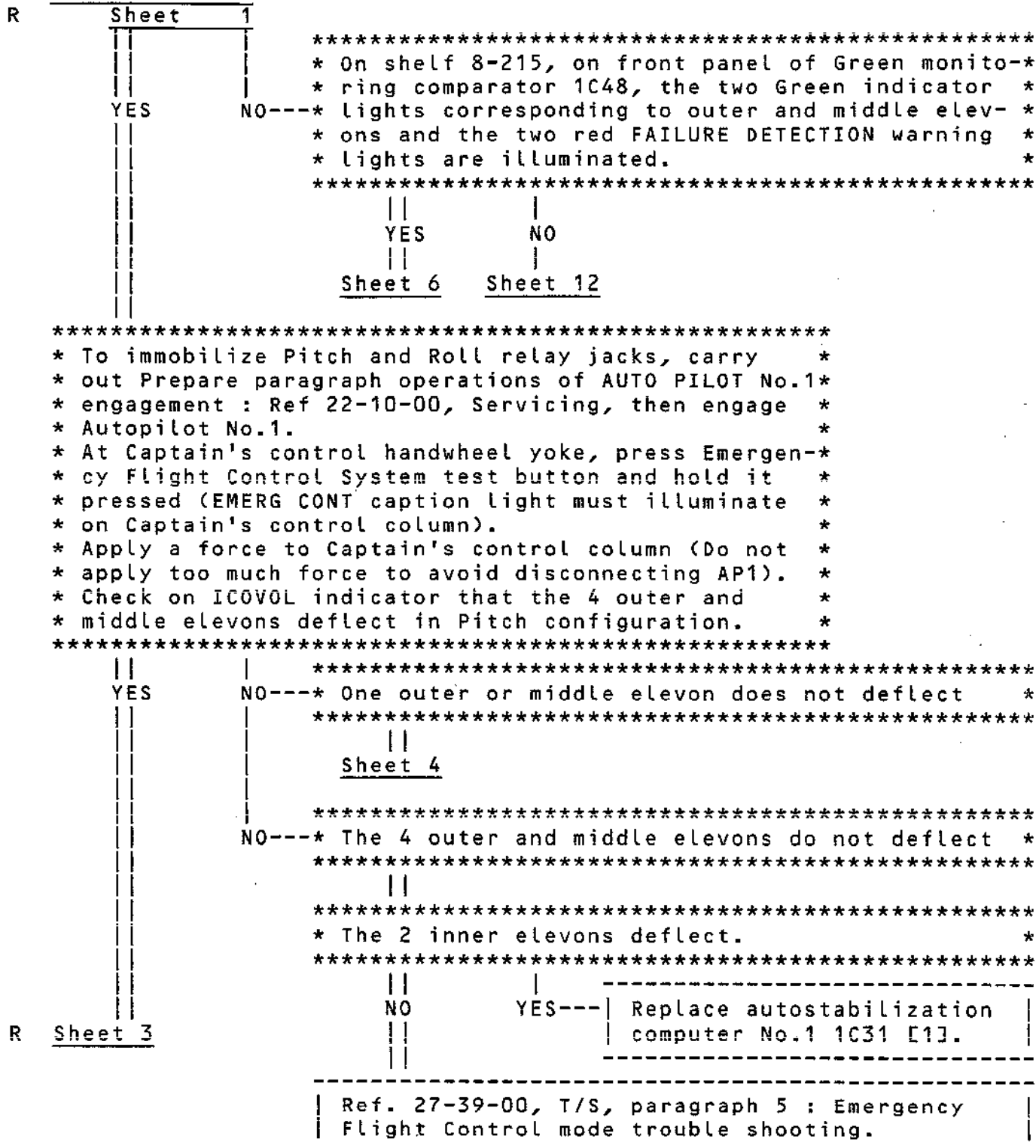


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YES

\*\*\*\*\*  
\* On shelf 8-215, replace Green monitoring compara- \*  
R \* tor 1C48 [3]. \*  
\* Repeat Emergency Flight Control System tests. \*  
\* On shelf 8-215, on front panel of Green monitoring \*  
\* comparator 1C48, the 2 Green indicator lights \*  
\* corresponding to outer and middle elevons illumina-\*  
\* te during actuation. \*

\*\*\*\*\*

NO

YES---

Replace autostabilization computer No.1 1C31  
[1].

\*\*\*\*\*  
\* Repeat Emergency Flight Control System tests, \*  
\* making a fast Pitch movement on control column. \*  
\* On shelf 8-215, on front panel of Green monitoring \*  
\* comparator 1C48, the 2 Green indicator lights \*  
\* corresponding to outer and middle elevons illumina-\*  
\* te immediately. \*

\*\*\*\*\*

YES

NO---

Replaced Green monitoring comparator was faulty

\*\*\*\*\*  
\* Connect Flight Controls Electrical circuits test \*  
\* set (31-56-100) and check linear transducers of \*  
R \* outer and middle elevon PFCUs for correct operation\*  
\* by carrying out the first test series. \*

R \* Ref. 27-10-00, Trouble Shooting \*

\*\*\*\*\*

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||

\*\*\*\*\*

- R \* On shelf 8-215 replace autostabilization computer \*  
\* No.1 1C31 [1]. \*  
\* Repeat Emergency Flight Control system tests. \*  
\* Check on ICOVOL indicator that the 4 outer and \*  
\* middle elevons deflect in Pitch configuration. \*

\*\*\*\*\*

|| |  
NO YES--| Replaced autostabilization computer was faulty. |  
||

\*\*\*\*\*

- \* Trip, safety and tag circuit breakers listed in 27-\*  
\* 34-52, Removal/Installation. \*  
\* Depending on RH or LH outer and middle elevon \*  
\* which did not deflect, open fairing 553LR, 653LR \*  
\* 552LR or 652LR and on PFCU C101, C102, C103 \*  
\* or C104, disconnect connector B, then : \*  
\* 1°) Check electrovalve impedance (1500 Ohms approx-\*  
\* imately) measured between pins B-h and B-f then \*  
\* B-h and B-j. \*  
\* 2°) Check continuity between pins B-g and B-f \*

\*\*\*\*\*

R || |  
OK NOT OK--| Replace Green electrovalve on PFCU C101 [9], |  
|| | C102 [10], C103 [11] or C104 [12]. |  
||

\*\*\*\*\*

- R \* On shelf 8-216, replace static monitoring change \*  
\* over unit C56 [7]. \*  
\* Repeat Emergency Flight Control system tests. \*  
\* Check on ICOVOL indicator that the 4 outer and \*  
\* middle elevons deflect in Pitch configuration. \*

\*\*\*\*\*

|| |  
OK NOT OK--| Check continuity between static monitoring |  
		change over unit C56 and electrovalves of
		relevant PFCU (Ref. WDM. 27-37-01).
		Replaced static monitoring change over unit was
		faulty.

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||  
YES  
||

\*\*\*\*\*  
\* On shelf 8-215, replace Green monitoring compara- \*  
\* tor 1C48 [3]. \*  
\* Repeat tests which led to the fault. \*  
\* On IC0VOL indicator the 4 outer and middle elevon \*  
\* magnetic indicators display G. \*  
\*\*\*\*\*

||  
NO YES--| Replaced Green monitoring comparator was faulty|  
||

\*\*\*\*\*  
\* On shelf 8-215, on front panel of Green monitoring \*  
\* comparator 1C48, press the two OUTER LEFT (O.L.) \*  
\* push buttons simultaneously. \*  
\* The two red FAILURE DETECTION warning lights go \*  
\* off. \*  
\*\*\*\*\*

||  
NO YES--| \*\*\*\*\*  
| \* Trip, safety and tag circuit breakers listed in\*  
| \* 27-34-52, Removal/Installation. \*  
| \* Open fairing 553LR and on PFCU C101, disconnect\*  
| \* connector B, then : \*  
| \* 1°) Check rotor resistance of Green monitoring \*  
| \* resolver, measured between pins B-M and B-P : \*  
| \* this resistance must be 120 Ohms approximately.\*  
| \* 2°) Check stator resistance of Green monitoring\*  
| \* resolver measured between pins B-c and B-N \*  
| \* then B-b and B-N : this resistance must be 105 \*  
| \* Ohms approximately. \*  
| \*\*\*\*\*

||  
OK NOT OK--| Replace synchro pack on  
| PFCU C101 [9].  
||

Check aircraft wiring between LH outer and  
middle elevon monitoring resolver 1C98 and the  
Green monitoring comparator 1C48 (Ref. WDM. 27-  
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NO

\*\*\*\*\*  
\* On shelf 8-215, on front panel of Green monitoring \*  
\* comparator 2C48, press the two MIDDLE LEFT (M.L.) \*  
\* push buttons simultaneously. \*  
\* The 2 red FAILURE DETECTION warning lights go off. \*  
\*\*\*\*\*

NO

YES---

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in \*  
\* 27-34-52, Removal/Installation. \*  
\* Open fairing 552LR and on PFCU C103, disconnect \*  
\* connector B, then : \*  
\* 1°) Check rotor resistance of Green monitoring \*  
\* resolver, measured between pins B-M and B-P : \*  
\* this resistance must be 120 Ohms approximately. \*  
\* 2°) Check stator resistance of Green monitoring \*  
\* resolvers, measured between pins B-c and B-N \*  
\* then B-b and B-N : this resistance must be 105 \*  
\* Ohms approximately. \*  
\*\*\*\*\*

OK

NOT OK--

Replace synchro pack on  
PFCU C103 [11].

Check aircraft wiring between LH outer and  
middle elevon Green monitoring resolver 1C98  
and Green monitoring comparator 1C48 (Ref. WDM.  
27-37-03).

\*\*\*\*\*  
\* On shelf 8-215, on front panel of Green monitoring \*  
\* comparator 1C48 press the 4 OUTER LEFT and MIDDLE \*  
\* LEFT (O.L. and M.L.) push buttons simultaneously. \*  
\* The 2 red FAILURE DETECTION warning lights go off. \*  
\*\*\*\*\*

NO

YES

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NO

YES---

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in \*  
\* 27-16-11, Removal/Installation. \*  
\* At zone 121, open access door 121FB. \*  
\* On synchro pack 1C98 disconnect connector B \*  
\* then : \*  
\* 1°) check rotor resistance of LH outer and \*  
\* middle eleven Green monitoring resolver, \*  
\* measured between pins B-D and B-B then B-C and \*  
\* B-P : this resistance must be 15.1 Ohms approxi \*  
\* mately. \*  
\* 2°) Check stator resistance of LH outer and \*  
\* middle eleven Green monitoring resolver, measu \*  
\* red between pins B-A and B-M then B-L and B-N : \*  
\* this resistance must be 20.1 Ohms approximately \*  
\*\*\*\*\*

OK

NOT OK--

Replace Roll synchro pack  
[16].

Check aircraft wiring between Green monitoring  
resolver 1C96 and PFCU C101 and C103 (Ref.  
27-37-03).

\*\*\*\*\*  
\* On shelf 8-215, on front panel of Green monitoring \*  
\* comparator 1C48 press the 2 OUTER RIGHT (O.R.) \*  
\* push buttons simultaneously. \*  
\* The 2 red FAILURE DETECTION warning lights go off. \*  
\*\*\*\*\*

NO

YES---

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in \*  
\* 27-34-52, Removal/Installation. \*  
\* Open fairing 653LR and on PFCU C102 disconnect \*  
\* connector B, then : \*  
\* 1°) Check rotor resistance of Green monitoring \*  
\* resolver, measured between pins B-M and B-P : \*  
\* this resistance must be 120 Ohms approximately. \*  
\* 2°) Check stator resistance of Green monitoring \*  
\* resolver, measured between pins B-c and B-N \*  
\* then B-b and B-N : this resistance must be 105 \*  
\* Ohms approximately. \*  
\*\*\*\*\*

OK

NOT OK--

Replace synchro pack on  
PFCU C102 [10].

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OK

NO

Check aircraft wiring between RH outer and middle elevon Green monitoring resolver 1C98 and Green monitoring comparator 1C48 (Ref. WDM. 27-37-03).

\*\*\*\*\*  
\* On shelf 8-215, on front panel of Green monitoring \*  
\* comparator 1C48 press the 2 MIDDLE RIGHT (M.R.) \*  
\* push buttons simultaneously. \*  
\* The 2 red FAILURE DETECTION warning lights go off \*  
\*\*\*\*\*

NO

YES---

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in \*  
\* 27-34-52, Removal/Installation. \*  
\* Open fairing 652LR and on PFCU C104 disconnect \*  
\* connector B, then : \*  
\* 1°) Check rotor resistance of Green monitoring \*  
\* resolver, measured between pins B-M and B-P : \*  
\* this resistance must be 120 Ohms approximately. \*  
\* 2°) Check stator resistance of Green monitoring \*  
\* resolver, measured between pins B-c and B-N \*  
\* then B-b and B-N : this resistance must be 105 \*  
\* Ohms approximately. \*  
\*\*\*\*\*

OK

NOT OK--

Replace synchro pack on PFCU C104 [12].

Check aircraft wiring between RH outer and middle elevon Green monitoring resolver 1C98 and Green monitoring comparator 1C48 (Ref. WDM. 27-37-03).

\*\*\*\*\*  
\* On shelf 8-215, on front panel of Green monitoring \*  
\* comparator 1C48, press the 4 OUTER RIGHT and \*  
\* MIDDLE RIGHT (O.R. and M.R.) push buttons simultane \*  
\* ously. \*  
\* The 2 red FAILURE DETECTION warning lights go off. \*  
\*\*\*\*\*

NO

YES

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Sheet 9

NO

YES---

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in \*  
\* 27-16-11, Removal/Installation. \*  
\* At zone 121, open access door 121FB. \*  
\* On synchro pack 1C98 disconnect connector B, \*  
\* then : \*  
\* 1°) Check rotor resistance of RH outer and \*  
\* middle elevons Green monitoring resolver, measu \*  
\* red between pins B-H and B-K then B-J and B-T: \*  
\* this resistance must be 15.1 Ohms approximately \*  
\* 2°) Check stator resistance of RH outer and \*  
\* middle elevons Green monitoring resolver, \*  
\* measured between pins B-E and B-G then B-S and \*  
\* B-F : this resistance must be 20.1 Ohms approxi \*  
\* mately. \*  
\*\*\*\*\*

OK

NOT OK--

Replace Roll synchro pack  
[16].

Check aircraft wiring between Green monitoring  
resolver 1C96 and PFCU C102 and C104 (Ref.  
WDM. 27-37-03).

\*\*\*\*\*  
\* On shelf 8-215, remove Green monitoring comparator \*  
\* 1C48 [3]. On rack connector, shunt pins 1C48-AA- \*  
\* 62 and 1C48-AB-60. On circuit breaker panel \*  
\* 1-213, remove safety clips and tags and set \*  
\* circuit breakers PFCS INV GRN FAIL IND 1C73 and \*  
\* PFCS IN GRN SUP 1C66 (Map Ref. M15 and P11). \*  
\* On rack connector 1C48-AB, voltage measured \*  
\* between pins 63 and 13 must be 26VAC 1800 Hz. \*  
\*\*\*\*\*

YES

NO---

Replace circuit breaker OUTER ELEVON AMP GRN  
SUP 1C44 [29].

\*\*\*\*\*  
\* On rack connector 1C48-AB voltage measured \*  
\* between pins 64 and 13 must be 26VAC 1800 Hz. \*  
\*\*\*\*\*

YES

NO---

Replace circuit breaker MID ELEVON AMP GRN SUP  
1C93 [31].

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||  
YES  
||

\*\*\*\*\*  
\* On rack connector 1C48-AB, voltage measured \*  
\* between pins 65 and 13 must be 26VAC 1800 Hz. \*  
\*\*\*\*\*

||  
YES  
||

NO---| Replace circuit breaker MID & OUTER ELEVON GRN |  
| CONT SUP 1C92 [32]. |

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers INNER ELEVON \*  
\* MON GRN SUP 1C47 and MID & OUTER ELEVON MON GRN SUP \*  
\* 1C46 on circuit breaker panel 2-213 (Map Ref. G1 \*  
\* and G2). At zone 121 open access door 121FB.. \*  
\* On synchro pack 1C96 disconnect connector B \*  
\* Remove safety clip and tag and set circuit breaker \*  
\* MID & OUTER ELEVON MON GRN SUP 1C46. \*  
\* Check that voltage measured between pins 1C96-B-A \*  
\* and 1C96-B-B is 26VAC 1800 Hz. \*  
\*\*\*\*\*

||  
YES  
||

NO---| Replace circuit breaker MID & OUTER ELEVON MON |  
| GRN SUP 1C46 [28]. |

\*\*\*\*\*  
\* On synchro pack 1C96, confirm fault of Green \*  
\* monitoring resolver by checking : \*  
\* 1°) Rotor resistance measured between pins B-A and \*  
\* B-B : this resistance must be 3.8 Ohms approximate- \*  
\* ly. \*  
\* 2°) Stator resistance measured between pins B-N \*  
\* and B-L then B-M and B-R : this resistance must be \*  
\* 5 Ohms approximately. \*  
\*\*\*\*\*

||  
OK  
||

NOT OK--| Replace Pitch synchro pack [15]. |

-----| Check aircraft wiring between connectors 1C96-  
B and 1C98-B (Ref. WDM. 27-37-03). |

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# Concorde

## MAINTENANCE MANUAL

Continued From

Sheet 5

NO

Continued From

Sheet 2

NO

\*\*\*\*\*  
\* On overhead panel, on Flight Control Unit, press \*  
\* and release O & M ELEVONS RESET push button and \*  
\* note on ICOVOL indicator displacement of outer and \*  
\* middle elevons. \*  
\* 4 cases are possible : \*  
\* Case No.1 : Only one outer and middle elevon \*  
\* deflects. \*  
\* Case No.2 : The two LH outer and middle elevons \*  
\* deflect. \*  
\* Case No.3 : The two RH outer and middle elevons \*  
\* deflect. \*  
\* Case No.4 : The 4 outer and middle elevons deflect.\*  
\*\*\*\*\*

R

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in\*  
\* 27-34-52, Removal/Installation. \*  
\* Depending on which elevon deflected, open \*  
\* fairing 553LR, 552LR, 653LR or 652LR and on \*  
\* PFCU C101, C103, C102 or C104 disconnect \*  
\* connector B, then : \*  
\* 1°) Check rotor resistance of Green control \*  
-Case No.1--\* resolver, measured between pins B-U and B-V : \*  
\* this resistance must be 23.3 Ohms approximately\*  
\* 2°) Check stator resistance of Green control \*  
\* resolver, measured between pins B-B and B-A \*  
\* then B-A and B-T. \*  
\*\*\*\*\*

R

OK

NOT OK--

Replace synchro pack on  
PFCU C101 [9], C103 [11],  
C102 [10] or C104 [12].

Check aircraft wiring between synchro pack 1C  
98 and servo valve of relevant PFCU. (Ref. WDM.  
27-36-01).

Sheet 13

Chart 112 (Sheet 12 of 14)

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## MAINTENANCE MANUAL

Continued From  
Sheet 12

-Case No.2--

```
*****
* Trip, safety and tag circuit breakers listed in*
* 27-16-11, Removal/Installation.                *
* At zone 121, open access door 121FB.            *
* On synchro pack 1C98 disconnect connector A      *
* then :                                           *
* 1°) Check rotor resistance of LH outer and      *
* middle elevons Green control resolver, measured*
* between pins A-B and A-D then A-C and A-P :    *
* this resistance must be 15.1 Ohms approximately*
* 2°) Check stator resistance of LH outer and      *
* middle elevon Green control resolver, measured *
* between pins A-A and A-M then A-L and A-N :    *
* this resistance must be 20.1 Ohms approximately*
*****
```

OK

NOT OK--

Replace Roll synchro pack  
[16].

Check aircraft wiring between synchro pack 1C  
96 and PFCUs C101 and C103 ; control channel  
(Ref. WDM. 27-36-01).

-Case No.3--

```
*****
* Trip, safety and tag circuit breakers listed in*
* 27-16-11, Removal/Installation.                *
* At zone 121, open access door 121FB.            *
* On synchro pack 1C98, disconnect connector A      *
* then :                                           *
* 1°) Check rotor resistance of RH outer and      *
* middle elevon Green control resolver, measured *
* between pins A-H and A-K then A-J and A-T :    *
* This resistance must be 15.1 Ohms approximately*
* 2°) Check stator resistance of RH outer and      *
* middle elevon Green control resolver, measured *
* between pins A-E and A-G then A-F and A-S :    *
* This resistance must be 20.1 Ohms approximately*
*****
```

OK

NOT OK--

Replace Roll synchro pack  
[16].

Sheet 14

Sheet 14

Chart 112 (Sheet 13 of 14)

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## MAINTENANCE MANUAL

Continued From Sheet 13

OK

Check aircraft wiring between synchro pack 1C 96 and PFCUs C102 and C104 : control channel (Ref. WDM. 27-36-01).

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in \*  
\* 27-36-11, Removal/Installation. \*  
\* At zone 121, open door 121FB. \*  
\* On synchro pack 1C96, disconnect connector A \*  
\* then : \*  
\* 1°) Check rotor resistance of Green control \*  
\* resolver, measured between pins A-A and A-B : \*  
\* this resistance must be 3.8 Ohms approximately. \*  
\* 2°) Check stator resistance of Green control \*  
\* resolver, measured between pins A-R and A-M \*  
\* then A-L and A-N : this resistance must be \*  
\* 5 Ohms approximately. \*  
\*\*\*\*\*

---Case No.4---

OK

NOT OK--

Replace Pitch synchro pack [15].

Check aircraft wiring between circuit breaker 1C92 and synchro pack 1C98 (Ref. WDM. 27-36-01)

Chart 112 (Sheet 14 of 14)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* WITH FLIGHT CONTROLS IN GREEN  
\* ELECTRICAL MODE, ONE INNER  
\* ELEVON FAILS TO DEFLECT.  
\*\*\*\*\*

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
MULTIMETER	_____
CIRCUIT BREAKER	_____
SAFETY CLIPS	_____
ACCESS PLATFORM	_____
3.220 M (10 FT. 7 IN.)	_____

\*\*\*\*\*  
\* On shelf 8-215, replace autostabilization computer \*  
\* No.1 1C31 [1]. \*  
\* Repeat Emergency Flight Control system tests. \*  
\* Check on ICOVOL indicator, that both inner elevons \*  
\* deflect in Pitch configuration. \*  
\*\*\*\*\*

||  
NO YES---| Replaced autostabilization computer was faulty.|  
||

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in \*  
\* 27-34-53, Removal/Installation. \*  
\* Depending on the LH or RH inner elevon which did \*  
\* not deflect, open fairing 551LR or 651LR and \*  
\* on PFCU C105 or C106 disconnect connector B, \*  
\* then : \*  
\* 1°) Check electrovalve impedance (1500 Ohms approx- \*  
\* imately) measured between pins B-q and B-r then \*  
\* B-q and B-p. \*  
\* 2°) Check continuity between pins B-p and B-t. \*  
\*\*\*\*\*

||  
OK NOT OK--| Replace Green electrovalve on PFCU C105 [13] \*  
|| | or C106 [14]. \*  
||

Sheet 2

Chart 113 (Sheet 1 of 2)

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* On shelf 8-216, remove static monitoring change \*  
\* over unit C56 [7]. \*  
R \* On circuit breaker panel 1-213, remove safety clip \*  
\* and tag and set circuit breaker PFCS INV GRN FAIL \*  
\* IND 1C73 (Map Ref. M15). \*  
\* On rack connector C56, check that voltage measu- \*  
\* red between pins AB-47 and AA-14 (ground) is 28 \*  
\* VDC. \*  
\*\*\*\*\*

	YES	NO---	Replace circuit breaker INNER ELEVON CONT & MON GRN SUP 2 1C59 [20].
--	-----	-------	---

\*\*\*\*\*  
\* On rack connector C56, check that voltage measu- \*  
\* red between pins A-B 36 and AA-14 (Ground) is \*  
\* 28VDC. \*  
\*\*\*\*\*

	YES	NO---	Replace circuit breaker INNER ELEVON CONT & MON GRN SUP 1 1C53 [17].
	-----		
R	----- Replace static monitoring change over unit C56 [7].		

Chart 113 (Sheet 2 of 2)

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## MAINTENANCE MANUAL

*****	
R * WITH FLIGHT CONTROLS IN GREEN	*   GROUND EQUIPMENT REQUIRED
* ELECTRICAL MODE, ONE OUTER OR	*
* MIDDLE ELEVON FAILS TO DEFLECT.	*   DESCRIPTION PART NO.
*****	
	MULTIMETER
	CIRCUIT BREAKER
	SAFETY CLIPS
	ACCESS PLATFORM
	3.220 M (10FT.7IN.)

*****	
R * On shelf 8-215, replace autostabilization computer	*
* No.1 1C31 [7].	*
* Repeat Emergency Flight Control system tests.	*
* Check that on IC0VOL indicator, the 4 outer and	*
* middle elevons deflect in Pitch configuration.	*
*****	
NO	YES--  Replaced autostabilization computer was faulty.

*****	
R * Trip, safety and tag circuit breakers listed in	*
* 27-34-52, Removal/Installation.	*
* Depending on the LH or RH, outer or middle elevon	*
* which did not deflect, open fairing 553LR, 653LR,	*
* 552LR or 652LR and on PFCU C101, C102, C103,	*
* or C104, disconnect connector B, then :	*
* 1°) Check electrovalve impedance (1500 Ohms approxi*	*
* mately) measured between pins B-h and B-f then	*
* B-h and B-j.	*
* 2°) Check continuity between pins B-g and B-f.	*
*****	
OK	NOT OK--  Replace Green electrovalve on PFCU C101 [9],
	C102 [10], C103 [11], or C104 [12].

Sheet 2

Chart 114 (Sheet 1 of 2)

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* On shelf 8-216, remove static monitoring change \*  
\* over unit C56 [7]. \*  
R \* On circuit breaker panel 1-213, remove safety clip \*  
\* and tag and set circuit breaker PFCS INV GRN FAIL \*  
\* IND 1C73 (Map Ref. M15). \*  
\* On rack connector C56, check that voltage measu- \*  
\* red between pins AA-47 and AA-14 (ground) is 28 \*  
\* VDC. \*  
\*\*\*\*\*

||  
YES NO---| Replace circuit breaker OUTER ELEVON NEUTRLN  
| GRN SUP 1C58 [19].  
|

\*\*\*\*\*  
\* On rack connector C56, check that voltage \*  
\* measured between pins AA-36 and AA-14 \*  
\* (ground) is 28VDC. \*  
\*\*\*\*\*

YES NO---| Replace circuit breaker MID & OUTER ELEVON CONT|  
| & MON GRN SUP 1C55 [18].  
|  
R -----| Replace static monitoring change over unit C56 |  
| [7].  
|

Chart 114 (Sheet 2 of 2)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
 \* WITH FLIGHT CONTROLS IN GREEN \*  
 \* ELECTRICAL MODE, ONE ELEVON LAGS \*  
 \*\*\*\*\*

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
MULTIMETER	_____
CIRCUIT BREAKER	_____
SAFETY CLIPS	_____
ACCESS PLATFORM	_____
3.220 m (10 ft.7 in.)	_____

R

\*\*\*\*\*  
 \* Repeat tests which led to the fault and visually \*  
 \* check that elevon lags. \*  
 \*\*\*\*\*

		Refer to trouble shooting dealing with the elevon position indicating system (Ref. 27-16-00, trouble shooting).
YES	NO---	

\*\*\*\*\*  
 \* On AFCS control unit, disengage AP1 switch. \*  
 \* On overhead panel : \*  
 \* - On AUTOSTAB unit No.1, disengage PITCH and ROLL \*  
 \* switches \*  
 \* - On Flight Control Unit, place ANTI STALL SYSTEM \*  
 \* 1 switch in OFF position, then place O & M ELE- \*  
 \* VONS and IN ELEVONS switches in MECH position \*  
 \* (on ICOVOL indicator (First Officer's instrument \*  
 \* panel) the 6 elevon magnetic indicators must \*  
 \* display M). \*  
 \* Move control column and handwheel ; elevon lags.\*  
 \*\*\*\*\*

R

YES	NO

R

||  
 || Sheet 3

\*\*\*\*\*  
 \* On overhead panel, on SERVO CONTROLS unit, place \*  
 \* upper selector switch in GREEN JAM (BLUE ONLY) \*  
 \* position. \*  
 \*\*\*\*\*

R

\* Move control column and handwheel ; elevon lags \*  
 \*\*\*\*\*

YES	NO

R

||  
 || Sheet 2

Chart 115 (Sheet 1 of 5)

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## MAINTENANCE MANUAL

Continued From

R	Sheet	1		
			*****	
			* Replace Green shuttle valve block on PFCU *	
			* associated with the elevon which lags, C101 *	
R	YES	NO---	* [9], C102 [10], C103 [11], C104 [12], C105 *	
			* [13], or C106 [14]. *	
			* Move control column and handwheel, elevon lags.*	
			*****	
				-----
			YES	NO---  Replaced shuttle valve
				block was faulty.
			-----	
R			Replace PFCU associated with the elevon	
			which lags : C101 [9], C102 [10], C103 [11]	
			C104 [12], C105 [13] or C106 [14].	
			-----	
			*****	
			* On overhead panel, on SERVO CONTROLS unit, place *	
			* upper switch in BLUE JAM (GREEN ONLY) position. *	
			* Move control column and handwheel ; elevon lags *	
			*****	
			*****	
			* Replace Blue shuttle valve block on PFCU *	
			* associated with the elevon which lags C101 *	
R	YES	NO---	* [9], C102 [10], C103 [11], C104 [12], C105 *	
			* [13] or C106 [14]. *	
			*****	
				-----
			YES	NO---  Replaced Blue shuttle
				valve block was faulty
			-----	
R			Replace PFCU associated with the elevon which	
			lags ; C101 [9], C102 [10], C103 [11], C104	
			[12] ; C105 [13] or C106 [14].	
			-----	

Chart 115 (Sheet 2 of 5)

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# Concorde

## MAINTENANCE MANUAL

Continued From  
Sheet 1

R NO--- \*\*\*\*\*  
\* On overhead panel, on Flight Control Unit, \*  
\* place O & M ELEVONS and IN ELEVONS switches \*  
\* in GREEN position, then press and release \*  
\* RESET push buttons on RH side of switches \*  
\* (on IC0VOL indicator (First Officer's \*  
\* instrument panel) the 6 magnetic indicators \*  
\* corresponding to elevons must display G). \*  
\* During actuation of control column and \*  
\* handwheel check on PFCU associated with the \*  
\* elevon which lags that input lever is \*  
\* disengaged. \*  
\* NOTE : For this check, refer to Figure on \*  
\* sheet 5 of 5 of this chart. \*  
\*\*\*\*\*

R NO YES  
R Sheet 4

\*\*\*\*\*  
\* On shelf 8-216, on front face of static monitoring\*  
\* change over unit C56, check that PILOT VALVES \*  
\* GREEN indicator light associated to the elevon \*  
\* which lags, is illuminated. \*  
\*\*\*\*\*

R YES NO--- Replace static monitoring change over unit  
C56 [7].

R \*\*\*\*\*  
\* Replace Green electrovalve on PFCU associated with\*  
\* the elevon which lags ; C101 [9], C102 [10] \*  
\* C103 [11], C104 [12], C105 [13] or C106 [14]. \*  
\* Repeat action on control column and handwheel, and\*  
\* check on PFCU associated with the elevon which \*  
\* lags that input lever is disengaged. \*  
\*\*\*\*\*

R YES NO--- Replace PFCU associated with the elevon which  
lags C101 [9], C102 [10], C103 [11], C104 [12]  
C105 [13], C106 [14].  
-----  
Replaced Green electrovalve was faulty

Chart 115 (Sheet 3 of 5)

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## MAINTENANCE MANUAL

Continued From  
Sheet 3

R

YES

\*\*\*\*\*  
\* Replace autostabilization computer No.1 1C31 \*  
R \* [1] \*  
\* Repeat tests which led to the fault \*  
\* Move control column and handwheel ; elevon lags \*  
\*\*\*\*\*

|| | -----  
YES NO---| Replaced autostabilization computer was faulty |  
|| | -----

R

\*\*\*\*\*  
\* Replace PFCU associated with the elevon which lags\*  
\* C101 [9], C102 [10], C103 [11], C104 [12], \*  
\* C105 [13], or C106 [14] (faulty servo valve) \*  
\* Repeat tests which led to the fault. \*  
\* Move control column and handwheel ; elevon lags \*  
\*\*\*\*\*

|| | -----  
YES NO---| Replaced PFCU was faulty |  
|| | -----

R

\*\*\*\*\*  
\* Check that there is no interference between the \*  
\* two Blue and Green 26 V 1800 Hz generation \*  
\* systems by shutting off the Blue generation system\*  
\* Check the electrical wiring between the elevon \*  
\* which lags and the Flight Controls (control \*  
\* column and handwheel) with reference to the \*  
\* wiring Diagram Manual. \*  
\*\*\*\*\*

Chart 115 (Sheet 4 of 5)

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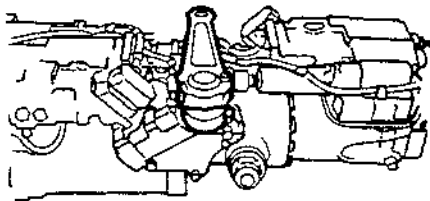
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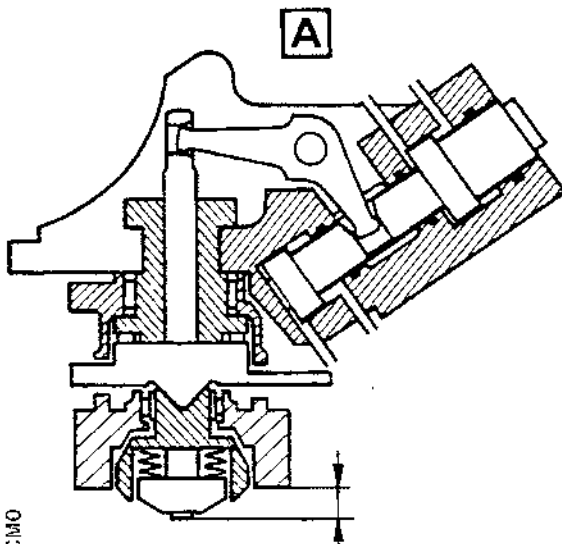
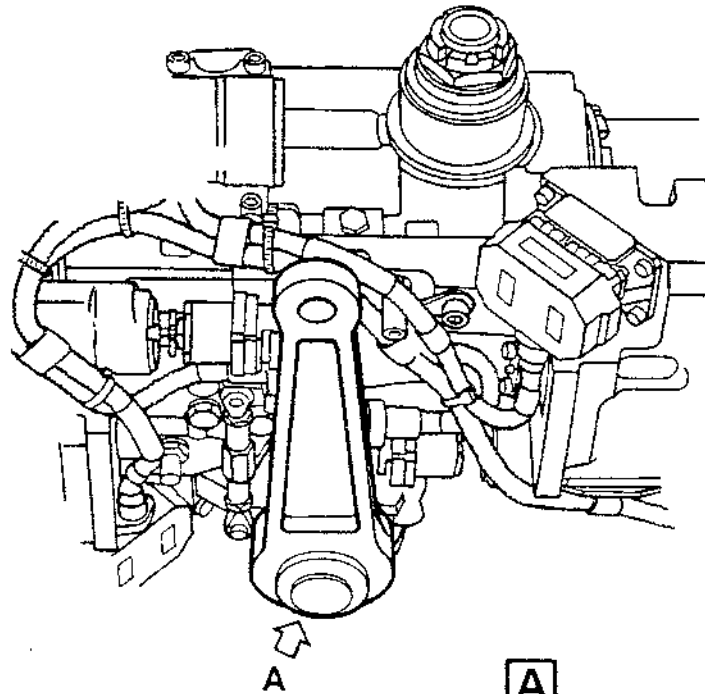
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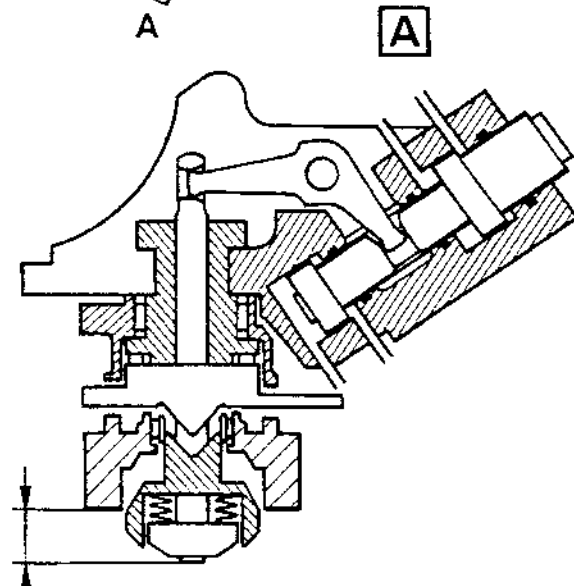
## MAINTENANCE MANUAL



LOCATION



LEVER ENGAGED  
(2 ELECTROVALVES CLOSED)



LEVER DISENGAGED 1 ELECTROVALVE  
(BLUE OR GREEN) OPEN

POWER FLIGHT CONTROL UNIT - ENGAGEMENT/DISENGAGEMENT OF INPUT LEVER

CMA 27 17 00 1 ACMO

Chart 115 (Sheet 5 of 5)  
Figure 102

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## MAINTENANCE MANUAL

*****	
* WITH FLIGHT CONTROLS IN GREEN	* GROUND EQUIPMENT REQUIRED
* ELECTRICAL MODE, THE TWO OUTER AND	* -----
* MIDDLE ELEVONS ON THE SAME WING	* DESCRIPTION PART NO.
* LAG	* -----
*****	* MULTIMETER
	* -----

\*\*\*\*\*  
R \* Check that there is no interference between the \*  
\* two Blue and Green 26 V 1800 Hz generation systems\*  
\* by shutting off the Blue generation system. \*  
\* Check the electrical wiring between the elevons \*  
\* which lag and the Flight Controls (control \*  
\* column and handwheel) with reference to the \*  
\* Wiring Diagram Manual. \*  
\*\*\*\*\*

Chart 116 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
 \* INCORRECT CHANGE OVER TO MECHANICAL\*  
 \* CHANNEL ; ON ICOVOL, THE TWO INNER \*  
 \* ELEVON MAGNETIC INDICATORS STILL \*  
 \* DISPLAY G. \*  
 \*\*\*\*\*

GROUND EQUIPMENT REQUIRED

DESCRIPTION	PART NO.
MULTIMETER	_____
CIRCUIT BREAKER	_____
SAFETY CLIPS	_____

\*\*\*\*\*  
 \* On shelf 8-216, on front panel of static monito- \*  
 \* ring change over unit (C56) L and R, PILOT \*  
 \* VALVE GREEN INNER ELEVONS indicator lights are \*  
 \* illuminated. \*  
 \*\*\*\*\*

YES	NO---	
		No indicator light is illuminated.
		Replace static monitoring change over unit C56 [7]

R

\*\*\*\*\*  
 \* On shelf 8-216, remove static monitoring change \*  
 \* over unit C56 [7]. \*  
 \* On circuit breaker panels 1-213 and 5-213, remove \*  
 \* safety clips and tags and reset circuit breakers \*  
 \* PFCS INV GRN FAIL IND 1C73 and PFCS INV BLUE FAIL \*  
 \* IND 2C73 (Map Ref. M15 and E11). \*  
 \* On rack connector C56, check that voltage \*  
 \* measured between pins AB-35 and AA-14 \*  
 \* (ground), then AB-32 and AA-14 (ground), then AB- \*  
 \* 32 and AA-14 (ground) is 28VDC. \*  
 \*\*\*\*\*

YES	NO---	
		Replace Flight Control Unit C57 [8].

R

		Replace static monitoring change over unit C56 [7].
--	--	---

R

Chart 117 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****		GROUND EQUIPMENT REQUIRED
* INCORRECT CHANGE OVER TO MECHANICAL*		
* CHANNEL ; ON ICOVOL INDICATOR THE 4*		
* OUTER AND MIDDLE ELEVON MAGNETIC *	DESCRIPTION	PART NO.
* INDICATORS STILL DISPLAY G. *		
*****		MULTIMETER
		CIRCUIT BREAKER
		SAFETY CLIPS

\*\*\*\*\*  
 \* On shelf 8-216, on front panel of static monitor- \*  
 \* ing change over unit C56 PILOT VALVES GREEN - \*  
 \* OUTER ELEVONS and MIDDLE ELEVONS indicator lights \*  
 \* are illuminated. \*

*****		
		No indicator light is illuminated.
R	YES	NO---  Replace static monitoring change over unit C56
		[7].

\*\*\*\*\*  
 \* On shelf 8-216, remove static monitoring change \*  
 \* over unit C56 [7]. \*  
 \* On circuit breaker panels 1-213 and 5-213, remove \*  
 \* safety clips and tags and set circuit breakers PFCS\*  
 \* INV GRN FAIL IND 1C73 and PFCS INV BLUE FAIL IND \*  
 \* 2C73 (Map Ref. 2C73 M15 and E11). \*  
 \* On rack connector C56, check that voltage measu- \*  
 \* red between pins AA-35 and AA-14 (ground), then \*  
 \* AA-32 and AA-14 (ground) is 28VDC. \*

*****		
R	YES	NO---  Replace Flight Control Unit C57 [8].
R		Replace static monitoring change over unit C56
		[7].

Chart 118 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

```
*****
* CHANNEL CHANGE OVER FOR OUTER AND * | GROUND EQUIPMENT REQUIRED
* MIDDLE ELEVONS WITH COMPARISON WARN* |
* ING ; ON ICOVOL INDICATOR THE 4 * | DESCRIPTION PART NO.
* OUTER AND MIDDLE ELEVON MAGNETIC * |
* INDICATORS DISPLAY G (OR M) AND THE* | FLIGHT CONTROLS
* 4 RED WARNING LIGHTS ARE ILLUMINA-* | ELECTRICAL CIRCUITS
* TED. * | TEST SET 31-56-100
*****
```

```
*****
* Channel change over occurs only when Flight Cont- *
* rols are actuated rapidly. *
*****
```

R		YES--	Connect Flight Controls Electrical Circuits Test Set (31-56-100) and check outer and middle elevon PFCU linear transducers for correct operation by performing the first test series. Ref. 27-10-00, Trouble shooting
	NO		

```
*****
* During test, outer elevons remain at neutral before*
* channel change over. *
*****
```

R		YES--	Confirm fault of Blue neutralization computer 2C45 [6] by checking that a neutralization control signal is sent to control channel (galvanometers not at zero and LOGICS-C lamp illuminated on front panel of computer) then : Replace Blue neutralization computer 2C45 [6]
	NO		

```
*****
* On shelf 8-216, on front panel of Blue neutraliza-*
* tion computer 2C45, LOGICS-M lamp is illuminated. *
*****
```

R		YES--	Replace Blue neutralization computer 2C45 [6].
	NO		
R	-----		Replace Blue monitoring comparator 2C48 [4].

Chart 119 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****		
* CHANNEL CHANGE OVER FOR OUTER AND	*	GROUND EQUIPMENT REQUIRED
* MIDDLE ELEVONS WITH COMPARISON WARN	*	-----
* ING ; ON ICOVOL INDICATOR THE 4	*	DESCRIPTION PART NO.
* OUTER AND MIDDLE ELEVON MAGNETIC	*	-----
* INDICATORS DISPLAY M AND THE 4	*	FLIGHT CONTROLS
* RED WARNING LIGHTS ARE ILLUMINATED	*	ELECTRICAL CIRCUITS
*****		
	TEST SET	31-56-100
-----		

\*\*\*\*\*  
\* Channel change over occurs only when Flight Cont- \*  
\* rols are actuated rapidly. \*  
\*\*\*\*\*

-----		
		Connect Flight Controls Electrical Circuits
		test set (31-56-100) and check linear transdu-
		cers of outer and middle PFCUs for correct
		operation by performing the first test series.
		Ref. 27-10-00, Trouble shooting
-----		

\*\*\*\*\*  
\* During test, outer elevons remain at neutral before\*  
\* channel change over. \*  
\*\*\*\*\*

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\*\*\*\*\*  
\* On shelf 8-216, on front panel of Green neutraliza-\*  
\* tion computer 1C45 LOGICS-M lamp is illuminated. \*  
\*\*\*\*\*

			-----
R	NO	YES--	Replace Green neutralization computer 1C45 [5]
			-----
			-----
R	-----		Replace Green monitoring comparator 1C48 [3].
			-----

Chart 120 (Sheet 1 of 1)

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	ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
						MAINT. TOPIC	WIRING DIAGRAM
R	[1] Autostabilization computer No.1	215-AS	8-215	1C31	Electronics rack-LH	22-22-11 R/I	27-36-01
R	[2] Autostabilization computer No.2	216-AS	8-216	2C31	Electronics rack-RH	22-22-11 R/I	27-36-02
R	[3] Green monitoring comparator	215-AS	8-215	1C48	Electronics rack-LH	27-37-11 R/I	27-37-03 27-37-05
R	[4] Blue monitoring comparator	216-AS	8-216	2C48	Electronics rack-RH	27-37-11 R/I	27-37-04 27-37-06
R	[5] Green neutralization computer	215-AS	8-215	1C45	Electronics rack-LH	27-36-16 R/I	27-36-01
R	[6] Blue neutralization computer	216-AS	8-216	2C45	Electronics rack-RH	27-36-16 R/I	27-36-02
R	[7] Static monitoring change over unit	216-AS	8-216	C56	Electronics rack RH	27-37-12 R/I	27-37-01 27-37-02
R	[8] Flight control unit	-	4-211	C57	Overhead panel	27-36-15 R/I	27-37-01 27-37-02
R	[9] Power flight control unit	653-JB	653	C101	Under wing	27-34-52 R/I	27-36-01 27-36-02
	[10] Power flight control unit	553-JB	553	C102	Under wing	27-34-52 R/I	27-36-01 27-36-02
	[11] Power flight control unit	652-JB	652	C103	Under wing	27-34-52 R/I	27-36-01 27-36-02

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ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[12] Power Flight Control unit	552-JB	552	C104	Under wing	27-34-52 R/I	27-36-01 27-36-02
[13] Power flight control unit	651-JB	651	C105	Under wing	27-34-53 R/I	27-36-01 27-36-02
[14] Power flight control unit	551-JB	551	C106	Under wing	27-34-53 R/I	27-36-01 27-36-02
[15] Pitch synchro pack	121-FB	121	1C96 2C96	Under flight compartment floor	27-36-11 R/I	27-36-01 27-36-02 27-37-0X
[16] Roll synchro pack	121-FB	121	1C98 2C98 1C100 2C100	Under flight compartment floor	27-16-11 R/I	27-36-01 27-36-02 27-37-0X
[17] Circuit breaker		1-213	1C53	Map Ref. M 11	27-50-00 R/I	27-37-02 27-37-05
[18] Circuit breaker		1-213	1C55	Map Ref. M 12	24-50-00 R/I	27-37-01 27-37-03
[19] Circuit breaker		1-213	1C58	Map Ref. M 13	24-50-00 R/I	27-37-01 27-37-03
[20] Circuit breaker		1-213	1C59	Map Ref. M 14	24-50-00 R/I	27-37-02 27-37-05
[21] Circuit breaker		2-213	2C44	Map Ref. C 1	24-50-00 R/I	27-36-02 27-37-04
[22] Circuit breaker		2-213	2C94	Map Ref. C 2	24-50-00 R/I	27-36-02 27-37-06
[23] Circuit breaker		2-213	2C93	Map Ref. C 3	24-50-00 R/I	27-36-02 27-37-04

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ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL / ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[24] Circuit breaker		2-213	2C92	Map Ref. C 4	24-50-00 R/I	27-36-02 27-37-04
[25] Circuit breaker		2-213	2C47	Map Ref. D 1	24-50-00 R/I	27-37-06
[26] Circuit breaker		2-213	2C46	Map Ref. D 2	24-50-00 R/I	27-37-04
[27] Circuit breaker		2-213	1C47	Map Ref. G 1	24-50-00 R/I	27-37-05
[28] Circuit breaker		2-213	1C46	Map Ref. G 2	24-50-00 R/I	27-37-05
[29] Circuit breaker		2-213	1C44	Map Ref. E 1	24-50-00 R/I	27-36-01 27-37-03
[30] Circuit breaker		2-213	1C94	Map Ref. F 1	24-50-00 R/I	27-36-01 27-37-05
[31] Circuit breaker		2-213	1C93	Map Ref. F 2	24-50-00 R/I	27-36-01 27-37-03
[32] Circuit breaker		2-213	1C92	Map Ref. H 5	24-50-00 R/I	27-36-01 27-37-03
[33] Circuit breaker		5-213	2C53	Map Ref. D11	24-50-00 R/I	27-37-02 27-37-06
[34] Circuit breaker		5-213	2C55	Map Ref. D12	24-50-00 R/I	27-37-01 27-37-04
[35] Circuit breaker		5-213	2C58	Map Ref. D13	24-50-00 R/I	27-37-01 27-37-04
[36] Circuit breaker		5-213	2C59	Map Ref. D14	24-50-00 R/I	27-37-02 27-37-06

Component Identification  
Table 101

D. Close Up

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Carry out close up operations of Procedure to set Flight  
Controls in electrical mode  
(Ref. 27-00-00, Servicing).

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### 3. Trouble Shooting of Outer Elevon Neutralization System

#### A. General

The following trouble shooting is carried out assuming that :

- Blue and Green electrical channels operate correctly on outer and middle elevons. (An electrical channel change over, caused by an incorrect neutralization command on control or monitoring channel and resulting in a comparison warning on ICOVOL indicator, is dealt with in previous paragraph 2 : Trouble shooting of Elevon Flight Control Electrical Channels).
- Air data system operates correctly. (If not, Ref. 34-11-00, Trouble Shooting).
- Interconnections between autostabilization (Pitch and Roll) computer, neutralization computer and elevon monitoring comparator are not checked during this Trouble shooting as data computation is checked during Autostabilization/open lanes trouble shooting ; thus only the wiring between these computers can be suspected. (1 autostabilization/pitch control line, 1 autostabilization/pitch monitoring line, 1 autostabilization roll control line, 1 autostabilization roll monitoring line) (For each neutralization sub-system).

The following trouble shooting is divided in two parts :

First part : Trouble shooting using front panel of neutralization computers

Self-test of neutralization computer checks control and monitoring logic circuitry of computer and control and monitoring analog circuitry (in monitoring comparator).

NOTE : Tests being identical for both neutralization computers, they will be described only once for the BLUE neutralization computer. Description or electrical identification of corresponding components of GREEN neutralization computer is indicated in parentheses.

Second part : Trouble shooting of ADC interconnections with neutralization computers.

Test carried out with "pressure sensors simulator" or "air data system pressure generator" checks "Vc - VM0" and ADC warning outputs to the neutralization computers.

#### B. Prepare

##### (1) Equipment and Materials

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	DESCRIPTION	PART NO.
R	Simulator - Pressure Sensors or	87-209-455
R	Pressure Generator - Air Data System	
R	2 Adapters Pitot Tube	853BFT025
R R	2 Blanking Plugs - Pitot Tube Drain Port	853BFT026
R	2 Adapters - Static Ports	T8751E22783002
	(2) Take the precautions described in the previous WARNING paragraph.	
	(3) Set Flight Controls in Blue electrical mode (Ref. 27-00-00, Servicing).	
R	(4) On PITCH TRIM wheel (centre console) select 4 degrees approximately. On ICOVOL indicator (First Officer's instrument panel) pointers corresponding to elevons must indicate 4 degrees approximately.	
	(5) On ADC control panel (centre console) make certain that the two ADC1 and ADC2 switches are in OFF position and that TEST switches are in NORM position.	
	<u>NOTE</u> : Preparation required for first part of trouble shooting is finished.	
	(6) On Captain's and First Officer's instrument panels altimeters and airspeed indicators, make certain that mode selector switches are in N (Normal) position.	
	(7) Make certain that the following circuit breakers are set :	

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW "A" SYS SUP	1-213	G 292	M17
ADC1 28V SUP		1F 74	P12

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## MAINTENANCE MANUAL

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
1ST PLT ADC INST SUP	2-213	1F 75	B 3
ADC1 26V SUP		1F 78	A 2
ADC1 115V SUP		1F 73	F 3
RH UC WEIGHT SW "B" SYS SUP	3-213	G 294	B 9
ADC2 28V SUP	5-213	2F 74	F12
2ND PLT ADC INST SUP	13-216	2F 75	A14
ADC2 26V SUP		2F 78	F14
NAV INST BUS 13XS		X 345	G 4
ADC2 115V SUP		2F 73	F15

(8) According to equipment used :

R  
R

- (a) Connect pressure sensor simulator to front panel of ADC 1 (1F71) (on shelf 6-215). Make certain that :
- SIMUL - SENSOR switch is in SENSOR position
  - ALTITUDE COARSE potentiometer is set to 1013
  - AIRSPEED COARSE potentiometer is set to 4
- or :
- (b) Connect pressure generator to static ports and pitot tubes, ADC1 and ADC2 systems ; make certain that generator is placed in ARRET position, pipes venting to atmosphere.

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### C. Trouble Shooting, using front panel of neutralization computers.

\*\*\*\*\*  
 \* Make certain that operations described in Prepare \*  
 \* paragraphs (2), (3), (4) and (5) have been carried \*  
 \* out. \*  
 \* On shelf 8-216 (8-215), on front panel of Blue \*  
 \* neutralization computer 2C45 (green 1C45). \*  
 \* - Check that ADC1 and ADC2 switches are in OFF \*  
 \* position. \*  
 \* - Place and hold TEST-LT-TEST switch in LT TEST \*  
 \* position. \*  
 \* LOGICS, C and M indicator lights must illuminate \*  
 \*\*\*\*\*

R	OK	NOT OK--	Light test inconclusive : one indicator light does not illuminate. Replace Blue neutralization computer 2C45 [2] (Green 1C45 [1]).
	OK	NOT OK--	Light test inconclusive : the two indicator lights do not illuminate. Ref. Chart 121

\*\*\*\*\*  
 \* 1°) Place and hold TEST-LT TEST switch in TEST \*  
 \* position. \*  
 \* LOGICS, C and M indicator lights must go off. \*  
 \* 2°) Place ADC1 switch in Vc > VMO position. \*  
 \* - LOGICS, C and M indicator lights must illuminate.\*  
 \* - Pointers of the two galvanometers must deflect \*  
 \* in opposite direction by a value of 4 degrees ap-\*  
 \* prox. \*  
 \* - On ICOVOL indicator (First Officer's instrument \*  
 \* panel) outer elevons pointers must return to zero\*  
 \*\*\*\*\*

R R	OK	NOT OK--	No indicator light illuminates and pointers of the two galvanometers do not deflect. Replace Blue neutralization computer 2C45 [2] (Green 1C45 [1]).
	OK	NOT OK--	Incorrect indication on front panel of neutralization computer without channel change over for outer and middle elevons. Replace Blue neutralization computer 2C45 [2] (Green 1C45 [1]).

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OK

NOT OK--

Channel change over from Blue to Green (Green to mechanical) with PFC warning, gong and comparison warning on ICOVOL indicator, all indications on front panel of neutralization computer being correct.

Ref. Chart 122

OK

NOT OK--

Channel change over from Blue to Green (Green to mechanical) with PFC warning, gong and comparison warning on ICOVOL indicator, one or several indications on front panel of neutralization computer being incorrect.

Ref. Chart 123

\*\*\*\*\*  
\* Place ADC1 switch in OFF position. \*  
\* - LOGICS, C and M indicator lights must go off. \*  
\* - Pointers of both galvanometers must return to \*  
\* zero \*  
\* - On ICOVOL indicator, outer eleven pointers must \*  
\* return to trimmed position (+ 4 degrees). \*  
\*\*\*\*\*

OK

NOT OK--

Channel change over from Blue to Green (Green to mechanical) with PFC warning, gong and comparison warning on ICOVOL indicator, all indications on front panel of neutralization computer being correct.

Ref. Chart 124

OK

NOT OK--

Channel change over from Blue to Green (Green to mechanical) with PFC warning, gong and comparison warning on ICOVOL indicator, one or several indications on front panel of neutralization computer being incorrect.

Replace Blue monitoring comparator 2C48 [4] (Green 1C48 [3]).

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||  
OK  
||

\*\*\*\*\*  
\* Place ADC2 switch in Vc > VMD position \*  
\* - LOGICS, C and M indicator lights must illuminate \*  
\* - Pointers of both galvanometers must deflect in \*  
\* opposite direction by a value of 4 degrees approx\*  
\* - On ICOVOL indicator, outer elevon pointers must \*  
\* return to zero. \*  
\*\*\*\*\*

R R			Incorrect indication on front panel of neutrali zation computer or on ICOVOL indicator.
	OK	NOT OK--	Replace Blue neutralization computer 2C45 [2] (Green 1C45 [1]).

\*\*\*\*\*  
\* Place ADC2 switch in OFF position. \*  
\* - LOGICS, C and M indicator lights must go off. \*  
\* - Pointers of both galvanometers must return to \*  
\* zero. \*  
\* - On ICOVOL indicator, pointers of outer elevons \*  
\* must return to trimmed position (+ 4 degrees). \*  
\*\*\*\*\*

R R			Incorrect indication on front panel of neutrali zation computer or on ICOVOL indicator.
	OK	NOT OK--	Replace Blue neutralization computer 2C45 [2] (Green 1C45 [1]).

\*\*\*\*\*  
\* Place ADC1 and ADC2 switches in ON position. \*  
\* - LOGICS, C and M indicator lights must remain off\*  
\* - Pointers of both galvanometers must remain at \*  
\* zero. \*  
\* - On ICOVOL indicator, pointers of outer elevons \*  
\* must indicate trimmed position (+ 4 degrees). \*  
\*\*\*\*\*

R R			Incorrect indication on front panel of neutrali zation computer or on ICOVOL indicator.
	OK	NOT OK--	Replace Blue neutralization computer 2C45 [2] (Green 1C45 [1]).

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||  
OK  
||

\*\*\*\*\*

- \* Place ADC1 switch in Vc > VMD position. \*
- \* - LOGICS, C and M indicator lights must remain off \*
- \* - Pointers of both galvanometers must remain at \*
- \* zero. \*
- \* - On ICOVOL indicator pointers of outer elevons \*
- \* must indicate trimmed position (+ 4 degrees). \*

\*\*\*\*\*

R  
R

||  
OK  
||

NOT OK--

-----  
Incorrect indication on front panel of neutrali  
zation computer or on ICOVOL indicator.  
Replace Blue neutralization computer 2C45 [2]  
(Green 1C45 [1]).  
-----

\*\*\*\*\*

- \* Place ADC2 switch in Vc > VMD position. \*
- \* - LOGICS, C and M indicator lights must illuminate. \*
- \* - Pointers of both galvanometers must indicate 4 \*
- \* degrees approximately. \*
- \* - On ICOVOL indicator, pointers of outer elevons \*
- \* must return to zero. \*

\*\*\*\*\*

R

||  
OK  
||

NOT OK--

-----  
Incorrect indication on front panel of neutrali  
zation computer or on ICOVOL indicator.  
Replace Blue neutralization computer 2C45  
[2] (Green 1C45 [1]).  
-----

\*\*\*\*\*

- \* Place ADC2 switch in ON position. \*
- \* - LOGICS, C and M indicator lights must remain \*
- \* illuminated. \*
- \* - Pointers of both galvanometers and those of outer \*
- \* elevons on ICOVOL indicator must not deflect. \*

\*\*\*\*\*

R

||  
OK  
||

NOT OK--

-----  
Incorrect indication on front panel of neutrali  
zation computer or on ICOVOL indicator.  
Replace Blue neutralization computer 2C45  
[2] (Green 1C45 [1]).  
-----

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*

\* Place ADC2 switch in Vc > VM0 position. \*

\* - LOGICS, C and M indicator lights must remain \*

\* illuminated. \*

R \* - Pointers of both galvanometers and those of \*

\* outer elevons on ICOVOL indicator must not deflect\*

\*\*\*\*\*

R			Incorrect indication on front panel of neutrali zation computer or on ICOVOL indicator.
R	OK	NOT OK--	Replace Blue neutralization computer 2C45 [2] (Green 1C45 [1]).

\*\*\*\*\*

\* Place ADC1 switch in ON position. \*

\* - LOGICS, C and M indicator lights must remain \*

\* illuminated. \*

\* - Pointers of both galvanometers and those of outer\*

\* elevons on ICOVOL indicator must not deflect. \*

\*\*\*\*\*

R			Incorrect indication on front panel of neutrali zation computer or on ICOVOL indicator.
R	OK	NOT OK--	Replace Blue neutralization computer 2C45 [2] (Green 1C45 [1]).

\*\*\*\*\*

\* Place ADC2 switch in ON position. \*

\* - LOGICS, C and M indicator lights must go off \*

\* - Pointers of both galvanometers must return to \*

\* zero. \*

\* - On ICOVOL indicator, pointers of outer elevons \*

\* must return to trimmed position (+ 4 degrees). \*

\*\*\*\*\*

R			Incorrect indication on front panel of neutrali zation computer or on ICOVOL indicator.
R	OK	NOT OK--	Replace Blue neutralization computer 2C45 [2] (Green 1C45 [1]).

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* Place ADC1 and ADC2 switches in OFF position. \*  
\* Release TEST-LT TEST switch. \*  
\* On overhead panel, on Flight Control Unit, place \*  
\* O & M ELEVONS switches in GREEN position. \*  
\* Repeat tests described above, following indications\*  
\* given in parentheses. \*  
\*\*\*\*\*

||  
OK  
||

\*\*\*\*\*  
\* End of trouble shooting using front panel of \*  
\* neutralization computers. \*  
\*\*\*\*\*

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* LIGHT TEST INCONCLUSIVE : THE TWO \*  
\* INDICATOR LIGHTS DO NOT ILLUMINATE \*  
\*\*\*\*\*

GROUND EQUIPMENT REQUIRED

DESCRIPTION PART NO.

MULTIMETER  
CIRCUIT BREAKER  
SAFETY CLIPS

\*\*\*\*\*  
\* On shelf 8-216 (8-215), remove Blue neutralization \*  
\* computer 2C45 [2] (Green 1C45 [1]). \*  
\* Remove safety clips and tags and set circuit \*  
\* breakers listed in 27-36-16, Removal/Installation. \*  
\* On rack connector 2C45 (1C45), voltage measured \*  
\* between pins AA-3 and AA-1 (ground) must be 28VDC. \*  
\*\*\*\*\*

R	YES	NO---	Replace circuit breaker OUTER ELEVON NEUTRLN BLUE SUP 2 C58 [10] (GRN SUP 1 C58 [9]).
R			
R			Replace Blue neutralization computer 2C45 [2] (Green 1C45 [1]).

Chart 121 (Sheet 1 of 1)

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# MAINTENANCE MANUAL

```
*****-----  
*****  
* Repeat tests which led to the fault and check on *  
* ICOVOL indicator that the two outer elevons tend to*  
* return to zero before change over to Green *  
* (Mechanical) channel. *  
*****
```

```

*****
* 1 outer elevon does not tend to return to zero *
R * Replace autostabilization computer No.2 2C31 [6] *
R * (No.1 1C31 [5]). *
* Repeat tests which led to the fault. *
* On ICOVOL indicator, pointers of outer elevons *
* return to zero. *
*****
|| | -----
NO YES--[ Replaced autostabilization computer was faulty.]

```

Sheet 2

# *Concorde*

## MAINTENANCE MANUAL

||  
NO  
||

\*\*\*\*\*  
\* Make certain that outer and middle elevons are in \*  
\* Blue (Green) electrical channel by actuating \*  
\* Flight Controls in Emergency Flight Control mode \*  
\* as described previously in paragraph 2 : Trouble \*  
\* Shooting of elevon Flight Control electrical \*  
\* channels, then check connections between neutrali- \*  
\* zation computer and autostabilization computer \*  
\* Ref. WDM. 27-36-02 (27-36-01) \*  
\*\*\*\*\*

Chart 122 (Sheet 2 of 2)

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R

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# Concorde

## MAINTENANCE MANUAL

\*\*\*\*\*

\* CHANNEL CHANGE OVER FROM BLUE TO  
\* GREEN (GREEN TO MECHANICAL) WITH  
\* PFC WARNING, GONG AND COMPARISON  
\* WARNING ON ICOVOL INDICATOR, ONE  
\* OR SEVERAL INDICATIONS ON FRONT  
\* PANEL OF NEUTRALIZATION COMPUTER  
\* BEING INCORRECT.

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
MULTIMETER	
CIRCUIT BREAKER	
SAFETY CLIPS	

\*\*\*\*\*

\*\*\*\*\*

R \* On shelf 8-216 (8-215), remove Blue neutralization \*  
\* computer 2 C45 [2] (Green 1 C45 [1]). \*  
\* Remove safety clips and tags and set circuit \*  
\* breakers listed in 27-36-16, Removal/Installation \*  
\* On rack connector 2 C45 (1 C45), voltage measured \*  
\* between pins AA-7 and AA-1 (ground) must be 28VDC. \*

\*\*\*\*\*

YES	NO---	
		Replace circuit breaker MID & OUTER ELEVON CONT & MON BLUE SUP 2 C55 [12] (GREEN SUP 1 C55[11])
		Replace Blue neutralization computer 2 C45 [2] (Green 1 C45 [1]).

R  
R

Chart 123 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

```

*****
* CHANNEL CHANGE OVER FROM BLUE TO * | GROUND EQUIPMENT REQUIRED |
* GREEN (GREEN TO MECHANICAL) WITH * |-----|
* PFC WARNING, GONG AND COMPARISON * | DESCRIPTION          PART NO. |
* WARNING ON ICOVOL INDICATOR, ALL * |-----|
* INDICATIONS OF FRONT PANEL OF NEUT-* |
* RALIZATION COMPUTER BEING CORRECT. * |-----|
*****

```

```

*****
* On overhead panel, on Flight Control Unit, press *
* and release O & M ELEVONS-RESET push button. *
* During reset, one outer elevon tends to return to *
* zero (indication on ICOVOL indicator). *
*****

```

R				
R	YES	NO---	Replace Blue monitoring comparator 2 C48 [4]	
			(Green 1 C48 [3]).	
R	-----		Replace Blue neutralization computer 2 C45 [2]	
R			(Green 1 C45 [1]).	

Chart 124 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

### D. Trouble Shooting of Air Data Computer Interconnections with Neutralization Computers

\*\*\*\*\*  
\* Make certain that operations of Prepare paragraphs \*  
\* (6), (7) and (8) have been carried out. \*  
\* On overhead panel, on Flight Control Unit, place \*  
\* O & M ELEVONS switch in BLUE position then press \*  
\* and release O & M ELEVONS-RESET push button. \*  
\* On ICOVOL indicator (First Officer's instrument \*  
\* panel) check that outer and middle elevon magne- \*  
\* tic indicators display B and that pointers \*  
\* indicate 4 degrees approximately. \*  
\* On ADC control panel (centre console), place ADC1 \*  
\* switch in ON position. \*  
\* Depending on the equipment used : \*  
\* (a) On pressure sensors simulator, place SIMUL SEN- \*  
\* -SOR switch in SIMUL position then set ALTITUDE \*  
\* and AIRSPEED potentiometers so as to display 695 \*  
\* on ALTITUDE and 284 on AIRSPEED. \*  
\* or, \*  
\* (b) Operate pressure generator and apply a 695 mb \*  
\* (10.080 PSI) absolute pressure to the static \*  
\* pressure system and a 284 mb (4.119 PSI) pressure \*  
\* difference ( $\Delta P$ ) to the total pressure system. \*  
\* On ADC control panel, press and release amber ADC1 \*  
\* warning light ; it must go off. \*  
\* On Captain's instrument panel airspeed indicator, \*  
\* Vc and VMO pointers must indicate 400 Kts approx. \*  
\* Slowly (to avoid triggering ADC1 warning) increase \*  
\* value of AIRSPEED potentiometer on simulator, or \*  
\* value of pressure difference ( $\Delta P$ ) on pressure \*  
\* generator in order to increase difference Vc-VMO. \*  
\* When this difference becomes greater than 25 Kts, \*  
\* outer elevons must return to zero (indication on \*  
\* ICOVOL indicator) ( a Vc-VMO difference greater \*  
\* than 40 Kts will be displayed in order to go \*  
\* beyond instrument and reading tolerance limits). \*  
\*\*\*\*\*

OK

NOT OK-

No neutralization of outer elevons  
Ref. Chart 125

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* On ADC control panel, place ADC1 TEST switch in \*  
\* MON position : Blue TEST indicator light and amber \*  
\* ADC1 warning light must illuminate and on \*  
\* Captain's instruments panel, flags must be visible \*  
R \* on instruments connected to ADC 1 (do not take \*  
\* other warnings related to ADC1 Test monitor func- \*  
\* tion into account). \*  
\* When ADC1 warning is set off, pointers of outer \*  
\* elevons on ICOVOL indicator must return to trimmed \*  
\* position (+ 4 degrees). \*  
\*\*\*\*\*

||  
OK  
||

NOT OK--

-----  
Outer elevon neutralization is no longer inhibi-  
-ted when ADC1 warning is set off.  
Replace Blue neutralization computer 2 C45 [2]  
-----

\*\*\*\*\*  
\* On overhead panel, on Flight Control Unit, place \*  
\* O & M ELEVONS switch in GREEN position : On ICOVOL \*  
\* indicator check that outer and middle elevon magne- \*  
\* tic indicators display G. \*  
\* On ADC control panel, place ADC1 TEST switch in \*  
\* NORM position then press and release amber ADC1 \*  
\* warning light ; it must go off. \*  
\* Check on Captain's instrument panel airspeed indi- \*  
\* cator that Vc-VM0 value (difference between the \*  
\* two pointers) is still greater than 25 Kts. \*  
\* On ICOVOL indicator outer elevons must return to \*  
\* zero. \*  
\* (If required, a Vc-VM0 difference greater than \*  
\* 40 Kts will be displayed in order to go beyond \*  
\* instrument and reading tolerance limits). \*  
\*\*\*\*\*

||  
OK  
||

NOT OK--

-----  
No neutralization of outer elevons  
Ref. Chart 126  
-----

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# Concorde

## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* On ADC control panel, place ADC1 TEST switch in \*  
\* MON position ; Blue TEST indicator light and amber \*  
\* ADC1 warning light must illuminate and on \*  
\* Captain's instrument panel, flags must be visible \*  
R \* on instruments connected to ADC 1 (do not take \*  
\* other warnings related to ADC1 Test monitor func- \*  
\* tion into account). \*  
\* When ADC1 alarm is set off, pointers of outer \*  
\* elevons on ICOVOL indicator must return to trimmed \*  
\* position (+ 4 degrees). \*  
\*\*\*\*\*

||  
OK  
||

NOT OK--

-----  
Outer elevon neutralization is no longer inhibi-  
-ted when ADC1 warning is set off.  
Replace Green neutralization computer 1C45 [1]  
-----

\*\*\*\*\*  
\* On overhead panel, on Flight Control Unit, place O \*  
\* & M ELEVONS switch in BLUE position then press and \*  
\* release O & M ELEVONS RESET push button. On ICOVOL \*  
\* indicator outer and middle elevons magnetic indica- \*  
\* tors must display B and corresponding pointers \*  
\* must indicate 4 degrees. On ADC control panel \*  
\* place ADC1 switch in OFF position, then depending \*  
\* on the equipment used : \*  
\* (a) Disconnect pressure sensors simulator from ADC1 \*  
\* and on shelf 6-216 connect simulator on Front \*  
\* panel of ADC2 then set AIRSPEED potentiometer to \*  
\* 284, or \*  
\* (b) Using pressure generator, set pressure differen- \*  
\* -ce ( $\Delta P$ ) to 284 mb (4.119 PSI) on total pressure \*  
\* system. \*  
\* On ADC control panel place ADC2 switch in ON posi- \*  
\* tion then after 30 seconds approximately press \*  
\* and release amber ADC2 warning light ; it must go \*  
\* off. \*  
\* Reading Vc-VM0 difference on airspeed indicator \*  
\* of First Officer's instrument panel, repeat \*  
\* operations described previously : On ICOVOL indi- \*  
\* cator, outer elevon pointers must return to zero. \*  
\*\*\*\*\*

||  
OK  
||

NOT OK--

-----  
No neutralization of outer elevons  
Ref. Chart 127  
-----

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* On ADC control panel, place ADC2 TEST switch in \*  
\* MON position : Blue TEST indicator lights and amber\*  
\* ADC2 warning light must illuminate and on First \*  
\* Officer's instrument panel, flags must be visible \*  
\* on instruments connected to ADC2 (Do not take other\*  
\* warnings related to ADC2 Test monitor function \*  
\* into account) \*  
\* When ADC2 warning is set off, pointers of outer \*  
\* elevons on ICOVOL indicator must return to trimmed \*  
\* position (+ 4 degrees). \*  
\*\*\*\*\*

R			-----
	OK	NOT OK--	Outer elevon neutralization is no longer inhibi- -ted when ADC2 warning is set off. Replace Blue neutralization computer 2 C45 [2]
			-----

\*\*\*\*\*  
\* On overhead panel, on Flight Control Unit, place \*  
\* O & M ELEVONS switch in GREEN position : On ICOVOL \*  
\* indicator check that outer and middle elevon magne-\*  
\* tic indicators display G. \*  
\* On ADC control unit, place ADC2 TEST switch in \*  
\* NORM position then press and release amber ADC2 \*  
\* warning light ; it must go off. \*  
\* Check on First Officer's instrument panel airspeed \*  
\* indicator that Vc-VM0 value (difference between \*  
\* the two pointers) is still greater than 25 Kts. \*  
\* On ICOVOL indicator outer elevons must return to \*  
\* zero. \*  
\* (If required, a Vc-VM0 difference greater than \*  
\* 40 Kts will be displayed in order to go beyond \*  
\* instrument and reading tolerance limits). \*  
\*\*\*\*\*

		-----
OK	NOT OK--	No neutralization of outer elevons Ref. Chart 128
		-----

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* On ADC control panel, place ADC2 TEST switch \*  
\* in MON position : Blue TEST indicator light \*  
\* and amber ADC2 warning light must illuminate and \*  
\* on First Officer's instrument panel flags must be \*  
\* visible on instruments connected to ADC2 (do not \*  
\* take other warnings related to ADC2 Test monitor \*  
\* function into account). \*  
\* When ADC2 warning is set off, outer elevon \*  
\* pointers on IC0VOL indicator must return to \*  
\* trimmed position (+ 4 degrees). \*  
\*\*\*\*\*

R

		Outer elevon neutralization is no longer inhibited when ADC warning is set off.
OK	NOT OK--	Replace Green neutralization computer 1C45 [11]

\*\*\*\*\*  
\* On ADC control panel, place ADC2 TEST switch in \*  
\* NORM position. \*  
\* Depending on the equipment used : \*  
\* (a) On pressure sensors simulator \*  
\* - Set ALTITUDE potentiometer to 1013 \*  
\* - Set AIRSPEED potentiometer to 4 \*  
\* - Place SIMUL-SENSOR switch in SENSOR position \*  
\* or : \*  
\* (b) On pressure generator slowly set static pressure and total pressure systems to ambient atmospheric pressure. \*  
\* On ADC control panel place ADC2 switch in OFF position. \*  
\* End of outer elevon neutralization system trouble shooting. \*  
\*\*\*\*\*

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# Concorde

## MAINTENANCE MANUAL

\*\*\*\*\*  
\* NO NEUTRALIZATION OF OUTER ELEVONS \*  
\*\*\*\*\*

GROUND EQUIPMENT REQUIRED

DESCRIPTION PART NO.

MULTIMETER

CIRCUIT BREAKER

SAFETY CLIPS

\*\*\*\*\*

\* On shelf 8-216, remove Blue neutralization compu-

R \* ter 2 C45 [2]

\* On rack connector 2 C45-AA, voltage measured

\* between pins 35 and 1 (ground) must be greater

\* than +5.25 VDC.

\*\*\*\*\*

\*\*\*\*\*

YES NO---\* Check continuity between pins 2 C45-AA-35 and \*

\* 1 F71-BA-55 (Ref. WDM. 27-36-02) \*

\*\*\*\*\*

OK-----| Replace ADC 1 1 F71 [7] |

\*\*\*\*\*

\* On rack connector 2 C45-AA, voltage measured

\* between pins 25 and 1 (ground) must be 28 VDC

\*\*\*\*\*

NO YES--| Replace Blue neutralization computer 2 C45 [2] |

\*\*\*\*\*

\* On ADC control panel (centre console) amber ADC1

\* warning light is off.

\*\*\*\*\*

YES NO---| Ref : 34-11-00, Trouble Shooting |

\*\*\*\*\*

\*\*\*\*\*

\*\*\*\*\*

-----| Check continuity between pins 2 C45-AA-25 and |

| 1 F71-BB-29 (Ref. WDM. 27-36-02) |

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# Concorde

## MAINTENANCE MANUAL

*****	
* NO NEUTRALIZATION OF OUTER ELEVONS *	GROUND EQUIPMENT REQUIRED
*****	
	DESCRIPTION PART NO.
	MULTIMETER
	CIRCUIT BREAKER
	SAFETY CLIPS
*****	

```

*****
* On shelf 8-215, remove Green neutralization compu- *
R * ter 1 C45 [1]. *
* On rack connector 1 C45-AA, voltage measured *
* between pins 35 and 1 (ground) must be greater *
* than +5.25 VDC. *
*****
YES NO-- * Check continuity between pins 1 C45-AA-35 and *
* 1 F71-BA-55 (Ref. WDM. 27-36-01) *
*****
R OK-----| Replace ADC 1 [7] |
*****
* On rack connector 1 C45-AA-, voltage measured *
* between pins 25 and 1 (ground) must be 28VDC. *
*****
R NO YES--| Replace Green neutralization computer 1C45 [1] |
*****
* On ADC control panel (centre console), amber ADC1 *
* warning light is off. *
*****
YES NO--| Ref. 34-11-00, Trouble Shooting |
*****
-----| Check continuity between pins 1 C45-AA-25 and |
| 1 F71-BB-29 (Ref. WDM. 27-36-01) |
*****

```

Chart 126 (Sheet 1 of 1)

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# Concorde

## MAINTENANCE MANUAL

*****	
* NO NEUTRALIZATION OF OUTER ELEVONS *	GROUND EQUIPMENT REQUIRED
*****	
	DESCRIPTION PART NO.
	MULTIMETER
	CIRCUIT BREAKER
	SAFETY CLIPS
*****	

\*\*\*\*\*

R \* On shelf 8-216, remove Blue neutralization \*  
\* computer 2 C45 [2]. \*

\* On rack connector 2 C45-AA, voltage measured bet- \*  
\* ween pins 32 and 1 (ground) must be greater than \*  
\* +5.25 VDC. \*

\*\*\*\*\*

YES NO---\* Check continuity between pins 2 C45-AA-32 and \*  
\* 2 F71-BA-55 (Ref. WDM. 27-36-02) \*

\*\*\*\*\*

R OK-----| Replace ADC 2 2 F71 [8] |

\*\*\*\*\*

\* On rack connector 2 C45-AA, voltage measured \*  
\* between pins 23 and 1 (ground) must be 28VDC. \*

\*\*\*\*\*

R NO YES--| Replace Blue neutralization computer 2 C45 [2] |

\*\*\*\*\*

\* On ADC control panel (centre console) amber ADC2 \*  
\* warning light is off. \*

\*\*\*\*\*

YES NO---| Ref. 34-11-00, Trouble Shooting |

-----| Check continuity between pins 2 C45-AA-23 and |  
| 2 F71-BB-29 (Ref. WDM. 27-36-02) |

-----

Chart 127 (Sheet 1 of 1)

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# Concorde

## MAINTENANCE MANUAL

\*\*\*\*\*  
 \* NO NEUTRALIZATION OF OUTER ELEVONS \*  
 \*\*\*\*\*

GROUND EQUIPMENT REQUIRED

DESCRIPTION PART NO.

MULTIMETER  
 CIRCUIT BREAKER  
 SAFETY CLIPS

\*\*\*\*\*

R \* On shelf 8-215, remove Green neutralization \*  
 \* computer 1 C45 [1]. \*  
 \* On rack connector 1 C45-AA, voltage measured \*  
 \* between pins 32 and 1 (ground) must be greater \*  
 \* than +5.25 VDC. \*

\*\*\*\*\*

YES NO---\* Check continuity between pins 1 C45-AA-32 and \*  
 \* 2 F71-BA-55 (Ref. WDM. 27-36-01) \*

R OK-----| Replace ADC 2 2F71 [8] |

\*\*\*\*\*

\* On rack connector 1 C45-AA, voltage measured betw- \*  
 \* een pins 23 and 1 (ground) must be 28 VDC. \*

\*\*\*\*\*

R NO YES--| Replace Green neutralization computer 1 C45  
 [1] |

\*\*\*\*\*

\* On ADC control panel (centre console), amber ADC2 \*  
 \* warning light is off. \*

\*\*\*\*\*

YES NO---| Ref. 34-11-00, Trouble Shooting |

-----| Check continuity between pins 1 C45-AA-23 and  
 | 2 F71-BB-29 (Ref. WDM. 27-36-01) |

Chart 128 (Sheet 1 of 1)

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# Concorde

## MAINTENANCE MANUAL

	ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
						MAINT. TOPIC	WIRING DIAGRAM
R R R	[1] Green neutralization computer	215AS	8-215	1C45	Electronics rack LH	27-36-16 R/I	27-36-01
R R R	[2] Blue neutralization computer	216AS	8-216	2C45	Electronics rack RH	27-36-16 R/I	27-36-02
R R R	[3] Green monitoring comparator	215AS	8-215	1C48	Electronics rack LH	27-37-11 R/I	27-36-01
R R R	[4] Blue monitoring comparator	216AS	8-216	2C48	Electronics rack RH	27-37-11 R/I	27-36-02
R	[5] Autostabilization computer No.1	215AS	8-215	1C31	Electronics rack LH	22-22-11 R/I	27-36-01
R	[6] Autostabilization computer No.2	216AS	8-216	2C31	Electronics rack RH	22-22-11 R/I	27-36-02
R R	[7] Air data computer	215BS	6-215	1F71	Electronics rack LH	34-00-00 R/I	27-36-01 27-36-02
R R	[8] Air data computer	216BS	6-216	2F71	Electronics rack RH	34-00-00 R/I	27-36-01 27-36-02
R R	[9] Circuit breaker		1-213	1C58	Map Ref. M13	24-50-00	27-37-01
	[10] Circuit breaker		5-213	2C58	Map Ref. D 13	24-50-00 R/I	27-37-01
	[11] Circuit breaker		1-213	1C55	Map Ref. M 12	24-50-00 R/I	27-37-01

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## MAINTENANCE MANUAL

ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
E123 Circuit breaker		5-213	2C55	Map Ref. D 12	24-50-00 R/I	27-37-01

Component Identification  
Table 102

### E. Close-Up

(1) Turn PITCH TRIM wheel (centre console) to zero degrees.

R

(2) Carry out Close-Up operations of Procedure to set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).

(3) Depending on equipment used :

R

(a) Disconnect pressure sensors simulator from front panel of ADC 2.

or :

(b) Disconnect pressure generator from static ports and pitot tubes, ADC1 and ADC2 systems.

(4) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
NAV INST BUS 13XS	13-216	X 345	G 4

EFFECTIVITY: ALL

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**END OF THIS  
SECTION**

**NEXT**

# *Concorde*

## MAINTENANCE MANUAL

### MONITORING CHANNELS - ADJUSTMENT/TEST

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The purposes of the following tests (dealing with roll, pitch and yaw axes) are to :

- Check the correct operation of the comparison and warning cards of the monitoring comparators and at the same time their action on the static monitoring change-over unit (C56).  
(in 2 : operational test)
- Check the correct operation :
  - (partially) of the control electrical channels
  - (entirely) of the monitoring electrical channels  
(in 3 : functional test)

#### 2. Operational Test

NOTE : This test enables all the comparison and warning cards (detecting elevon or rudder faulty deflections) as also the associated systems to be checked.

- If one wishes to check cards and systems associated to elevons only, the procedure referring to push-buttons 13, 14, 15 and 16 (Ref. Fig. 501 ) will not be carried out (operations carried out in paragraph C. Test below).

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### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
INNER ELVN CONT & MON GRN SUP1	1-213	1C 53	M11
MID & OUTER ELVN CONT & MON GRN SUP		1C 55	M12
OUTER ELEVON NEUTRLN GRN SUP		1C 58	M13
INNER ELEVON CONT & MON GRN SUP2		1C 59	M14
P.F.C.S. INV GRN FAIL IND		1C 73	M15
AUDIO WARN SYS SUP1		W 371	M21
RUDDER CONT & MON GRN SUP		1C 62	N11
RUDDER MON LOGIC GRN SUP		1C 63	N12
P.F.C.S. ALL SURFACES MON GRN SUP		1C 54	N13
P.F.C.S. INV BLUE FAIL SUP		1C 67	N14
P.F.C.S. INV GRN PROTN CONT		1C 68	N15
RELAY JACK HYD SEL IND & SUP		C 281	N17
P.F.C. IND		C 287	N18
M.W.S. SUP1		W 252	N21
P.F.C.S. INV GRN SUP		1C 66	P11
YEL/GRN GRN FAIL		C 285	P16
YEL/BLUE BLUE FAIL		C 286	P17
YELL L.L.		C 288	P18
FLT CONT POSN IND CONT		C 83	R11
FLT CONT POSN IND 26 V 400 Hz SUP	2-213	C 84	B 4
OUTER ELEVON AMP BLUE SUP		2C 44	C 1
INNER ELEVON BLUE CONT.SUP		2C 94	C 2
MID ELEVON AMP BLUE SUP		2C 93	C 3
MID & OUTER ELEVON BLUE CONT SUP		2C 92	C 4
INNER		2C 46	D 1
MIDDLE & OUTER		2C 46	D 2
RUDDER MON BLUE SUP		2C 49	D 3
RUDDER BLUE 26 V 1800 Hz CONT. SUP		2C 76	D 4
P.F.C.S. INV BLUE PROTN SUP		2C 71	D 5

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
OUTER ELEVON AMP GRN SUP		1C 44	E 1
INNER ELEVON GRN CONT SUP		1C 94	F 1
MID ELEVON AMP GRN SUP		1C 93	F 2
INNER		1C 47	G 1
MIDDLE & OUTER		1C 46	G 2
RUDDER MON GRN SUP		1C 49	G 3
P.F.C.S. INV GRN PROTN SUP		1C 71	G 5
MID & OUTER ELEVON GRN CONT SUP		1C 92	H 5
RUDDER GRN 26 V 1800 Hz CONT SUP		1C 76	H 6
YELL L/LEVEL	3-213	C 282	A 8
YELL/GRN GRN FAIL		C 283	A 9
YELL/BLUE BLUE FAIL		C 284	A10
PFCS INV BLUE SUP	5-213	2C 66	B14
RUDDER CONT2 MON		2C 62	C11
RUDDER MON LOGIC		2C 63	C12
PFCS IN GRN FAIL SUP		2C 67	C13
PFCS INB VBLUE PROTN CONT		2C 68	C14
AUDIO WARN SYS SUP2		W 372	C17
INNER ELEVON CONT & MON BLUE SUP1		2C 53	D11
MID & OUTER ELEVON CONT & MON BLUE SUP		2C 55	D12
OUTER ELEVON NEUTRLN BLUE SUP		2C 58	D13
INNER ELEVON CONT & MON BLUE SUP2		2C 59	D14
M.W.S. SUP2		W 251	D15
PFCS INV BLUE FAIL IND		2C 73	E11
PFCS ALL SURFACES MON BLUE SUP		2C 54	E12
PFCS TEST UNIT AC SUP	13-215	C 113	A 6
PFCS TEST UNIT DC SUP	15-215	C 114	A 5
ROOF PNL LT TEST SUP	15-216	L1002	D13

(3) On overhead panel :

- On SERVO CONTROLS unit, place the two selector switches in NORMAL position.

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- On RELAY JACK unit, place BLUE ONLY-NORM-GREEN ONLY switch in NORM position.
  - On Flight Control Unit, make certain that BLUE INVERTER and GREEN INVERTER switches are in PWR OFF position, and O & M ELEVONS, IN ELEVONS and RUDDER switches are in MECH position.
- (4) On panel 2-213, set circuit breaker:  
FLT CONT & NAV BUS 14xS (X 355 Map. Ref.: H 2).
- (5) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).
- Gong must sound
  - On overhead panel :
    - The GREEN L.PRESS and BLUE L.PRESS caption lights must illuminate (on SERVO CONTROLS unit).
    - P.F.C. warning light, master warning panel, must illuminate (other illuminated caption lights are not taken into account).
    - MECH JAM warning light must illuminate (on Flight Control Unit)
  - On ICOVOL indicator (Flight control surface position indicator) (First Officer's instrument panel) the 8 magnetic indicators must display M.
- (6) On Flight Engineer's panel, on EQUIPMENT BAY COOLING unit make certain that electronics rack ventilation operates (Ref. 21-21-00, Servicing).  
(Ref. Fig. 501 )
- (7) On shelf 8-216, on unit C56, press FLT TEST push-button then release it.
- On this unit, the 12 PILOT VALVES BLUE and GREEN indicator lights must illuminate then go off.
- (8) Pressurize the Green and Blue hydraulic systems (Ref. 29-12-00 and 29-11-00, Servicing).
- On overhead panel, on SERVO CONTROLS unit, the BLUE L.PRESS and GREEN L.PRESS caption lights must go off.
  - The elevons must deflect upwards.
- (9) On overhead panel, on Flight Control Unit :
- Place BLUE INVERTER and GREEN INVERTER switches in ON position and the three O & M ELEVONS, IN ELEVONS and RUDDER switches in BLUE position.
  - Press and release RESET push-button (on RH side of

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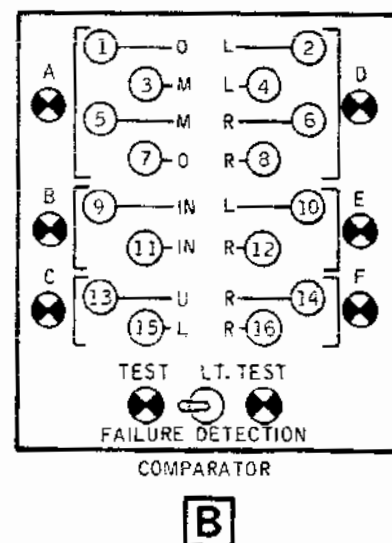
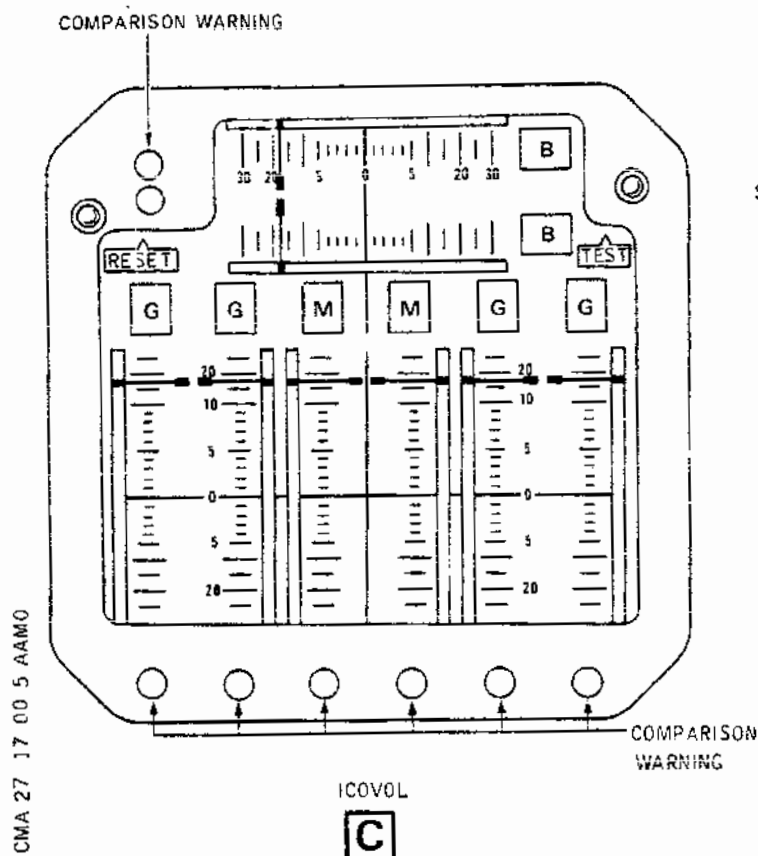
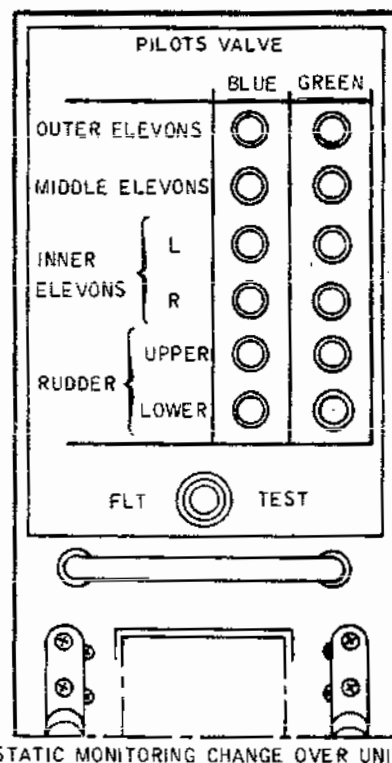
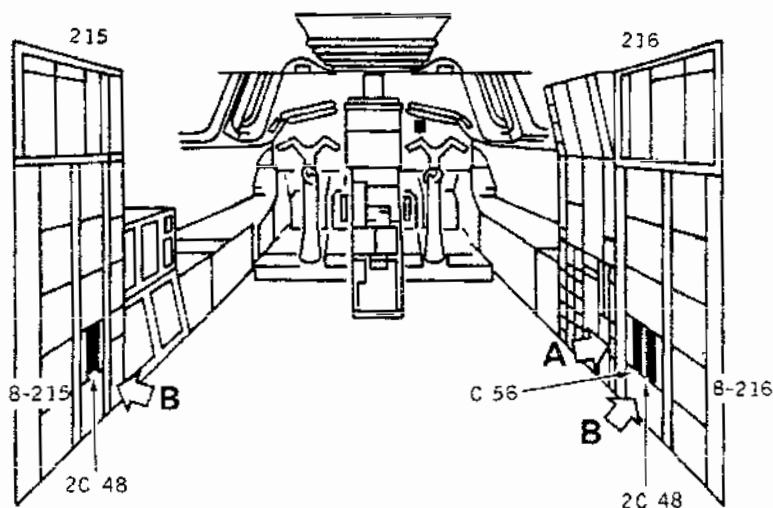
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Comparator - (Indicator/Push-Button Location)  
Static Monitoring Change Over Unit - ICOVOL  
Figure 501

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each of the three above mentioned switches)

- When pressing RESET push button, the corresponding magnetic indicators on ICOVOL indicator must display B.
- On shelf 8-216, on unit C56, the 6 BLUE indicator lights must be illuminated.
- Press and release MECH JAM warning light :
  - This warning light must go off.
- PFC warning light (on master warning panel) must go off.

(10) On shelf 8-215 on unit 1C48, and on shelf 8-216 on unit 2C48, open the covers of the indicating units.

- The front panel must appear as shown on figure.

(11) On front panel of each unit, (1C48 and 2C48) place and hold LT TEST toggle switch, then release it.

- The 8 indicator lights must illuminate then go off.

NOTE : The figure shows numbering given to the indicator lights and push-buttons mentioned in the following test.

### C. Test

(1) On shelf 8-216, on unit 2C48, place and hold toggle switch in TEST position, press and release push-button 1 (then release toggle switch).

- Gong must sound.
- On unit 2C48, indicator light A must illuminate, and go off when push-button is released.
- On unit C56 of shelf 8-216, the 2 BLUE OUTER ELEVONS and MIDDLE ELEVONS indicator lights must go off and the 2 GREEN corresponding indicator lights must illuminate.
- On overhead panel, on master warning panel, PFC warning light must illuminate
- On First Officer's instrument panel, on ICOVOL indicator, the 4 magnetic indicators of outer and middle elevons must display G and the 4 red corresponding warning lights must illuminate.

(2) On ICOVOL indicator, press and release RESET push-button

- On ICOVOL indicator, the 4 red warning lights must go off
- PFC warning light must go off.

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- (3) On unit 2C48, place and hold toggle switch in TEST position ; press and release push-button 3 (then release toggle switch)
- Gong must sound
  - On unit 2C48, indicator light A must illuminate then go off when push-button is released
  - PFC warning light must illuminate
  - On ICOVOL indicator, the 4 red warning lights associated to middle and outer elevons must illuminate.  
(No change on unit C56).
- (4) Repeat step (2) above.
- Identical results.
- (5) Repeat step (3) above, pressing push-button 5.
- Identical results.
- (6) Repeat step (2) above.
- Identical results.
- (7) Repeat step (3) above, pressing push-button 7.
- Identical results
- (8) Repeat step (2) above
- Identical results
- (9) On shelf 8-216, on unit 2C48, place and hold toggle switch in TEST position, press and release push-button 9 (then release toggle switch).
- Gong must sound
  - On unit 2C48, indicator light B must illuminate then go off when push-button is released.
  - On unit C56 (shelf 8-216) the two BLUE - INNER ELEVONS L and R indicator lights must go off and the two GREEN corresponding indicator lights must illuminate.  
(the GREEN - OUTER ELEVONS and MIDDLE ELEVONS indicator lights remain illuminated).
  - At overhead panel, on master warning panel, the PFC warning light must illuminate.
  - On ICOVOL indicator (First Officer's instrument panel) the 2 inner elevon magnetic indicators must display G and the two corresponding red warning

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lights must illuminate.

- (10) On ICOVOL indicator, press and release RESET push-button.
- On ICOVOL indicator, the two red warning lights must go off.
  - PFC warning light must go off.
- (11) Repeat step (9) above, pressing push-button 11.
- Gong must sound.
  - On unit 2C48, indicator light B must illuminate, then go off when push-button is released.
  - PFC warning light must illuminate.
  - On ICOVOL, the two red warning lights associated to inner elevons must illuminate.  
(No change on unit C56).
- (12) Repeat step (10) above.
- Identical results.
- (13) On shelf 8-216, on unit 2C48, place and hold toggle switch in TEST position ; press and release push-button 13 (then release toggle switch).
- Gong must sound
  - On unit 2C48 indicator light C must illuminate then go off (when push-button is released).
  - On shelf 8-216, on unit C56, the two BLUE - RUDDER UPPER and LOWER indicator lights must go off and the two GREEN corresponding indicator lights must illuminate (the 6 BLUE indicator lights must then be off and the 6 GREEN indicator lights must be illuminated).
  - PFC warning light must illuminate
  - On ICOVOL indicator, the two magnetic indicators associated to rudders must display G, and the two corresponding red warning lights must illuminate.
- (14) On ICOVOL indicator, press and release RESET push-button.
- On ICOVOL indicator, the 2 red warning lights must go off
  - PFC warning light must go off.
- (15) Repeat step (13) above, pressing push-button 15.
- Gong must sound.
  - On unit 2C48, indicator light C must illuminate

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- then go off when push-button is released.
- PFC warning light must illuminate.
- On ICOVOL indicator, the 2 red warning lights corresponding to rudders must illuminate.  
(No change on unit C56).

(16) Repeat step (14) above.

- Identical results.

(17) On shelf 8-215, on unit 1C48, place and hold toggle switch in TEST position, then press and release push-button 1 (then release toggle switch).

- Gong must sound.
- On unit 1C48, indicator light A must illuminate then go off when push-button is released.
- On shelf 8-216, on unit C56, the 2 GREEN - OUTER ELEVONS and MIDDLE ELEVONS indicator lights must go off (the corresponding BLUE indicator lights remain off).
- At overhead panel, master warning panel, PFC warning light must illuminate.
- On ICOVOL indicator, the 4 magnetic indicators associated to outer and middle elevons must display M and the 4 red corresponding warning lights must illuminate.

(18) On ICOVOL indicator, press and release RESET push-button.

- On ICOVOL indicator, the 4 red warning lights must go off.
- PFC warning light must go off.

(19) Place and hold toggle switch in TEST position ; press and release push-button 3 (then release switch).

- Gong must sound.
- On unit 1C48, indicator light A must illuminate then go off (when push-button is released).
- PFC warning light must illuminate.
- On ICOVOL indicator, the 4 red warning lights associated to outer and middle elevons must illuminate.  
(No change on unit C56).

(20) Repeat step (18) above.

- Identical results.

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- (21) Repeat step (19) above, pressing push-button 5.
- Identical results.
- (22) Repeat step (18) above.
- Identical results.
- (23) Repeat step (19) above, pressing push-button 7.
- Identical results.
- (24) Repeat step (18) above.
- Identical results.
- (25) On shelf 8-215, on unit 1C48, place and hold toggle switch in TEST position, press and release push-button 9 (then release toggle switch).
- Gong must sound.
  - On unit 1C48, indicator light B must illuminate then go off when push-button is released.
  - On unit C56 (shelf 8-216), the two GREEN - INNER ELEVONS - L and R indicator lights must go off (only the two GREEN - RUDDER indicator lights must remain illuminated).
  - On ICOVOL indicator, the 2 magnetic indicators associated to inner elevons must display M, and the two corresponding red warning lights must illuminate.
  - PFC warning light must illuminate (overhead panel, master warning panel).
- (26) On ICOVOL indicator, press and release RESET push-button.
- On ICOVOL indicator, the two red warning lights must go off.
  - PFC warning light must go off.
- (27) Repeat step (25) above, pressing push-button 11.
- Gong must sound.
  - On unit 1C48, indicator light B must illuminate then go off when push-button is released.
  - PFC warning light must illuminate.
  - On ICOVOL indicator, the two red warning lights associated to inner elevons must illuminate.
- (28) Repeat step (26) above (RESET on ICOVOL)

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- Identical results.
- (29) On shelf 8-215, on unit 1C48, place and hold toggle switch in TEST position, press and release push-button 13.  
(then release toggle switch).
- Gong must sound.
  - On unit 1C48, indicator light C must illuminate then go off when push-button is released.
  - On unit C56, the two GREEN - RUDDER - UPPER and LOWER indicator lights must go off (All indicator lights must be off).
  - On overhead panel, PFC warning light must illuminate.
  - On ICOVOL indicator, the two magnetic indicators associated to rudders must display M and the two corresponding red warning lights must illuminate.
- (30) Repeat step (26) above (RESET on ICOVOL)
- Identical results.
- (31) Repeat step (29) above, pressing push-button 15.
- Gong must sound.
  - On unit 1C48, indicator light C must illuminate then go off when push-button is released.
  - PFC warning light must illuminate.
  - On ICOVOL indicator, the two red warning lights associated to rudders must illuminate.
  - No change on unit C56.
- (32) Repeat above procedure, pressing push-button 15.
- Gong must sound.
  - On unit 1C48, C indicator light must illuminate then go off, when releasing push-button
  - (No indication change on unit C56).
- (33) On First Officer's instrument panel, on ICOVOL indicator, press RESET push-button then release it.
- On ICOVOL indicator, the 2 red warning lights must go off.
  - On overhead panel, on master warning panel, PFC warning light must go off
  - (No change on unit C56 of shelf 8-216).
- (34) On overhead panel, on Flight Control Unit press successively each RESET push-button located on the O & M ELEVONS, IN ELEVONS and RUDDER selector right

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hand side.

- On ICOVOL indicator, the 8 magnetic indicators must display B ; all red warning lights must be off.
- On shelf 8-216, on unit C56, the 6 BLUE indicator lights must illuminate.

(35) Repeat above procedures described from paragraph 2. C. (1) to paragraph 2. C. (34) inclusive taking into account the following table :

REPLACE		BY	
Push-button	1	Push-button	2
Push-button	3	Push-button	4
Push-button	5	Push-button	6
Push-button	7	Push-button	8
Push-button	9	Push-button	10
Push-button	11	Push-button	12
Push-button	13	Push-button	14
Push-button	15	Push-button	16
Indicator light A		Indicator light D	
Indicator light B		Indicator light E	
Indicator light C		Indicator light F	

### D. Close-Up

- (1) On overhead panel, on Flight Control Unit place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position, then place O & M ELEVONS, IN ELEVONS and RUDDER switches in MECH position.
- (2) Shut down pressurization of Blue and Green hydraulic systems (Ref. 29-12-00 and 29-11-00, Servicing).
- (3) De-energize the aircraft electrical network (Ref. 24-41-00, Servicing).
- (4) On shelf 8-215, on unit 1C48 and on shelf 8-216, on unit 2C48, lower and lock covers of indicating units.
- (5) On panel 2-213, trip, safety and tag circuit breaker: FLT.CONT & NAV. BUS 14XS (X 355, Map. Ref.: H 2).

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### 3. Functional Test

#### A. General

This test is carried out with the Flight Control Electrical Circuits Test Set, thus enabling the concealed faults to be detected. These faults, though they do not affect the correct operation of a channel, would suppress the system redundancy.

Three series of tests are scheduled for ; the first two series each include 23 tests, the third series comprises 22 tests. With the first two series the transition from one test to the following can be performed either manually or automatically. With the third series, transition can only be performed manually.

- (1) With the two first series, upon close-up of each test, the flashing CORRECT indicator light and various green indicator lights on test set panel confirm the correct operation of the test. (In such case, there is a transition time of 5 to 6 seconds between appearance of test number in display window and the moment the CORRECT indicator light flashes).

When a fault in the aircraft circuits is detected by the test set, FAIL indicator light illuminates and the test sequence stops.

Location of illuminated green indicator lights on test set panel compared with those depicted on figures (one figure for each test) enables the faulty component to be located, thus facilitating repair. At the end of a series, test number "00" appears in display window and END indicator light illuminates.

- (2) With the third test series, the correct operation of a test can only be checked by comparing location of illuminated indicator lights on test set with that depicted on figure corresponding to test number (CORRECT and FAIL indicator lights do not illuminate).

NOTE : In any one of the three series, an inconclusive test does not prevent continuation of test. After observing the location of illuminated indicator lights which differs from the location shown on figure, an action on the RESET push-button will start again the sequence operation (in automatic mode) or will cause the following test number to appear (manual control).

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DESCRIPTION	PART NO.
Ground Service Telephone	
Test Set - Electrical Circuits - Flight Controls	31-56-100

### C. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
INNER ELVN CONT & MON GRN SUP1	1-213	1C 53	M11
MID & OUTER ELVN CONT & MON GRN SUP		1C 55	M12
OUTER ELEVON NEUTRLN GRN SUP		1C 58	M13
INNER ELEVON CONT & MON GRN SUP2		1C 59	M14
P.F.C.S. INV GRN FAIL IND		1C 73	M15
AUDIO WARN SYS SUP1		W 371	M21
RUDDER CONT & MON GRN SUP		1C 62	N11
RUDDER MON LOGIC GRN SUP		1C 63	N12
P.F.C.S. ALL SURFACES MON GRN SUP		1C 54	N13
P.F.C.S. INV BLUE FAIL SUP		1C 67	N14
P.F.C.S. INV GRN PROTN CONT		1C 68	N15
RELAY JACK HYD SEL IND & SUP		C 281	N17
P.F.C. IND		C 287	N18
M.W.S. SUP1		W 252	N21
P.F.C.S. INV GRN SUP		1C 66	P11
YEL/GRN GRN FAIL		C 285	P16
YEL/BLUE BLUE FAIL		C 286	P17
YELL L.L.		C 288	P18
FLT CONT POSN IND CONT		C 83	R11
LAT ACCELMTR 1 26V SUP	2-213	1C 42	A 4
FLT CONT POSN IND 26 V 400 Hz SUP		C 84	B 4

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
OUTER ELEVON AMP BLUE SUP		2C 44	C 1
INNER ELEVON BLUE CONT.SUP		2C 94	C 2
MID ELEVON AMP BLUE SUP		2C 93	C 3
MID & OUTER ELEVON BLUE CONT SUP		2C 92	C 4
INNER		2C 46	D 1
MIDDLE & OUTER		2C 46	D 2
RUDDER MON BLUE SUP		2C 49	D 3
RUDDER BLUE 26 V 1800 Hz CONT. SUP		2C 76	D 4
P.F.C.S. INV BLUE PROTN SUP		2C 71	D 5
OUTER ELEVON AMP GRN SUP		1C 44	E 1
INNER ELEVON GRN CONT SUP		1C 94	F 1
MID ELEVON AMP GRN SUP		1C 93	F 2
INNER		1C 47	G 1
MIDDLE & OUTER		1C 46	G 2
RUDDER MON GRN SUP		1C 49	G 3
P.F.S.C. INV GRN PROTN SUP		1C 71	G 5
MID & OUTER ELEVON GRN CONT SUP		1C 92	H 5
RUDDER GRN 26 V 1800 Hz CONT SUP		1C 76	H 6
YELL L/LEVEL	3-213	C 282	A 8
YELL/GRN GRN FAIL		C 283	A 9
YELL/BLUE BLUE FAIL		C 284	A10
ADC 2 26 V SUP	5-213	2F 78	A15
PFCS INV BLUE SUP		2C 66	B14
RUDDER CONT2 MON		2C 62	C11
RUDDER MON LOGIC		2C 63	C12
PFCS IN GRN FAIL SUP		2C 67	C13
PFCS INB BLUE PROTN CONT		2C 68	C14
AUDIO WARN SYS SUP2		W 372	C17
INNER ELEVON CONT & MON BLUE SUP1		2C 53	D11
MID & OUTER ELEVON CONT & MON BLUE SUP		2C 55	D12
OUTER ELEVON NEUTRLN BLUE SUP		2C 58	D13
INNER ELEVON CONT & MON BLUE SUP2		2C 59	D14
M.W.S. SUP2		W 251	D15
PFCS INV BLUE FAIL IND		2C 73	E11
PFCS ALL SURFACES MON BLUE SUP		2C 54	E12

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# Concorde

## MAINTENANCE MANUAL

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFCs TEST UNIT AC SUP	13-215	C 113	A 6
LAT. ACCELMTR 2 26 V SUP	13-216	2C 42	B16
AUTO STAB 2 COMP SUP		2C 37	D17
PFCs TEST UNIT DC SUP	15-215	C 114	A 5
ROOF PNL LT TEST SUP	15-216	L1002	D13

- (3) On panel 2-213, set circuit breaker:  
FLT.CONT & NAV BUS 14xS (X 355 Map Ref.: H 2).

NOTE : If aircraft electrical network is energized ;  
before carrying out operations (4), (5) and (6)  
described below, trip, safety and tag the follo-  
wing circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFCs INV GRN FAIL IND	1-213	1C 73	M15
PFCs INV BLUE FAIL IND	5-213	2C 73	E11

- (4) On shelf 8-216
- (a) Unlock and remove unit C110.
- (b) On unit 2C31, remove protective plugs from  
connectors ZA and ZB.
- (5) On shelf 8-215 on unit 1C31, remove protective plugs  
from connectors ZA and ZB.
- (6) Connect bundle of tool TE 3015-208 to unit 2C31  
(connectors ZA and ZB) and to connector P6 of Test set  
TE 3015-100.
- (7) Connect bundle of tool TE 3015-207 to unit 1C31 (con-  
nectors ZA and ZB) and to connector P5 of Test set TE  
3015-100.
- (8) On shelf 8-216, install unit TE 3015-303 (in lieu of

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unit C110).

- (9) Connect bundles TE 3015-301 and TE 3015-302 to the two connectors of this unit.  
Connect the two other connectors of bundle TE 3015-301 to connectors P1 and P2 of Test set TE 3015-100.  
Connect the two connectors of bundle TE 3015-302 to connectors P3 and P4 of test set TE 3015-100.
- (10) On Test set TE 3015-100 :
- (a) On front panel, rotate the three wheels until they display zero.
  - (b) On control and display panel :
    - (b1) Make certain that switch located in upper LH corner is not in ON position.
    - (b2) Make certain that switch located in upper RH corner is in AUTOMATIC position and that ORDER switch is not in ON position.
    - (b3) Make certain that TEST SERIES SELECTION selector switch is in 0 position.
- (11) On overhead panel :
- (a) On Flight Control Unit, make certain that BLUE INVERTER and GREEN INVERTER switches are in PWR OFF position, 0 & M ELEVONS, IN. ELEVONS and RUDDER switches are in MECH position and ANTI STALL switches are in OFF position.
  - (b) On SERVO CONTROLS unit, make certain that both selector switches are in NORMAL position.
  - (c) On RELAY JACK unit, make certain that switch is in NORM position.
- (12) Make certain that trim controls are set to zero.
- (13) NOTE : If the aircraft electrical network is energized, set circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFCs INV GRN FAIL IND	1-213	1C 73	M15

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFCS INV GRN FAIL IND	5-213	2C 73	E11
(14) On centre console, make certain that ADC1 and ADC2 switches are in OFF position.			
(15) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).			
<u>NOTE</u> : Do not take aural and visual warnings which are not mentioned into account.			
- On ICOVOL indicator, the 8 magnetic indicators must display M.			
(16) Pressurize Blue and Green hydraulic systems (Ref. 29-12-00, Servicing) (Ref. 29-11-00, Servicing).			
- Elevons must deflect up to neutral.			
(17) On control and display panel of test set TE 3015-100 :			
(a) Place switch (LH upper corner) in ON position.			
- Indicator light (above switch) must illuminate. ICOVOL-A- indicator lights may illuminate (do not take them into account).			
(b) Place TEST SERIES SELECTION selector switch successively in 1, 2 then 3 position, then in 0 position.			
- For each position ; 1, 2 and 3, numbers 1-00, 2-00 and 3-00 must appear in display window and CORRECT indicator light must flash. When in 0 position, CORRECT indicator light must go off and number 0-00 must appear in display window.			
(c) Press and release FLT TEST push button.			
- All indicator lights on Test set control and display panel must illuminate then go off.			
(18) Open cover of test set upper section to gain access to another control panel (called module N) : On this module TEST DATUM indicator light must flash alternately			

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with 4 indicator lights.

(a) On module N, press and release FLT TEST push-button.

- The indicator lights of module N (except 8 of them) must illuminate then go off (the 4 indicator lights and TEST DATUM indicator light must flash).

(b) On module N, press and release INT. TEST push-button.

- All indicator lights of module N (except the 8 indicator lights mentioned above) must flash.
- CORRECT indicator light on control and display panel must flash.

(c) On module N, press again and release INT. TEST push-button.

- TEST DATUM indicator light and the 4 indicator lights mentioned above must continue to flash. The other indicator lights must go off.

(19) On Test set control and display panel, press and release RESET push-button.

- On module N, three indicator lights and TEST DATUM indicator light must continue to flash. (ICOVOL A indicator lights must go off, if they were illuminated).

(20) Place VOLTAGE CHECK selector switch successively in +5V, +15, -15, +28V INT, 26V 1800Hz, and 115V 400Hz positions.

- Voltmeter must indicate :

position +5V	:	5 volts plus or minus 5%
+15V	:	12 volts plus or minus 10%
-15V	:	12 volts plus or minus 10%
+28V INT	:	26 volts plus or minus 20%
26V-1800Hz	:	26 volts plus or minus 1%
115V-400Hz	:	115 volts plus or minus 20%

NOTE : Voltmeter on Test set gives only approximate values for indication. More precise values can be obtained by connecting a voltmeter of appropriate type to sockets provided for that purpose

(21) Place VOLTAGE CHECK selector switch in PFC ORDER posi-

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tion, then adjust SETTING potentiometer, by means of a screw driver, so as to obtain a maximum deflection on Test set voltmeter.

(22) Place above mentioned selector switch in 0 position.

### D. Test Series No.1

NOTE 1 : If CORRECT indicator light flashes upon close-up of each of the 23 tests of this series, it is not necessary to take illumination of the various green indicator lights of control panel into account. But, if a fault is detected by test set, Test sequence is stopped, CORRECT indicator light remains off and FAIL indicator light illuminates. Comparison between actual illumination of the green indicator lights on control panel and illumination layout on figure will enable the faulty circuit or component to be located.

The following figures show the indicator lights which should illuminate at the end of each test.

(Ref. Fig. 502, 503 and 504)  
(Ref. Fig. 505, 506 and 507)  
(Ref. Fig. 508, 509 and 510)  
(Ref. Fig. 511, 512 and 513)  
(Ref. Fig. 514, 515 and 516)  
(Ref. Fig. 517, 518 and 519)  
(Ref. Fig. 520, 521 and 522)  
(Ref. Fig. 523, 524 and 525)

NOTE 2 : During the various tests of this series, do not take aircraft visual or aural warnings into account

(1) On overhead panel, on Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in ON position, and O & M ELEVONS, IN. ELEVONS and RUDDER switches in BLUE position ; press then release RESET push-button located on RH side of each switch.

- On ICOVOL indicator, the 8 magnetic indicators must display B.

NOTE : If red warning lights are illuminated on ICOVOL indicator, press and release ICOVOL ALARM RESET push-button : red warning lights must go off.

(2) On Test set Control and display panel, place TEST SERIES SELECTION selector switch in 1 position.

- Indication 1-00 must appear in display window.  
- END indicator light must illuminate on control and

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display panel (Ref. Fig. 502 ).

- (3) Press and release RESET push-button on test set control and display panel.
- END indicator light must go off. After 2 seconds approximately, 1-01 must appear in display window. Then, after 4 to 5 seconds, CORRECT indicator light must flash and the green indicator lights on test set must illuminate. Then numbers 1-02, 1-03, .... 1-19 appear and CORRECT indicator light flashes at the end of each test.
  - When reaching 1-20, cycle stops and FAIL and B. MODE indicator lights go off.  
(Ref. Fig. 522 )
- (4) On overhead panel, on Flight Control Unit, place the three switches in GREEN position.
- On ICOVOL indicator, the 8 magnetic indicators must display G.
  - On test set, FAIL indicator light must go off. Then CORRECT indicator light must flash at the end of test
  - Then, number 1-21 appears in display window : FAIL and M. MODE indicator lights illuminate  
(Ref. Fig. 523 ) and cycle stops again.
- (5) On Flight Control Unit, place the 3 switches in MECH position.
- On ICOVOL indicator, the 8 magnetic indicators must display M.
  - On Test set, FAIL indicator light must go off. Then CORRECT indicator light must flash at the end of test
  - Number 1-22 appears in display window ; FAIL and B. MODE indicator lights illuminate, (Ref. Fig. 524 ) and cycle stops again.
- (6) On Flight Control Unit, place the 3 switches in BLUE position.
- On ICOVOL indicator, the 8 magnetic indicators must display B.

NOTE : It is not necessary to press RESET push button, as this order is sent from the Test set.

- Number 1-23 appears in display window. CORRECT indicator light flashes, then number 1-00 appears and END indicator light illuminates. Control and display panel is as shown in figure

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





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re (Ref. Fig. 502 ) Test 1-00.  
The First test series is finished.

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 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">1 00</div>		SELECTION RESET    B.MODE A/S1    G.MODE A/S2    M.MODE				TEST SERIES    AUTOMATIC STEP BY STEP  					
CORRECT    FAIL		ICVOL B    G    M    A OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1    B2    G1    G2 B1    B2    G1    G2 B1    B2    G1    G2		CONTROLS G1    G2    M1    M2 G1    G2    M1    M2 G1    G2    M1    M2		SELF LOCKING B/G1    B/G2    G/M1    G/M2 B/G1    B/G2    G/M1    G/M2 B/G1    B/G2    G/M1    G/M2		COMPARATORS B1    B2    G1    G2 B1    B2    G1    G2 B1    B2    G1    G2			
STEP BY STEP 		INVERTERS B    G B    G		FAILURES DETECTION T    F T    F		LINEAR TRANSDUCER B    G B    G		SEIZURES B    G PFC    JACK RELAY    JACK MECHANICAL LINKAGE		RELAY JACK SOLENOID VALVES B    G Y/B    Y/G		FLT TEST 	

Test Set Display Panel - Test 1-00  
Figure 502

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





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 ON   DIM BRIGHT	SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">           1 01         </div> <div style="display: flex; justify-content: space-around;"> <span style="border: 1px solid black; padding: 2px;">END</span> <span style="border: 1px solid black; padding: 2px;">FAIL</span> </div>	SELECTION <div style="display: flex; justify-content: space-around;"> <span style="border: 1px solid black; padding: 2px;">RESET</span> <span style="border: 1px solid black; padding: 2px;">B.MODE</span> </div> <div style="display: flex; justify-content: space-around;"> <span style="border: 1px solid black; padding: 2px;">A/S1</span> <span style="border: 1px solid black; padding: 2px;">G.MODE</span> </div> <div style="display: flex; justify-content: space-around;"> <span style="border: 1px solid black; padding: 2px;">A/S2</span> <span style="border: 1px solid black; padding: 2px;">M.MODE</span> </div>		TEST SERIES  AUTOMATIC  STEP BY STEP  ORDER ON 		
ICOVOL OUT. MID ELEVONS INNER ELEVONS RUDDER	B G M A <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	PILOT VALVES B1 B2 G1 G2 <input checked="" type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/>	CONTROLS G1 G2 M1 M2 <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	SELF LOCKING B/G1 B/G2 G/M1 G/M2 <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	COMPARATORS B1 B2 G1 G2 <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	
STEP BY STEP  RESET	INVERTERS B <input checked="" type="radio"/> G <input checked="" type="radio"/>	FAILURES DETECTION T F <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	LINEAR TRANSDUCER B <input type="radio"/> G <input type="radio"/>	SEIZURES B G PFC <input type="radio"/> JACK RELAY <input type="radio"/> JACK MECHANICAL LINKAGE <input type="radio"/>	RELAY JACK SOLENOID VALVES B G Y/B Y/G <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	FLT TEST 

Test Set Display Panel - Test 1-01  
Figure 503

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 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 2px; display: inline-block;">1 02</div> <div style="display: flex; justify-content: space-around;"> <span>END</span> <span>FAIL</span> </div>		SELECTION <div style="display: grid; grid-template-columns: 1fr 1fr; gap: 5px;"> <div>RESET</div> <div>A/S1</div> <div>A/S2</div> <div>B.MODE</div> <div>G.MODE</div> <div>M.MODE</div> </div>				TEST SERIES SELECTION  	
I/O VOL OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2		CONTROLS G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2	
STEP BY STEP 		INVERTERS B G		FAILURES DETECTION T F		LINEAR TRANSDUCER B G		SEIZURES B G PFC RELAY MECHANICAL LINKAGE	
						RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 	

CWA 27 17 00 5 AGMO

Test Set Display Panel - Test 1-02  
Figure 504

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 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 2px; display: inline-block;">1 03</div> <div style="display: flex; justify-content: space-around;"> <span></span> <span>END</span> <span>FAIL</span> </div>		SELECTION <div style="display: flex; flex-wrap: wrap;"> <div style="margin-right: 5px;">RESET</div> <div style="margin-right: 5px;">B.MODE</div> <div style="margin-right: 5px;">A/S1</div> <div style="margin-right: 5px;">G.MODE</div> <div style="margin-right: 5px;">A/S2</div> <div>M.MODE</div> </div>				TEST SERIES AUTOMATIC  					
1 COVOL OUT. MID ELEVONS: B ● G ○ M ○ A ○ INNER ELEVONS: ● ○ ○ ○ ○ RUDDER: ● ○ ○ ○ ○		PILOT VALVES B1 ● B2 ● G1 ○ G2 ○ ● ● ○ ○ ○ ● ● ○ ○ ○		CONTROLS G1 ○ G2 ○ M1 ○ M2 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○		SELF LOCKING B/G1 ○ B/G2 ○ G/M1 ○ G/M2 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○		COMPARATORS B1 ● B2 ● G1 ● G2 ● ○ ○ ○ ○ ○ ○ ○ ○ ○ ○					
STEP BY STEP 		INVERTERS B ● G ●		FAILURES DETECTION T ○ F ○ ○ ○ ○ ○		LINEAR TRANSDUCER B ● G ●		SEIZURES B PFC ○ G JACK ○ RELAY ○ JACK ○ MECHANICAL LINKAGE ○ ○		RELAY JACK SOLENOID VALVES B ○ G ○ Y/B ○ Y/G ○		FLT TEST 	

CMA 27 17 00 5 AJMO

Test Set Display Panel - Test 1-03  
Figure 505

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






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 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">1 04</div>  		SELECTION      				TEST SERIES SELECTION   			
I/O VOL OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2		CONTROLS G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2			
STEP BY STEP 		INVERTERS B G		FAILURES DETECTION T F		LINEAR TRANSDUCER B G		SEIZURES B G PFC RELAY MECHANICAL LINKAGE			
						RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 			

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Test Set Display Panel - Test 1-04  
Figure 506

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 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">1 05</div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">CORRECT</div> <div style="border: 1px solid black; padding: 2px;">END</div> <div style="border: 1px solid black; padding: 2px;">FAIL</div> </div>		SELECTION <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">RESET</div> <div style="border: 1px solid black; padding: 2px;">B.MODE</div> </div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">A/S1</div> <div style="border: 1px solid black; padding: 2px;">G.MODE</div> </div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">A/S2</div> <div style="border: 1px solid black; padding: 2px;">M.MODE</div> </div>		TEST SERIES AUTOMATIC <div style="display: flex; align-items: center;">  <div style="margin-left: 10px;">             0 1 2 3              STEP BY STEP              ORDER ON         </div> </div>							
ICOVOL OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2		CONTROLS G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2					
STEP BY STEP 		INVERTERS B G		FAILURES DETECTION T F		LINEAR TRANSDUCER B G		SEIZURES B G PFC JACK RELAY JACK MECHANICAL LINKAGE		RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 	

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Test Set Display Panel - Test 1-05  
Figure 507

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 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 2px; display: inline-block;">1 06</div> <div style="display: flex; justify-content: space-around;"> <span>END</span> <span>FAIL</span> </div>		SELECTION <div style="display: flex; justify-content: space-around;"> <span>RESET</span> <span>B.MODE</span> </div> <div style="display: flex; justify-content: space-around;"> <span>A/S1</span> <span>G.MODE</span> </div> <div style="display: flex; justify-content: space-around;"> <span>A/S2</span> <span>M.MODE</span> </div>		TEST SERIES SELECTION  							
ICVOL OUT. MID ELEVONS: B ● G ○ M ○ A ○ INNER ELEVONS: B ● G ○ M ○ A ○ RUDDER: B ● G ○ M ○ A ○		PILOT VALVES B1 ● B2 ● G1 ○ G2 ○ B1 ● B2 ● G1 ○ G2 ○ B1 ● B2 ● G1 ○ G2 ○		CONTROLS G1 ○ G2 ○ M1 ○ M2 ○ G1 ○ G2 ○ M1 ○ M2 ○ G1 ○ G2 ○ M1 ○ M2 ○		SELF LOCKING B/G1 B/G2 G/M1 G/M2 B/G1 B/G2 G/M1 G/M2 B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 ● B2 ● G1 ● G2 ● B1 ● B2 ● G1 ● G2 ● B1 ● B2 ● G1 ● G2 ●					
STEP BY STEP 		INVERTERS B ● G ● B ● G ●		FAILURES DETECTION T ○ F ○ T ○ F ○		LINEAR TRANSDUCER B ● G ● B ● G ●		SEIZURES B PFC ○ G JACK ● RELAY ○ JACK ○ MECHANICAL LINKAGE ○		RELAY JACK SOLENOID VALVES B ○ G ○ Y/B ○ Y/G ○		FLT TEST 	

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Test Set Display Panel - Test 1-06  
Figure 508

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 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 2px; display: inline-block;">1 07</div> <div style="display: flex; justify-content: space-around; width: 100%;"> <span></span> <span>END</span> <span>FAIL</span> </div>		SELECTION <div style="display: grid; grid-template-columns: 1fr 1fr; gap: 5px;"> <div>RESET</div> <div>A/S1</div> <div>A/S2</div> <div>B.MODE</div> <div>G.MODE</div> <div>M.MODE</div> </div>				TEST SERIES SELECTION  <div style="display: flex; align-items: center;">  <div style="margin-left: 10px;">             ORDER ON   </div> </div>	
ICOVOL OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2		CONTROLS G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2	
STEP BY STEP 		INVERTERS B G		FAILURES DETECTION T F		LINEAR TRANSDUCER B G		SEIZURES PFC RELAY B G JACK JACK MECHANICAL LINKAGE	
						RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 	

CMA 27 17 00 5 ASMO

Test Set Display Panel - Test 1-07  
Figure 509

EFFECTIVITY: ALL

# 27-17-00

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## MAINTENANCE MANUAL

 	SERIES N°    TEST N° <div style="border: 1px solid black; padding: 2px; display: inline-block;">1    08</div> <div style="display: flex; justify-content: space-around; width: 100%;"> <span></span> <span>END</span> </div>	SELECTION <div style="display: grid; grid-template-columns: 1fr 1fr; gap: 5px;"> <div>RESET</div> <div>A/S1</div> <div>A/S2</div> <div>B.MODE</div> <div>G.MODE</div> <div>H.MODE</div> </div>		TEST SERIES    AUTOMATIC <div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-left: 10px;">             ORDER ON  </div> </div>					
1COVOL OUT. MID ELEVONS    B    G    M    A INNER ELEVONS    ●    ○    ○    ○ RUDDER    ●    ○    ○    ○		PILOT VALVES B1   B2   G1   G2 ●   ●   ○   ○ ●   ●   ○   ○ ●   ●   ○   ○		CONTROLS G1   G2   M1   M2 ○   ○   ○   ○ ○   ○   ○   ○ ○   ○   ○   ○		SELF LOCKING B/G1   B/G2   G/M1   G/M2 ○   ○   ○   ○ ○   ○   ○   ○ ○   ○   ○   ○		COMPARATORS B1   B2   G1   G2 ○   ○   ○   ○ ○   ○   ○   ○ ●   ●   ●   ●	
STEP BY STEP  RESET	INVERTERS B   ● G   ●	FAILURES DETECTION T   ○   F   ○ ○   ○   ○   ○	LINEAR TRANSDUCER B   ● G   ●	SEIZURES B   ○   G   ○ PFC   ○   JACK RELAY   ○   JACK MECHANICAL LINKAGE   ○		RELAY JACK SOLENOID VALVES B   ○   G   ○ Y/B   ○   Y/G   ○		FLT TEST 	

CMA 27 17 00 5 AUMQ

Test Set Display Panel - Test 1-08  
Figure 510

EFFECTIVITY: ALL

# 27-17-00

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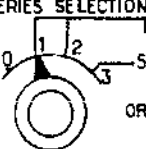




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# Concorde

## MAINTENANCE MANUAL

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 2px; display: inline-block;">1 09</div> <div style="display: flex; justify-content: space-around;"> <span>END</span> <span>FAIL</span> </div>		SELECTION <div style="display: grid; grid-template-columns: 1fr 1fr; gap: 5px;"> <div>RESET</div> <div>A/S1</div> <div>A/S2</div> <div>B.MODE</div> <div>G.MODE</div> <div>M.MODE</div> </div>				TEST SERIES SELECTION 		AUTOMATIC  	
ICOVOL OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2		CONTROLS G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2			
STEP BY STEP 		INVERTERS B G		FAILURES DETECTION T F		LINEAR TRANSDUCER B G		SEIZURES B G PFC RELAY JACK JACK MECHANICAL LINKAGE			
						RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 			

CMA 27 17 00 5 AWMD

Test Set Display Panel - Test 1-09  
Figure 511

EFFECTIVITY: ALL








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## MAINTENANCE MANUAL

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">1 10</div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">END</div> <div style="border: 1px solid black; padding: 2px;">FAIL</div> </div>		SELECTION <div style="display: flex; flex-wrap: wrap;"> <div style="border: 1px solid black; padding: 2px; margin: 2px;">RESET</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">B.MODE</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">A/S1</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">G.MODE</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">A/S2</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">M.MODE</div> </div>				TEST SERIES 		AUTOMATIC  	
ICOVOL OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2		CONTROLS G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2			
STEP BY STEP 		INVERTERS B G		FAILURES DETECTION T F		LINEAR TRANSDUCER B G		SEIZURES B G PFC JACK RELAY JACK MECHANICAL LINKAGE			
						RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 			

CMA 27 17 00 5 AYMO

Test Set Display Panel - Test 1-10  
Figure 512

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

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 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 2px; display: inline-block;">1 11</div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">CORRECT</div> <div style="border: 1px solid black; padding: 2px;">END</div> <div style="border: 1px solid black; padding: 2px;">FAIL</div> </div>		SELECTION <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">RESET</div> <div style="border: 1px solid black; padding: 2px;">B.MODE</div> </div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">A/S?</div> <div style="border: 1px solid black; padding: 2px;">G.MODE</div> </div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">A/S2</div> <div style="border: 1px solid black; padding: 2px;">M.MODE</div> </div>		TEST SERIES SELECTION  	
I/O VOL B G M A OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2 G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2 B1 B2 G1 G2			
STEP BY STEP 		INVERTERS B G T F		LINEAR TRANSDUCER B G SEIZURES B G PFC RELAY MECHANICAL LINKAGE			
				RELAY JACK SOLENOID VALVES B G Y/B Y/G FLT TEST 			

Test Set Display Panel - Test 1-11  
Figure 513

EFFECTIVITY: ALL

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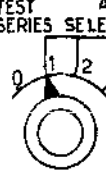


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# Concorde

## MAINTENANCE MANUAL

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">1 12</div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">CORRECT</div> <div style="border: 1px solid black; padding: 2px;">END</div> <div style="border: 1px solid black; padding: 2px;">FAIL</div> </div>		SELECTION <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">RESET</div> <div style="border: 1px solid black; padding: 2px;">B.MODE</div> </div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">A/S1</div> <div style="border: 1px solid black; padding: 2px;">G.MODE</div> </div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">A/S2</div> <div style="border: 1px solid black; padding: 2px;">M.MODE</div> </div>		TEST SERIES SELECTION  <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">STEP BY STEP</div> <div style="border: 1px solid black; padding: 2px;">ORDER ON</div> </div>							
IC VOL OUT. MID ELEVONS <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">B</div> <div style="border: 1px solid black; padding: 2px;">G</div> <div style="border: 1px solid black; padding: 2px;">M</div> <div style="border: 1px solid black; padding: 2px;">A</div> </div> INNER ELEVONS <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">B</div> <div style="border: 1px solid black; padding: 2px;">G</div> <div style="border: 1px solid black; padding: 2px;">M</div> <div style="border: 1px solid black; padding: 2px;">A</div> </div> RUDDER <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">B</div> <div style="border: 1px solid black; padding: 2px;">G</div> <div style="border: 1px solid black; padding: 2px;">M</div> <div style="border: 1px solid black; padding: 2px;">A</div> </div>		PILOT VALVES B1 B2 G1 G2 <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">B1</div> <div style="border: 1px solid black; padding: 2px;">B2</div> <div style="border: 1px solid black; padding: 2px;">G1</div> <div style="border: 1px solid black; padding: 2px;">G2</div> </div>		CONTROLS G1 G2 M1 M2 <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">G1</div> <div style="border: 1px solid black; padding: 2px;">G2</div> <div style="border: 1px solid black; padding: 2px;">M1</div> <div style="border: 1px solid black; padding: 2px;">M2</div> </div>		SELF LOCKING B/G1 B/G2 G/M1 G/M2 <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">B/G1</div> <div style="border: 1px solid black; padding: 2px;">B/G2</div> <div style="border: 1px solid black; padding: 2px;">G/M1</div> <div style="border: 1px solid black; padding: 2px;">G/M2</div> </div>		COMPARATORS B1 B2 G1 G2 <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">B1</div> <div style="border: 1px solid black; padding: 2px;">B2</div> <div style="border: 1px solid black; padding: 2px;">G1</div> <div style="border: 1px solid black; padding: 2px;">G2</div> </div>					
STEP BY STEP 		INVERTERS B <input type="radio"/> G <input checked="" type="radio"/>		FAILURES DETECTION T <input checked="" type="radio"/> F <input checked="" type="radio"/> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">T</div> <div style="border: 1px solid black; padding: 2px;">F</div> </div>		LINEAR TRANSDUCER B <input type="radio"/> G <input type="radio"/>		SEIZURES B PFC <input type="radio"/> G JACK <input type="radio"/> RELAY <input type="radio"/> JACK <input type="radio"/> MECHANICAL LINKAGE <input type="radio"/>		RELAY JACK SOLENOID VALVES B <input type="radio"/> G <input type="radio"/> Y/B <input type="radio"/> Y/G <input type="radio"/>		FLT TEST 	

CMA 27 17 00 5 BCMO

Test Set Display Panel - Test 1-12  
Figure 514

EFFECTIVITY: ALL

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





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## MAINTENANCE MANUAL

CMA 27 17 00 5 BEMO

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">1 13</div> <div style="display: flex; justify-content: space-around;"> <span>END</span> <span>FAIL</span> </div>		SELECTION <div style="display: flex; flex-wrap: wrap;"> <div style="margin-right: 10px;">RESET</div> <div style="margin-right: 10px;">B.MODE</div> <div style="margin-right: 10px;">A/S1</div> <div style="margin-right: 10px;">G.MODE</div> <div style="margin-right: 10px;">A/S2</div> <div>M.MODE</div> </div>				TEST SERIES SELECTION  					
I/O VOL OUT. MID ELEVONS: B <input type="radio"/> G <input checked="" type="radio"/> M <input type="radio"/> A <input type="radio"/> INNER ELEVONS: <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> RUDDER: <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/>		PILOT VALVES B1 <input type="radio"/> B2 <input type="radio"/> G1 <input checked="" type="radio"/> G2 <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>		CONTROLS G1 <input type="radio"/> G2 <input type="radio"/> M1 <input type="radio"/> M2 <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>		SELF LOCKING B/G1 <input type="radio"/> B/G2 <input type="radio"/> G/M1 <input type="radio"/> G/M2 <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>		COMPARATORS B1 <input checked="" type="radio"/> B2 <input checked="" type="radio"/> G1 <input type="radio"/> G2 <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/>					
STEP BY STEP 		INVERTERS B <input type="radio"/> G <input checked="" type="radio"/>		FAILURES DETECTION T <input checked="" type="radio"/> F <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/>		LINEAR TRANSDUCER B <input type="radio"/> G <input type="radio"/>		SEIZURES PFC <input checked="" type="radio"/> G <input type="radio"/> JACK RELAY <input type="radio"/> JACK MECHANICAL LINKAGE <input type="radio"/>		RELAY JACK SOLENOID VALVES B <input type="radio"/> G <input type="radio"/> Y/B <input type="radio"/> Y/G <input type="radio"/>		FLT TEST 	

Test Set Display Panel - Test 1-13  
Figure 515

EFFECTIVITY: ALL

**27-17-00**

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## MAINTENANCE MANUAL

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 2px; display: inline-block;">1 14</div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">END</div> <div style="border: 1px solid black; padding: 2px;">FAIL</div> </div>		SELECTION <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">RESET</div> <div style="border: 1px solid black; padding: 2px;">B. MODE</div> </div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">A/S1</div> <div style="border: 1px solid black; padding: 2px;">G. MODE</div> </div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">A/S2</div> <div style="border: 1px solid black; padding: 2px;">M. MODE</div> </div>		TEST SERIES SELECTION <div style="display: flex; align-items: center;">  <div style="margin-left: 10px;">             1 2              STEP BY STEP              ORDER ON           </div> </div>							
1 COVOL OUT. MID ELEVONS <input type="radio"/> B <input checked="" type="radio"/> G <input type="radio"/> M <input type="radio"/> A INNER ELEVONS <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> RUDDER <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/>		PILOT VALVES B1 B2 G1 G2 <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>		CONTROLS G1 G2 M1 M2 <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>		SELF LOCKING B/G1 B/G2 G/M1 G/M2 <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>		COMPARATORS B1 B2 G1 G2 <input checked="" type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/>					
STEP BY STEP 		INVERTERS B <input type="radio"/> <input type="radio"/> G <input checked="" type="radio"/> <input type="radio"/>		FAILURES DETECTION T F <input checked="" type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/>		LINEAR TRANSDUCER B <input type="radio"/> <input type="radio"/> G <input type="radio"/> <input type="radio"/>		SEIZURES B G PFC <input type="radio"/> <input type="radio"/> JACK RELAY <input type="radio"/> <input type="radio"/> JACK MECHANICAL LINKAGE <input type="radio"/> <input type="radio"/>		RELAY JACK SOLENOID VALVES B G Y/B Y/G <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>		FLT TEST 	

CMA 27 17 00 5 BGMO

Test Set Display Panel - Test 1-14  
Figure 516

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">1 15</div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">END</div> <div style="border: 1px solid black; padding: 2px;">FAIL</div> </div>		SELECTION <div style="display: flex; flex-wrap: wrap;"> <div style="margin-right: 10px;">RESET</div> <div style="margin-right: 10px;">B.MODE</div> <div style="margin-right: 10px;">A/S1</div> <div style="margin-right: 10px;">G.MODE</div> <div style="margin-right: 10px;">A/S2</div> <div style="margin-right: 10px;">M.MODE</div> </div>				TEST SERIES SELECTION  	
ICVOL OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2		CONTROLS G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2	
STEP BY STEP 		INVERTERS B G		FAILURES DETECTION Y F		LINEAR TRANSDUCER B G		SEIZURES B G PFC RELAY JACK JACK MECHANICAL LINKAGE	
						RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 	

CMA 27 17 00 5 BJMD

Test Set Display Panel - Test 1-15  
Figure 517

EFFECTIVITY: ALL

# 27-17-00

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






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## MAINTENANCE MANUAL

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 2px; display: inline-block;">1 16</div> <div style="display: flex; justify-content: space-around; width: 100%;"> <span></span> <span>END</span> <span>FAIL</span> </div>		SELECTION <div style="display: flex; justify-content: space-around;"> <div>             RESET A/S1 A/S2         </div> <div>             B.MODE G.MODE M.MODE         </div> </div>		TEST SERIES SELECTION <div style="display: flex; align-items: center;">  <div style="margin-left: 10px;">             0 1 2   </div> </div> ORDER ON 			
I/O VOL OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2		CONTROLS G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2	
STEP BY STEP 		INVERTERS B G		FAILURES DETECTION T F		LINEAR TRANSDUCER B G		SEIZURES B G PFD RELAY MECHANICAL LINKAGE	
						RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 	

CMA 27 17 00 5 BLMO

Test Set Display Panel - Test 1-16  
Figure 518

EFFECTIVITY: ALL

# 27-17-00

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








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## MAINTENANCE MANUAL

CMA 27 17 00 5 BNMO

 ON   DIM BRIGHT	SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">1 17</div> <div style="display: flex; justify-content: space-around; width: 100%;"> <span> CORRECT</span> <span> END</span> <span> FAIL</span> </div>	SELECTION <div style="display: flex; justify-content: space-around;"> <div>  RESET   A/S1   A/S2         </div> <div>  B.MODE   G.MODE   M.MODE         </div> </div>	TEST SERIES SELECTION  0 1 2 3 STEP BY STEP AUTOMATIC ORDER ON 			
ICVOL OUT. MID ELEVONS INNER ELEVONS RUDDER	B G M A <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/>	PILOT VALVES B1 B2 G1 G2 <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>	CONTROLS G1 G2 M1 M2 <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	SELF LOCKING B/G1 B/G2 G/M1 G/M2 <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	COMPARATORS B1 B2 G1 G2 <input checked="" type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>	
STEP BY STEP  RESET	INVERTERS B <input type="radio"/> G <input checked="" type="radio"/>	FAILURES DETECTION T F <input checked="" type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/>	LINEAR TRANSDUCER B <input type="radio"/> G <input type="radio"/>	SEIZURES B G PFC <input type="radio"/> JACK <input type="radio"/> RELAY <input type="radio"/> JACK <input type="radio"/> MECHANICAL LINKAGE <input type="radio"/>	RELAY JACK SOLENOID VALVES B G Y/B <input type="radio"/> Y/G <input type="radio"/> <input type="radio"/> <input type="radio"/>	FLT TEST 

Test Set Display Panel - Test 1-17  
Figure 519

EFFECTIVITY: ALL

27-17-00

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



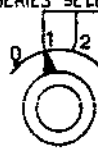




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## MAINTENANCE MANUAL

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 2px; display: inline-block;">1 18</div> <div style="display: flex; justify-content: space-around;"> <span></span> <span></span> <span></span> </div>		SELECTION <div style="display: flex; flex-wrap: wrap;"> <div style="margin-right: 5px;"></div> <div style="margin-right: 5px;"></div> <div style="margin-right: 5px;"></div> <div style="margin-right: 5px;"></div> <div style="margin-right: 5px;"></div> <div style="margin-right: 5px;"></div> </div>				TEST SERIES 		AUTOMATIC  STEP BY STEP 	
I/O VOL B G M A OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2 OUT. MID ELEVONS INNER ELEVONS RUDDER		CONTROLS G1 G2 M1 M2 OUT. MID ELEVONS INNER ELEVONS RUDDER		SELF LOCKING B/G1 B/G2 G/M1 G/M2 OUT. MID ELEVONS INNER ELEVONS RUDDER		COMPARATORS B1 B2 G1 G2 OUT. MID ELEVONS INNER ELEVONS RUDDER			
STEP BY STEP  RESET		INVERTERS B G OUT. MID ELEVONS INNER ELEVONS RUDDER		FAILURES DETECTION T F OUT. MID ELEVONS INNER ELEVONS RUDDER		LINEAR TRANSDUCER B G OUT. MID ELEVONS INNER ELEVONS RUDDER		SEIZURES B G PFC RELAY MECHANICAL LINKAGE JACK JACK			
						RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 			

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Test Set Display Panel - Test 1-18  
Figure 520

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

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 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 2px; display: inline-block;">1 19</div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">END</div> <div style="border: 1px solid black; padding: 2px;">FAIL</div> </div>		SELECTION <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">RESET</div> <div style="border: 1px solid black; padding: 2px;">B.MODE</div> </div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">A/S1</div> <div style="border: 1px solid black; padding: 2px;">G.MODE</div> </div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">A/S2</div> <div style="border: 1px solid black; padding: 2px;">M.MODE</div> </div>		TEST SERIES SELECTION  							
ICOVOL OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2		CONTROLS G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2					
STEP BY STEP 		INVERTERS B G		FAILURES DETECTION T F		LINEAR TRANSDUCER B G		SEIZURES B G PFC RELAY JACK MECHANICAL LINKAGE		RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 	

Test Set Display Panel - Test 1-19  
Figure 521

EFFECTIVITY: ALL

**27-17-00**

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






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## MAINTENANCE MANUAL

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 2px; display: inline-block;">1 20</div>		SELECTION <div style="display: flex; justify-content: space-around;"> <div>RESET</div> <div>B.MODE</div> </div> <div style="display: flex; justify-content: space-around;"> <div>A/S1</div> <div></div> </div> <div style="display: flex; justify-content: space-around;"> <div>A/S2</div> <div>M.MODE</div> </div>		TEST SERIES SELECTION  							
ICVOL OUT. MID ELEVONS B G M A INNER ELEVONS B G M A RUDDER B G M A		PILOT VALVES B1 B2 G1 G2 B1 B2 G1 G2 B1 B2 G1 G2		CONTROLS G1 G2 M1 M2 G1 G2 M1 M2 G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2 B/G1 B/G2 G/M1 G/M2 B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2 B1 B2 G1 G2 B1 B2 G1 G2					
STEP BY STEP 		INVERTERS B G B G		FAILURES DETECTION T F T F		LINEAR TRANSDUCER B G B G		SEIZURES B G PFC RELAY JACK RELAY JACK MECHANICAL LINKAGE		RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 	

(BEFORE SELECTION OF GREEN CHANNEL)

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 2px; display: inline-block;">1 20</div>		SELECTION <div style="display: flex; justify-content: space-around;"> <div>RESET</div> <div>B.MODE</div> </div> <div style="display: flex; justify-content: space-around;"> <div>A/S1</div> <div></div> </div> <div style="display: flex; justify-content: space-around;"> <div>A/S2</div> <div>M.MODE</div> </div>		TEST SERIES SELECTION  							
ICVOL OUT. MID ELEVONS B G M A INNER ELEVONS B G M A RUDDER B G M A		PILOT VALVES B1 B2 G1 G2 B1 B2 G1 G2 B1 B2 G1 G2		CONTROLS G1 G2 M1 M2 G1 G2 M1 M2 G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2 B/G1 B/G2 G/M1 G/M2 B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2 B1 B2 G1 G2 B1 B2 G1 G2					
STEP BY STEP 		INVERTERS B G B G		FAILURES DETECTION T F T F		LINEAR TRANSDUCER B G B G		SEIZURES B G PFC RELAY JACK RELAY JACK MECHANICAL LINKAGE		RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 	

(AFTER SELECTION OF GREEN CHANNEL)

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Test Set Display Panel - Test 1-20  
Figure 522

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">1 21</div>		SELECTION <div style="display: flex; justify-content: space-between;"> <div> <div>RESET</div> <div>A/S1</div> <div>A/S2</div> </div> <div> <div>B.MODE</div> <div>G.MODE</div> <div><del>H.MODE</del></div> </div> </div>				TEST SERIES SELECTION  	
<div style="display: flex; justify-content: space-around;"> <div> <div>CORRECT</div> <div><del>FAIL</del></div> </div> </div>									
I/O VOL OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2		CONTROLS G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2	
STEP BY STEP 		INVERTERS B G		FAILURES DETECTION T F		LINEAR TRANSDUCER B G		SEIZURES B G PFC RELAY MECHANICAL LINKAGE	
						RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 	

(BEFORE SELECTION OF MECHANICAL CHANNEL)

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">1 21</div>		SELECTION <div style="display: flex; justify-content: space-between;"> <div> <div>RESET</div> <div>A/S1</div> <div>A/S2</div> </div> <div> <div>B.MODE</div> <div>G.MODE</div> <div><del>H.MODE</del></div> </div> </div>				TEST SERIES SELECTION  	
<div style="display: flex; justify-content: space-around;"> <div> <div><del>CORRECT</del></div> <div>FAIL</div> </div> </div>									
I/O VOL OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2		CONTROLS G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2	
STEP BY STEP 		INVERTERS B G		FAILURES DETECTION T F		LINEAR TRANSDUCER B G		SEIZURES B G PFC RELAY MECHANICAL LINKAGE	
						RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 	

(AFTER SELECTION OF MECHANICAL CHANNEL)

Test Set Display Panel - Test 1-21  
Figure 523

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

  	SERIES N° TEST N° <div style="border: 1px solid black; padding: 2px; display: inline-block;">1 22</div>		SELECTION RESET A/S1 A/S2		TEST SERIES SELECTION  0 1 2 3 STEP BY STEP ORDER ON		
	CORRECT	END	G.MODE	M.MODE			
ICOVOL OUT. MID ELEVONS B G M A INNER ELEVONS B G M A RUDDER B G M A		PILOT VALVES B1 B2 G1 G2 B1 B2 G1 G2 B1 B2 G1 G2		CONTROLS G1 G2 M1 M2 G1 G2 M1 M2 G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2 B/G1 B/G2 G/M1 G/M2 B/G1 B/G2 G/M1 G/M2	
COMPARATORS B1 B2 G1 G2 B1 B2 G1 G2 B1 B2 G1 G2		STEP BY STEP 		INVERTERS B G B G		FAILURES DETECTION T F T F	
LINEAR TRANSDUCER B G B G		SEIZURES B G PFC RELAY JACK RELAY JACK MECHANICAL LINKAGE		RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 	

(BEFORE SELECTION OF BLUE CHANNEL)

  	SERIES N° TEST N° <div style="border: 1px solid black; padding: 2px; display: inline-block;">1 22</div>		SELECTION RESET A/S1 A/S2		TEST SERIES SELECTION  0 1 2 3 STEP BY STEP ORDER ON		
	CORRECT	END	G.MODE	M.MODE			
ICOVOL OUT. MID ELEVONS B G M A INNER ELEVONS B G M A RUDDER B G M A		PILOT VALVES B1 B2 G1 G2 B1 B2 G1 G2 B1 B2 G1 G2		CONTROLS G1 G2 M1 M2 G1 G2 M1 M2 G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2 B/G1 B/G2 G/M1 G/M2 B/G1 B/G2 G/M1 G/M2	
COMPARATORS B1 B2 G1 G2 B1 B2 G1 G2 B1 B2 G1 G2		STEP BY STEP 		INVERTERS B G B G		FAILURES DETECTION T F T F	
LINEAR TRANSDUCER B G B G		SEIZURES B G PFC RELAY JACK RELAY JACK MECHANICAL LINKAGE		RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 	

(AFTER SELECTION OF BLUE CHANNEL)

CMA 27 17 00 5 BYMD

Test Set Display Panel - Test 1-22  
Figure 524

EFFECTIVITY: ALL

**27-17-00**

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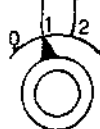



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## MAINTENANCE MANUAL

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">1 23</div> <div style="display: flex; justify-content: space-around;"> <span>END</span> <span>FAIL</span> </div>		SELECTION <div style="display: flex; flex-wrap: wrap;"> <div style="margin-right: 10px;">RESET</div> <div style="margin-right: 10px;">B. MODE</div> <div style="margin-right: 10px;">A/S1</div> <div style="margin-right: 10px;">G. MODE</div> <div style="margin-right: 10px;">A/S2</div> <div style="margin-right: 10px;">M. MODE</div> </div>				TEST SERIES SELECTION 		AUTOMATIC  ORDER ON	
IGOVVL OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2		CONTROLS G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2			
STEP BY STEP 		INVERTERS B G		FAILURES DETECTION T F		LINEAR TRANSDUCER B G		SEIZURES B G PFC RELAY MECHANICAL LINKAGE			
						RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 			

CMA 27 17 00 5 CAMO

Test Set Display Panel - Test 1-23  
Figure 525

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### E. Test Series No.2

NOTE 1 : As in test series No.1, if CORRECT indicator light flashes upon close-up of each of the 23 tests of this series, it is not necessary to take illumination of the various green indicator lights of control and display panel into account.  
The following figures show the indicator lights which should illuminate at the end of each test.

(Ref. Fig. 526, 527 and 528)  
(Ref. Fig. 529, 530 and 531)  
(Ref. Fig. 532, 533 and 534)  
(Ref. Fig. 535, 536 and 537)  
(Ref. Fig. 538, 539 and 540)  
(Ref. Fig. 541, 542 and 543)  
(Ref. Fig. 544, 545 and 546)  
(Ref. Fig. 547, 548 and 549)

(1) On test set control and display panel, place TEST SERIES SELECTION selector switch in 2 position.

- Number 2-00 must appear in display window.
- END indicator light must remain illuminated  
(Ref. Fig. 526 )

(2) Press and release RESET push-button

- END indicator light must go off.
- Number 2-01 must appear in display window ; CORRECT indicator light must flash at the end of test.
- Then numbers 2-02, 2-03... to 2-23 must successively appear in display window, and CORRECT indicator light must flash at the end of each test.
- Number 2-00 appears in display window and cycle stops ; END indicator light must illuminate and control and display panel, must be as shown in figure  
(Ref. Fig. 526 ) Test 2-00.  
The second test series is finished.

NOTE 2 : During this test series, do not take aircraft aural or visual warnings into account.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

  DIM BRIGHT		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">2 00</div> CORRECT  FAIL		SELECTION RESET B.MODE A/S1 G.MODE A/S2 M.MODE		TEST SERIES SELECTION  0 1 2 3 STEP BY STEP ORDER ON							
1COVOL OUT. MID ELEVONS B G M A INNER ELEVONS B G M A RUDDER B G M A		PILOT VALVES B1 B2 G1 G2 B1 B2 G1 G2 B1 B2 G1 G2		CONTROLS G1 G2 M1 M2 G1 G2 M1 M2 G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2 B/G1 B/G2 G/M1 G/M2 B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2 B1 B2 G1 G2 B1 B2 G1 G2					
STEP BY STEP  RESET		INVERTERS B G B G		FAILURES DETECTION T F T F		LINEAR TRANSDUCER B G B G		SEIZURES B G PFC RELAY JACK JACK MECHANICAL LINKAGE		RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 	

CMA 27 17 00 5 CCMO

Test Set Display Panel - Test 2-00  
Figure 526

EFFECTIVITY: ALL

**27-17-00**

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





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## MAINTENANCE MANUAL

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">2 01</div> <div style="display: flex; justify-content: space-around; width: 100%;"> <span></span> <span>END</span> <span>FAIL</span> </div>		SELECTION <div style="display: flex; flex-wrap: wrap;"> <div style="margin-right: 10px;">RESET</div> <div style="margin-right: 10px;">B.MODE</div> <div style="margin-right: 10px;">A/S1</div> <div style="margin-right: 10px;">G.MODE</div> <div style="margin-right: 10px;">A/S2</div> <div style="margin-right: 10px;">M.MODE</div> </div>				TEST SERIES SELECTION  <div style="display: flex; align-items: center;">  <div style="margin-left: 10px;">             ORDER ON   </div> </div>	
ICOVOL OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2		CONTROLS G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2	
STEP BY STEP 		INVERTERS B G		FAILURES DETECTION T F		LINEAR TRANSDUCER B G		SEIZURES B G PFC RELAY MECHANICAL LINKAGE	
						RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 	

CMA 27 17 00 5 CEMO

Test Set Display Panel - Test 2-01  
Figure 527

EFFECTIVITY: ALL






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## MAINTENANCE MANUAL

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">2 02</div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">CORRECT</div> <div style="border: 1px solid black; padding: 2px;">END</div> <div style="border: 1px solid black; padding: 2px;">FAIL</div> </div>		SELECTION <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">RESET</div> <div style="border: 1px solid black; padding: 2px;">B.MODE</div> </div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">A/S1</div> <div style="border: 1px solid black; padding: 2px;">G.MODE</div> </div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">A/S2</div> <div style="border: 1px solid black; padding: 2px;">M.MODE</div> </div>		TEST SERIES AUTOMATIC <div style="display: flex; align-items: center;">  <div style="margin-left: 10px;">             STEP BY STEP              ORDER ON           </div> </div>							
ICVOL OUT. MID ELEVONS <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">B <input type="radio"/></div> <div style="text-align: center;">G <input type="radio"/></div> <div style="text-align: center;">M <input checked="" type="radio"/></div> <div style="text-align: center;">A <input type="radio"/></div> </div>		PILOT VALVES B1 B2 G1 G2 <div style="display: grid; grid-template-columns: repeat(4, 1fr); gap: 5px;"> <div><input type="radio"/></div><div><input type="radio"/></div><div><input type="radio"/></div><div><input type="radio"/></div> <div><input type="radio"/></div><div><input type="radio"/></div><div><input type="radio"/></div><div><input type="radio"/></div> <div><input type="radio"/></div><div><input type="radio"/></div><div><input type="radio"/></div><div><input type="radio"/></div> </div>		CONTROLS G1 G2 M1 M2 <div style="display: grid; grid-template-columns: repeat(4, 1fr); gap: 5px;"> <div><input type="radio"/></div><div><input type="radio"/></div><div><input type="radio"/></div><div><input type="radio"/></div> <div><input type="radio"/></div><div><input type="radio"/></div><div><input type="radio"/></div><div><input type="radio"/></div> <div><input type="radio"/></div><div><input type="radio"/></div><div><input type="radio"/></div><div><input type="radio"/></div> </div>		SELF LOCKING B/G1 B/G2 G/M1 G/M2 <div style="display: grid; grid-template-columns: repeat(4, 1fr); gap: 5px;"> <div><input type="radio"/></div><div><input type="radio"/></div><div><input type="radio"/></div><div><input type="radio"/></div> <div><input type="radio"/></div><div><input type="radio"/></div><div><input type="radio"/></div><div><input type="radio"/></div> <div><input type="radio"/></div><div><input type="radio"/></div><div><input type="radio"/></div><div><input type="radio"/></div> </div>		COMPARATORS B1 B2 G1 G2 <div style="display: grid; grid-template-columns: repeat(4, 1fr); gap: 5px;"> <div><input checked="" type="radio"/></div><div><input checked="" type="radio"/></div><div><input checked="" type="radio"/></div><div><input checked="" type="radio"/></div> <div><input checked="" type="radio"/></div><div><input checked="" type="radio"/></div><div><input checked="" type="radio"/></div><div><input checked="" type="radio"/></div> <div><input checked="" type="radio"/></div><div><input checked="" type="radio"/></div><div><input checked="" type="radio"/></div><div><input checked="" type="radio"/></div> </div>					
STEP BY STEP 		INVERTERS B <input type="radio"/> G <input type="radio"/>		FAILURES DETECTION T <input checked="" type="radio"/> F <input checked="" type="radio"/> T <input checked="" type="radio"/> F <input checked="" type="radio"/>		LINEAR TRANSDUCER B <input type="radio"/> G <input type="radio"/>		SEIZURES B PFC <input type="radio"/> G JACK <input type="radio"/> RELAY <input type="radio"/> JACK <input type="radio"/> MECHANICAL LINKAGE <input type="radio"/>		RELAY JACK SOLENOID VALVES B <input type="radio"/> G <input type="radio"/> Y/B <input type="radio"/> Y/G <input type="radio"/>		FLT TEST 	

CMA 27 17 00 5 CGMO

Test Set Display Panel - Test 2-02  
Figure 528

EFFECTIVITY: ALL

# 27-17-00

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## MAINTENANCE MANUAL

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">2 03</div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">END</div> <div style="border: 1px solid black; padding: 2px;">FAIL</div> </div>		SELECTION <div style="display: flex; flex-wrap: wrap;"> <div style="border: 1px solid black; padding: 2px; margin: 2px;">RESET</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">B. MODE</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">A/S1</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">G. MODE</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">A/S2</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">M. MODE</div> </div>				TEST SERIES SELECTION  	
ICVOL OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2		CONTROLS G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2	
STEP BY STEP 		INVERTERS B G		FAILURES DETECTION T F		LINEAR TRANSDUCER B G		SEIZURES B G PFC RELAY JACK MECHANICAL LINKAGE	
						RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 	

CMA 27 17 00 5 CJMO

Test Set Display Panel - Test 2-03  
Figure 529

EFFECTIVITY: ALL

# 27-17-00

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
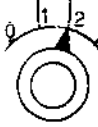



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## MAINTENANCE MANUAL

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">2 04</div> <div style="display: flex; justify-content: space-around;"> <span></span> <span>END</span> <span>FAIL</span> </div>		SELECTION <div style="display: grid; grid-template-columns: 1fr 1fr; gap: 5px;"> <div>RESET</div> <div>A/S1</div> <div>A/S2</div> <div>B.MODE</div> <div>G.MODE</div> <div>M.MODE</div> </div>				TEST SERIES SELECTION  <div style="display: flex; justify-content: space-between;"> <span>0</span> <span>1</span> <span>2</span> <span>3</span> </div> ORDER ON 					
I/O VOL OUT. MID ELEVONS <span>B</span> <span>G</span> <span>M</span> <span>A</span> INNER ELEVONS <span>B</span> <span>G</span> <span>M</span> <span>A</span> RUDDER <span>B</span> <span>G</span> <span>M</span> <span>A</span>		PILOT VALVES B1 B2 G1 G2 <span>B1</span> <span>B2</span> <span>G1</span> <span>G2</span> <span>B1</span> <span>B2</span> <span>G1</span> <span>G2</span> <span>B1</span> <span>B2</span> <span>G1</span> <span>G2</span>		CONTROLS G1 G2 M1 M2 <span>G1</span> <span>G2</span> <span>M1</span> <span>M2</span> <span>G1</span> <span>G2</span> <span>M1</span> <span>M2</span> <span>G1</span> <span>G2</span> <span>M1</span> <span>M2</span>		SELF LOCKING B/G1 B/G2 G/M1 G/M2 <span>B/G1</span> <span>B/G2</span> <span>G/M1</span> <span>G/M2</span> <span>B/G1</span> <span>B/G2</span> <span>G/M1</span> <span>G/M2</span> <span>B/G1</span> <span>B/G2</span> <span>G/M1</span> <span>G/M2</span>		COMPARATORS B1 B2 G1 G2 <span>B1</span> <span>B2</span> <span>G1</span> <span>G2</span> <span>B1</span> <span>B2</span> <span>G1</span> <span>G2</span> <span>B1</span> <span>B2</span> <span>G1</span> <span>G2</span>					
STEP BY STEP 		INVERTERS B <span>B</span> G <span>G</span>		FAILURES DETECTION T <span>T</span> F <span>F</span> T <span>T</span> F <span>F</span>		LINEAR TRANSDUCER B <span>B</span> G <span>G</span>		SEIZURES B PFC <span>B</span> G JACK <span>G</span> RELAY <span>RELAY</span> JACK <span>JACK</span> MECHANICAL LINKAGE <span>MECHANICAL LINKAGE</span>		RELAY JACK SOLENOID VALVES B <span>B</span> G <span>G</span> Y/B <span>Y/B</span> Y/G <span>Y/G</span>		FLY TEST 	

CMA 27 17 00 5 CLM0

Test Set Display Panel - Test 2-04  
Figure 530

EFFECTIVITY: ALL

**27-17-00**

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



















































































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## MAINTENANCE MANUAL

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">2 05</div> <div style="display: flex; justify-content: space-around;"> <span></span> <span></span> <span></span> </div>		SELECTION <div style="display: flex; justify-content: space-around;"> <span>RESET</span> <span>B.MODE</span> </div> <div style="display: flex; justify-content: space-around;"> <span>A/S1</span> <span>G.MODE</span> </div> <div style="display: flex; justify-content: space-around;"> <span>A/S2</span> <span>M.MODE</span> </div>		TEST SERIES SELECTION  <div style="display: flex; justify-content: space-around;"> <span>1</span> <span>2</span> <span>3</span> </div> ORDER ON 							
ICOVOL OUT. MID ELEVONS: B  G  M  A  INNER ELEVONS: B  G  M  A  RUDDER: B  G  M  A 		PILOT VALVES B1  B2  G1  G2  B1  B2  G1  G2  B1  B2  G1  G2 		CONTROLS G1  G2  M1  M2  G1  G2  M1  M2  G1  G2  M1  M2 		SELF LOCKING B/G1  B/G2  G/M1  G/M2  B/G1  B/G2  G/M1  G/M2  B/G1  B/G2  G/M1  G/M2 		COMPARATORS B1  B2  G1  G2  B1  B2  G1  G2  B1  B2  G1  G2 					
STEP BY STEP  RESET		INVERTERS B  G 		FAILURES DETECTION T  F  T  F 		LINEAR TRANSDUCER B  G 		SEIZURES B  G  PFC  RELAY  MECHANICAL LINKAGE 		RELAY JACK SOLENOID VALVES B  G  Y/B  Y/G 		FLT TEST 	

CMA 27 17 00 5 CNMO

Test Set Display Panel - Test 2-05  
Figure 531

EFFECTIVITY: ALL

# 27-17-00







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## MAINTENANCE MANUAL

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 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 2px; display: inline-block;">2 06</div>		SELECTION <div style="display: flex; justify-content: space-between;"> <div> <div>RESET</div> <div>A/S1</div> <div>A/S2</div> </div> <div> <div>B.MODE</div> <div>G.MODE</div> <div>M.MODE</div> </div> </div>				TEST SERIES SELECTION  	
I/O VOL OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2		CONTROLS G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2	
STEP BY STEP 		INVERTERS B G		FAILURES DETECTION T F		LINEAR TRANSDUCER B G		SEIZURES B G PFC RELAY JACK JACK MECHANICAL LINKAGE	
						RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 	

Test Set Display Panel - Test 2-06  
Figure 532

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">2 07</div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">CORRECT</div> <div style="border: 1px solid black; padding: 2px;">END</div> <div style="border: 1px solid black; padding: 2px;">FAIL</div> </div>		SELECTION <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">RESET</div> <div style="border: 1px solid black; padding: 2px;">B. MODE</div> </div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">A/S1</div> <div style="border: 1px solid black; padding: 2px;">G. MODE</div> </div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">A/S2</div> <div style="border: 1px solid black; padding: 2px;">M. MODE</div> </div>		TEST SERIES SELECTION <div style="display: flex; align-items: center;">  <div style="margin-left: 10px;">             0 1 2 3              STEP BY STEP              ORDER ON           </div> </div>							
1COVOL OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2		CONTROLS G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2					
STEP BY STEP 		INVERTERS B G		FAILURES DETECTION T F		LINEAR TRANSDUCER B G		SEIZURES B G PFC RELAY JACK MECHANICAL LINKAGE		RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 	

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Test Set Display Panel - Test 2-07  
Figure 533

EFFECTIVITY: ALL








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## MAINTENANCE MANUAL

 	SERIES N° TEST N° <div style="border: 1px solid black; padding: 2px; display: inline-block;">2 08</div>		SELECTION RESET    B.MODE A/S1    G.MODE A/S2    M.MODE				TEST SERIES SELECTION 		AUTOMATIC  
	CORRECT END FAIL								
ICVOL OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2		CONTROLS G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2	
STEP BY STEP 		INVERTERS B G		FAILURES DETECTION T F		LINEAR TRANSDUCER B G		SEIZURES B G PFC RELAY JACK MECHANICAL LINKAGE	
						RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 	

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Test Set Display Panel - Test 2-08  
Figure 534

EFFECTIVITY: ALL

**27-17-00**

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





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## MAINTENANCE MANUAL

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 2px; display: inline-block;">2 09</div> <div style="display: flex; justify-content: space-around; width: 100%;"> <span></span> <span>END</span> <span>FAIL</span> </div>		SELECTION <div style="display: grid; grid-template-columns: 1fr 1fr; gap: 5px;"> <div>RESET</div> <div>A/S1</div> <div>A/S2</div> <div>B.MODE</div> <div>G.MODE</div> <div>M.MODE</div> </div>				TEST SERIES SELECTION  <div style="display: flex; align-items: center;">  <div style="margin-left: 10px;">             ORDER ON   </div> </div>					
ICVOL OUT. MID ELEVONS: B <input type="radio"/> G <input type="radio"/> M <input checked="" type="radio"/> A <input type="radio"/> INNER ELEVONS: B <input type="radio"/> G <input type="radio"/> M <input checked="" type="radio"/> A <input type="radio"/> RUDDER: B <input type="radio"/> G <input type="radio"/> M <input checked="" type="radio"/> A <input type="radio"/>		PILOT VALVES B1 <input type="radio"/> B2 <input type="radio"/> G1 <input type="radio"/> G2 <input type="radio"/> B1 <input type="radio"/> B2 <input type="radio"/> G1 <input type="radio"/> G2 <input type="radio"/> B1 <input type="radio"/> B2 <input type="radio"/> G1 <input type="radio"/> G2 <input type="radio"/>		CONTROLS G1 <input type="radio"/> G2 <input type="radio"/> M1 <input type="radio"/> M2 <input type="radio"/> G1 <input type="radio"/> G2 <input type="radio"/> M1 <input type="radio"/> M2 <input type="radio"/> G1 <input type="radio"/> G2 <input type="radio"/> M1 <input type="radio"/> M2 <input type="radio"/>		SELF LOCKING B/G1 <input type="radio"/> B/G2 <input type="radio"/> G/M1 <input type="radio"/> G/M2 <input type="radio"/> B/G1 <input type="radio"/> B/G2 <input type="radio"/> G/M1 <input type="radio"/> G/M2 <input type="radio"/> B/G1 <input type="radio"/> B/G2 <input type="radio"/> G/M1 <input type="radio"/> G/M2 <input type="radio"/>		COMPARATORS B1 <input checked="" type="radio"/> B2 <input checked="" type="radio"/> G1 <input checked="" type="radio"/> G2 <input checked="" type="radio"/> B1 <input checked="" type="radio"/> B2 <input checked="" type="radio"/> G1 <input checked="" type="radio"/> G2 <input checked="" type="radio"/> B1 <input checked="" type="radio"/> B2 <input checked="" type="radio"/> G1 <input checked="" type="radio"/> G2 <input checked="" type="radio"/>					
STEP BY STEP 		INVERTERS B <input type="radio"/> G <input type="radio"/> B <input type="radio"/> G <input type="radio"/>		FAILURES DETECTION T <input type="radio"/> F <input checked="" type="radio"/> T <input type="radio"/> F <input checked="" type="radio"/>		LINEAR TRANSDUCER B <input type="radio"/> G <input type="radio"/> B <input type="radio"/> G <input type="radio"/>		SEIZURES B <input type="radio"/> G <input type="radio"/> PFC <input type="radio"/> RELAY <input type="radio"/> MECHANICAL LINKAGE <input type="radio"/> B <input type="radio"/> G <input type="radio"/> JACK <input type="radio"/> JACK <input type="radio"/>		RELAY JACK SOLENOID VALVES B <input type="radio"/> G <input type="radio"/> Y/B <input type="radio"/> Y/G <input type="radio"/>		FLT TEST 	

CMA 27 17 00 5 CWMO

Test Set Display Panel - Test 2-09  
Figure 535

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">2 10</div>		SELECTION RESET    B.MODE A/S1    G.MODE A/S2    M.MODE				TEST SERIES    AUTOMATIC STEP BY STEP 											
DIM    BRIGHT 		END 																	
1COVOL OUT. MID ELEVONS    B    G    M    A INNER ELEVONS    B    G    M    A RUDDER    B    G    M    A				PILOT VALVES B1 B2 G1 G2 B1 B2 G1 G2 B1 B2 G1 G2				CONTROLS G1 G2 M1 M2 G1 G2 M1 M2 G1 G2 M1 M2				SELF LOCKING B/G1 B/G2 G/M1 G/M2 B/G1 B/G2 G/M1 G/M2 B/G1 B/G2 G/M1 G/M2				COMPARATORS B1 B2 G1 G2 B1 B2 G1 G2 B1 B2 G1 G2			
STEP BY STEP 		INVERTERS B    G B    G		FAILURES DETECTION T    F T    F		LINEAR TRANSDUCER B    G B    G		SEIZURES PFC    B    G    JACK RELAY    B    G    JACK MECHANICAL LINKAGE		RELAY JACK SOLENOID VALVES B    G Y/B    Y/G		FLT TEST 							

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Test Set Display Panel - Test 2-10  
Figure 536















EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 2px; display: inline-block;">2 11</div>  		SELECTION      		TEST SERIES SELECTION  							
I/O VOL OUT. MID ELEVONS <input checked="" type="radio"/> B <input type="radio"/> G <input type="radio"/> M <input type="radio"/> A INNER ELEVONS <input checked="" type="radio"/> B <input type="radio"/> G <input type="radio"/> M <input type="radio"/> A RUDDER <input checked="" type="radio"/> B <input type="radio"/> G <input type="radio"/> M <input type="radio"/> A		PILOT VALVES B1 <input checked="" type="radio"/> B2 <input checked="" type="radio"/> G1 <input type="radio"/> G2 B1 <input checked="" type="radio"/> B2 <input checked="" type="radio"/> G1 <input type="radio"/> G2 B1 <input checked="" type="radio"/> B2 <input checked="" type="radio"/> G1 <input type="radio"/> G2		CONTROLS G1 <input type="radio"/> G2 <input type="radio"/> M1 <input type="radio"/> M2 G1 <input type="radio"/> G2 <input type="radio"/> M1 <input type="radio"/> M2 G1 <input type="radio"/> G2 <input type="radio"/> M1 <input type="radio"/> M2		SELF LOCKING B/G1 <input type="radio"/> B/G2 <input type="radio"/> G/M1 <input type="radio"/> G/M2 B/G1 <input type="radio"/> B/G2 <input type="radio"/> G/M1 <input type="radio"/> G/M2 B/G1 <input type="radio"/> B/G2 <input type="radio"/> G/M1 <input type="radio"/> G/M2		COMPARATORS B1 <input type="radio"/> B2 <input type="radio"/> G1 <input type="radio"/> G2 B1 <input type="radio"/> B2 <input type="radio"/> G1 <input type="radio"/> G2 B1 <input type="radio"/> B2 <input type="radio"/> G1 <input type="radio"/> G2					
STEP BY STEP 		INVERTERS B <input checked="" type="radio"/> G <input checked="" type="radio"/>		FAILURES DETECTION T <input type="radio"/> F <input type="radio"/> T <input type="radio"/> F <input type="radio"/>		LINEAR TRANSDUCER B <input type="radio"/> G <input type="radio"/>		SEIZURES B <input type="radio"/> G <input type="radio"/> PFC <input type="radio"/> RELAY <input type="radio"/> MECHANICAL LINKAGE <input type="radio"/>		RELAY JACK SOLENOID VALVES B <input type="radio"/> G <input type="radio"/> Y/B <input type="radio"/> Y/G <input type="radio"/>		FLT TEST 	

CMA 27 17 00 5 DAMO

Test Set Display Panel - Test 2-11  
Figure 537

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 2px; display: inline-block;">2 12</div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">END</div> <div style="border: 1px solid black; padding: 2px;">FAIL</div> </div>		SELECTION <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">RESET</div> <div style="border: 1px solid black; padding: 2px;">B. MODE</div> </div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">A/S1</div> <div style="border: 1px solid black; padding: 2px;">G. MODE</div> </div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">A/S2</div> <div style="border: 1px solid black; padding: 2px;">M. MODE</div> </div>		TEST SERIES SELECTION  							
IGOVOL OUT. MID ELEVONS B G M A INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2		CONTROLS G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2					
STEP BY STEP 		INVERTERS B G		FAILURES DETECTION T F		LINEAR TRANSDUCER B G		SEIZURES B G JACK RELAY JACK MECHANICAL LINKAGE		RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 	

CMA 27 17 00 5 DCMO

Test Set Display Panel - Test 2-12  
Figure 538

EFFECTIVITY: ALL

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





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## MAINTENANCE MANUAL

 ON   DIM BRIGHT		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">2 13</div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">END</div> <div style="border: 1px solid black; padding: 2px;">FAIL</div> </div>		SELECTION <div style="display: flex; flex-wrap: wrap;"> <div style="margin-right: 5px;">RESET</div> <div style="margin-right: 5px;">B.MODE</div> <div style="margin-right: 5px;">A/S1</div> <div style="margin-right: 5px;">G.MODE</div> <div style="margin-right: 5px;">A/S2</div> <div style="margin-right: 5px;">M.MODE</div> </div>				TEST SERIES SELECTION   STEP BY STEP ORDER ON					
I/O VDL OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2		CONTROLS G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2					
STEP BY STEP  RESET		INVERTERS B G		FAILURES DETECTION T F		LINEAR TRANSDUCER B G		SEIZURES B G PFC RELAY JACK MECHANICAL LINKAGE		RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 	

CMA 27 17 00 5 DEMO

Test Set Display Panel - Test 2-13  
Figure 539



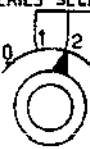




EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">           2 14         </div>		SELECTION <div style="display: flex; flex-wrap: wrap;"> <div style="margin-right: 10px;">RESET</div> <div style="margin-right: 10px;">B.MODE</div> <div style="margin-right: 10px;">A/S1</div> <div style="margin-right: 10px;">G.MODE</div> <div style="margin-right: 10px;">A/S2</div> <div style="margin-right: 10px;">M.MODE</div> </div>				TEST SERIES 		AUTOMATIC  	
1COVOL OUT. MID FLEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2		CONTROLS G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2			
STEP BY STEP 		INVERTERS B G		FAILURES DETECTION T F		LINEAR TRANSDUCER B G		SEIZURES B G PFC RELAY MECHANICAL LINKAGE			
						RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 			

CMA 27 17 00 5 DGM0

Test Set Display Panel - Test 2-14  
Figure 540

EFFECTIVITY: ALL







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## MAINTENANCE MANUAL

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">2 15</div> <div style="display: flex; justify-content: space-around;"> <span>END</span> <span>FAIL</span> </div>		SELECTION <div style="display: flex; flex-wrap: wrap;"> <div style="margin-right: 10px;">RESET</div> <div style="margin-right: 10px;">B. MODE</div> <div style="margin-right: 10px;">A/S1</div> <div style="margin-right: 10px;">G. MODE</div> <div style="margin-right: 10px;">A/S2</div> <div>M. MODE</div> </div>				TEST SERIES SELECTION  ORDER ON 			
ICVOL OUT. MID ELEVONS B G M A INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2		CONTROLS G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2			
STEP BY STEP 		INVERTERS B G		FAILURES DETECTION T F		LINEAR TRANSDUCER B G		SEIZURES B G JACK PFC RELAY MECHANICAL LINKAGE			
						RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 			

CMA 27 17 00 5 DJMO

Test Set Display Panel - Test 2-15  
Figure 541

EFFECTIVITY: ALL






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## MAINTENANCE MANUAL

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">2 16</div> <div style="display: flex; justify-content: space-around;"> <span>END</span> <span>FAIL</span> </div>		SELECTION <div style="display: flex; justify-content: space-between;"> <div>             RESET A/S1 A/S2         </div> <div>             B.MODE G.MODE M.MODE         </div> </div>				TEST SERIES SELECTION  <div style="display: flex; justify-content: space-between;"> <span>0</span> <span>1</span> <span>2</span> <span>3</span> </div> <div style="display: flex; justify-content: space-between;"> <span>STEP BY STEP</span> <span>ORDER ON</span> </div>			
I/O VOL OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2		CONTROLS G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2			
STEP BY STEP 		INVERTERS B G		FAILURES DETECTION T F		LINEAR TRANSDUCER B G		SEIZURES B G PFC RELAY JACK MECHANICAL LINKAGE			
						RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 			

CMA 27 17 00 5 DLMO

Test Set Display Panel - Test 2-16  
Figure 542

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 2px; display: inline-block;">2 17</div> <div style="display: flex; justify-content: space-around;"> <span>END</span> <span>FAIL</span> </div>		SELECTION <div style="display: flex; flex-wrap: wrap;"> <div style="margin-right: 5px;">RESET</div> <div style="margin-right: 5px;">B.MODE</div> <div style="margin-right: 5px;">A/S1</div> <div style="margin-right: 5px;">G.MODE</div> <div style="margin-right: 5px;">A/S2</div> <div style="margin-right: 5px;">M.MODE</div> </div>				TEST SERIES SELECTION  	
ICVOL OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2		CONTROLS G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2	
STEP BY STEP 		INVERTERS B G		FAILURES DETECTION T F		LINEAR TRANSDUCER B G		SEIZURES B G PFC RELAY MECHANICAL LINKAGE	
						RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 	

CMA 27 17 00 5 DNMO

Test Set Display Panel - Test 2-17  
Figure 543

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 2px; display: inline-block;">2 18</div>  		SELECTION <div style="display: flex; justify-content: space-between;"> <div>      </div> <div>      </div> </div>		TEST SERIES SELECTION  							
1COVOL OUT. MID ELEVONS: B <input type="radio"/> G <input type="radio"/> M <input checked="" type="radio"/> A <input checked="" type="radio"/> INNER ELEVONS: B <input type="radio"/> G <input type="radio"/> M <input checked="" type="radio"/> A <input checked="" type="radio"/> RUDDER: B <input type="radio"/> G <input type="radio"/> M <input checked="" type="radio"/> A <input checked="" type="radio"/>		PILOT VALVES B1 <input type="radio"/> B2 <input type="radio"/> G1 <input type="radio"/> G2 <input type="radio"/> B1 <input type="radio"/> B2 <input type="radio"/> G1 <input type="radio"/> G2 <input type="radio"/> B1 <input type="radio"/> B2 <input type="radio"/> G1 <input type="radio"/> G2 <input type="radio"/>		CONTROLS G1 <input type="radio"/> G2 <input type="radio"/> M1 <input type="radio"/> M2 <input type="radio"/> G1 <input type="radio"/> G2 <input type="radio"/> M1 <input type="radio"/> M2 <input type="radio"/> G1 <input type="radio"/> G2 <input type="radio"/> M1 <input type="radio"/> M2 <input type="radio"/>		SELF LOCKING B/G1 <input checked="" type="radio"/> B/G2 <input checked="" type="radio"/> G/M1 <input checked="" type="radio"/> G/M2 <input checked="" type="radio"/> B/G1 <input checked="" type="radio"/> B/G2 <input checked="" type="radio"/> G/M1 <input checked="" type="radio"/> G/M2 <input checked="" type="radio"/> B/G1 <input checked="" type="radio"/> B/G2 <input checked="" type="radio"/> G/M1 <input checked="" type="radio"/> G/M2 <input checked="" type="radio"/>		COMPARATORS B1 <input type="radio"/> B2 <input type="radio"/> G1 <input type="radio"/> G2 <input type="radio"/> B1 <input type="radio"/> B2 <input type="radio"/> G1 <input type="radio"/> G2 <input type="radio"/> B1 <input type="radio"/> B2 <input type="radio"/> G1 <input type="radio"/> G2 <input type="radio"/>					
STEP BY STEP 		INVERTERS B <input type="radio"/> G <input checked="" type="radio"/>		FAILURES DETECTION T <input checked="" type="radio"/> F <input checked="" type="radio"/> T <input type="radio"/> F <input type="radio"/>		LINEAR TRANSDUCER B <input type="radio"/> G <input type="radio"/> B <input type="radio"/> G <input type="radio"/>		SEIZURES PFC <input type="radio"/> B <input type="radio"/> G <input type="radio"/> JACK RELAY <input type="radio"/> B <input type="radio"/> G <input type="radio"/> JACK MECHANICAL LINKAGE <input type="radio"/>		RELAY JACK SOLENOID VALVES B <input type="radio"/> G <input type="radio"/> Y/B <input type="radio"/> Y/G <input type="radio"/>		FLT TEST 	

CMA 27 17 00 5 DQMO

Test Set Display Panel - Test 2-18  
Figure 544

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

 	SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">             2 19         </div> <div style="display: flex; justify-content: space-around;"> <span>END</span> <span>FAIL</span> </div>	SELECTION <div style="display: flex; justify-content: space-around;"> <span>RESET</span> <span>B. MODE</span> </div> <div style="display: flex; justify-content: space-around;"> <span>A/S1</span> <span>G. MODE</span> </div> <div style="display: flex; justify-content: space-around;"> <span>A/S2</span> <span>M. MODE</span> </div>	TEST SERIES SELECTION  ORDER ON	
1COVOL OUT. MID ELEVONS INNER ELEVONS RUDDER	PILOT VALVES B1 B2 G1 G2	CONTROLS G1 G2 M1 M2	SELF LOCKING B/G1 B/G2 G/M1 G/M2	COMPARATORS B1 B2 G1 G2
STEP BY STEP  RESET	INVERTERS B <input type="radio"/> <input type="radio"/> G <input type="radio"/> <input type="radio"/>	FAILURES DETECTION T <input checked="" type="radio"/> <input checked="" type="radio"/> F <input checked="" type="radio"/> <input checked="" type="radio"/>	LINEAR TRANSDUCER B <input type="radio"/> <input type="radio"/> G <input type="radio"/> <input type="radio"/>	SEIZURES B PFC <input type="radio"/> <input type="radio"/> G RELAY <input type="radio"/> <input type="radio"/> MECHANICAL LINKAGE <input type="radio"/> <input type="radio"/>
		RELAY JACK SOLENOID VALVES B <input type="radio"/> <input type="radio"/> G Y/B <input type="radio"/> <input type="radio"/> Y/G <input type="radio"/> <input type="radio"/>	FLT TEST 	

CMA 27 17 00 5 DSMO

Test Set Display Panel - Test 2-19  
Figure 545

EFFECTIVITY: ALL

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





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## MAINTENANCE MANUAL

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 2px; display: inline-block;">2 20</div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">END</div> <div style="border: 1px solid black; padding: 2px;">FAIL</div> </div>		SELECTION <div style="display: grid; grid-template-columns: 1fr 1fr; gap: 5px;"> <div>RESET</div> <div>A/S1</div> <div>A/S2</div> <div>B.MODE</div> <div>G.MODE</div> <div>M.MODE</div> </div>				TEST SERIES SELECTION  <div style="display: flex; align-items: center;">  <div>ORDER ON</div> </div>			
ICOVOL OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2		CONTROLS G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2			
STEP BY STEP 		INVERTERS B G		FAILURES DETECTION T F		LINEAR TRANSDUCER B G		SEIZURES B G PFC RELAY MECHANICAL LINKAGE			
						RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 			

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Test Set Display Panel - Test 2-20  
Figure 546

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">           2 21         </div>		SELECTION RESET    B. MODE A/S1    G. MODE A/S2    M. MODE				TEST SERIES SELECTION  	
ICDVOL OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2		CONTROLS G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2	
STEP BY STEP 		INVERTERS B G		FAILURES DETECTION T F		LINEAR TRANSDUCER B G		SEIZURES B G PFC RELAY JACK MECHANICAL LINKAGE	
						RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 	

CMA 27 17 00 5 DWMO

Test Set Display Panel - Test 2-21  
Figure 547

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">2 22</div> <div style="display: flex; justify-content: space-around;"> <span>END</span> <span>FAIL</span> </div>		SELECTION <div style="display: flex; flex-wrap: wrap;"> <div style="margin-right: 10px;">RESET</div> <div style="margin-right: 10px;">B. MODE</div> <div style="margin-right: 10px;">A/S1</div> <div style="margin-right: 10px;">G. MODE</div> <div style="margin-right: 10px;">A/S2</div> <div style="margin-right: 10px;">M. MODE</div> </div>				TEST SERIES SELECTION  	
I/O VOL OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2		CONTROLS G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2	
STEP BY STEP 		INVERTERS B G		FAILURES DETECTION T F		LINEAR TRANSDUCER B G		SEIZURES B G PFC RELAY MECHANICAL LINKAGE	
						RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 	

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Test Set Display Panel - Test 2-22  
Figure 548

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 2px; display: inline-block;">2 23</div>		SELECTION <div style="display: flex; justify-content: space-between;"> <div> <div>RESET</div> <div>A/S1</div> <div>A/S2</div> </div> <div> <div>B.MODE</div> <div>G.MODE</div> <div>M.MODE</div> </div> </div>				TEST SERIES SELECTION 		AUTOMATIC  	
ICVOL OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2		CONTROLS G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2			
STEP BY STEP 		INVERTERS B G		FAILURES DETECTION T F		LINEAR TRANSDUCER B G		SEIZURES B G PFC RELAY JACK MECHANICAL LINKAGE			
						RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 			

CMA 27 17 00 5 EAMO

Test Set Display Panel - Test 2-23  
Figure 549

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### F. Test Series No.3

**NOTE** : The 22 tests of this series are not carried out automatically. It is necessary to press the RESET push-button for changing from one test to another. Contrary to series No.1 and No.2, CORRECT indicator light does not illuminate at the end of each test. A test is "correct" when the actual location of illuminated indicator lights on control and display panel corresponds with that shown on figure associated with each test of this series.

- (1) On overhead panel, on Flight Control Unit, place O & M ELEVONS, IN ELEVONS and RUDDER switches in MECH position.
  - On ICOVOL indicator, the 8 magnetic indicators must display M. (If the red warning lights on ICOVOL indicator are illuminated, press and release ALARM RESET push-button to extinguish these warning lights).
- (2) Test Set control and display panel (Ref. Fig. 550 )
  - (a) Place AUTOMATIC - STEP BY/STEP switch in STEP BY STEP position.
  - (b) Place TEST SERIES SELECTION selector switch in 3 position.
  - (c) Place ORDER switch in ON position.

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## MAINTENANCE MANUAL

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 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">           3 00         </div>		SELECTION RESET    B.MODE A/S1    G.MODE A/S2    M.MODE		TEST SERIES SELECTION  STEP BY STEP  ORDER ON	
ICVOL OUT. MID ELEVONS    B    G    M    A INNER ELEVONS    B    G    M    A RUDDER    B    G    M    A		PILOT VALVES B1 B2 G1 G2 B1 B2 G1 G2 B1 B2 G1 G2		CONTROLS G1 G2 M1 M2 G1 G2 M1 M2 G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2 B/G1 B/G2 G/M1 G/M2 B/G1 B/G2 G/M1 G/M2	
COMPARATORS B1 B2 G1 G2 B1 B2 G1 G2 B1 B2 G1 G2		STEP BY STEP  RESET		INVERTERS B    G B    G		FAILURES DETECTION T    F T    F	
LINEAR TRANSDUCER B    G B    G		SEIZURES B    G PFC    JACK RELAY    JACK MECHANICAL LINKAGE		RELAY JACK SOLENOID VALVES B    G Y/B    Y/G		FLT TEST 	

Test Set Display Panel - Test 3-00  
Figure 550

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- (3) On overhead panel press and release PFC warning light if this light is illuminated.

- It must go off.

NOTE : After several tests of this series, gong shall sound and PFC warning light shall illuminate on master warning panel.  
Before proceeding with the following test it will be necessary to press and release this warning light to extinguish it.

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## MAINTENANCE MANUAL

- (4) Test 3-01  
(Ref. Fig. 551 )

On test set, press then release RESET push-button.






(a) Gong must sound.

(b) On overhead panel.

(b1) PFC warning light must illuminate.

(b2) On Flight Control Unit, MECH JAM warning light must illuminate.

(b3) On RELAY JACK unit, BLUE JAM caption light must illuminate.

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 2px; display: inline-block;">3 01</div>		SELECTION RESET    B.MODE A/S1    G.MODE A/S2    M.MODE				TEST SERIES SELECTION 	
CORRECT    END    FAIL								ORDER ON	
ICDVOL OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2		CONTROLS G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2	
STEP BY STEP 		INVERTERS B G		FAILURES DETECTION T F		LINEAR TRANSDUCER B G		SEIZURES B G PFC RELAY JACK MECHANICAL LINKAGE	
						RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 	

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Test Set Display Panel - Test 3-01  
Figure 551

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (5) Test 3-02  
(Ref. Fig. 552 )

On test set, press then release RESET push-button.







(a) Gong must sound.

(b) On aircraft, on overhead panel

(b1) PFC warning light must illuminate.

(b2) On RELAY JACK unit, GREEN JAM caption light must illuminate. BLUE JAM caption light switch must remain illuminated.

(b3) On Flight Control Unit, MECH JAM warning light must remain illuminated.

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 2px; display: inline-block;">3 02</div>		SELECTION <div style="display: flex; justify-content: space-between;"> <div> <input type="button" value="RESET"/>  <input type="button" value="A/S1"/>  <input type="button" value="A/S2"/> </div> <div> <input type="button" value="B.MODE"/>  <input type="button" value="G.MODE"/>  <input type="button" value="M.MODE"/> </div> </div>				TEST SERIES SELECTION 		AUTOMATIC ORDER ON 	
ICOVOL OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2		CONTROLS G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2			
STEP BY STEP 		INVERTERS B G		FAILURES DETECTION T F		LINEAR TRANSDUCER B G		SEIZURES B G PFC RELAY JACK MECHANICAL LINKAGE			
						RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 			

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Test Set Display Panel - Test 3-02  
Figure 552

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (6) Test 3-03  
(Ref. Fig. 553 )

On test set, press then release RESET push-button.

On aircraft, on overhead panel

- (a) On RELAY JACK unit, BLUE JAM and GREEN JAM caption lights must go off.
- (b) On Flight Control Unit, MECH JAM warning light must go off.

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">                     3 03                 </div>		SELECTION RESET B.MODE A/S1 G.MODE A/S2 M.MODE				TEST SERIES SELECTION  ORDER ON																			
CORRECT END FAIL																											
ICVOL OUT. MID ELEVONS B G M A INNER ELEVONS RUDDER				PILOT VALVES B1 B2 G1 G2				CONTROLS G1 G2 M1 M2				SELF LOCKING B/G1 B/G2 G/M1 G/M2				COMPARATORS B1 B2 G1 G2											
STEP BY STEP 				INVERTERS B G				FAILURES DETECTION T F				LINEAR TRANSDUCER B G				SEIZURES B G PFC JACK RELAY JACK MECHANICAL LINKAGE				RELAY JACK SOLENOID VALVES B G Y/B Y/G				FLT TEST 			

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Test Set Display Panel - Test 3-03  
Figure 553

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (7) Test 3-04  
(Ref. Fig. 554 )



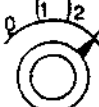


On test set, press then release RESET push-button.

(a) Gong must sound.

(b) On aircraft, on overhead panel.

(b1) PFC warning light must illuminate

(b2) On RELAY JACK unit, GREEN JAM caption light must illuminate.

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">                     3 04                 </div>		SELECTION RESET    B.MODE A/S1    G.MODE A/S2    M.MODE				TEST SERIES SELECTION 			
CORRECT    END    FAIL											
I/O VOL OUT. MID ELEVONS    B    G    M    A INNER ELEVONS RUDDER		PILOT VALVES B1    B2    G1    G2		CONTROLS G1    G2    M1    M2		SELF LOCKING B/G1    B/G2    G/M1    G/M2		COMPARATORS B1    B2    G1    G2			
STEP BY STEP 		INVERTERS B    G		FAILURES DETECTION T    F		LINEAR TRANSDUCER B    G		SEIZURES B    G PFC RELAY    JACK MECHANICAL LINKAGE			
						RELAY JACK SOLENOID VALVES B    G Y/B    Y/G		FLT TEST 			

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Test Set Display Unit - Test 3-04  
Figure 554

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (7) Test 3-05  
(Ref. Fig. 555 )

On test set, press then release RESET push-button.

(a) Gong must sound.

(b) On overhead panel :

(b1) PFC warning light must illuminate.

(b2) On RELAY JACK unit, BLUE JAM caption light must illuminate (GREEN JAM caption light must remain illuminated).

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 2px; display: inline-block;">3 05</div>		SELECTION RESET    B.MODE A/S1    G.MODE A/S2    M.MODE				TEST SERIES SELECTION  ORDER ON	
CORRECT    END    FAIL									
ICVOL OUT. MID ELEVONS    B    G    M    A INNER ELEVONS RUDDER		PILOT VALVES B1    B2    G1    G2		CONTROLS G1    G2    M1    M2		SELF LOCKING B/G1    B/G2    G/M1    G/M2		COMPARATORS B1    B2    G1    G2	
STEP BY STEP 		INVERTERS B    G		FAILURES DETECTION T    F		LINEAR TRANSDUCER B    G		SEIZURES B    G PFC    JACK RELAY    JACK MECHANICAL LINKAGE	
						RELAY JACK SOLENOID VALVES B    G Y/B    Y/G		FLT TEST 	

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Test Set Display Panel - Test 3-05  
Figure 555

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (9) Test 3-06  
(Ref. Fig. 556 )

On test set, press then release RESET push-button.

On overhead panel, on RELAY JACK unit, BLUE JAM and GREEN JAM caption lights must go off.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

 	SERIES N° TEST N° <div style="border: 1px solid black; padding: 2px; display: inline-block;">3 06</div>	SELECTION <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">A/S2</div> <div style="border: 1px solid black; padding: 2px;">G.MODE</div> <div style="border: 1px solid black; padding: 2px;">M.MODE</div> </div>		TEST SERIES SELECTION 	AUTOMATIC 		
	<div style="border: 1px solid black; padding: 2px; display: inline-block;">CORRECT</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">END</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">FAIL</div>						
		ICOVOL OUT. MID ELEVONS INNER ELEVONS RUDDER	PILOT VALVES B1 B2 G1 G2	CONTROLS G1 G2 M1 M2	SELF LOCKING B/G1 B/G2 G/M1 G/M2	COMPARATORS B1 B2 G1 G2	
		STEP BY STEP 	INVERTERS B G	FAILURES DETECTION T F	LINEAR TRANSDUCER B G	SEIZURES B G PFC JACK RELAY JACK MECHANICAL LINKAGE	RELAY JACK SOLENOID VALVES B G Y/B Y/G
		FLT TEST 					

(BEFORE SELECTION ON AIRCRAFT PANEL)

 	SERIES N° TEST N° <div style="border: 1px solid black; padding: 2px; display: inline-block;">3 06</div>	SELECTION <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">A/S2</div> <div style="border: 1px solid black; padding: 2px;">G.MODE</div> <div style="border: 1px solid black; padding: 2px;">M.MODE</div> </div>		TEST SERIES SELECTION 	AUTOMATIC 		
	<div style="border: 1px solid black; padding: 2px; display: inline-block;">CORRECT</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">END</div> <div style="border: 1px solid black; padding: 2px; display: inline-block;">FAIL</div>						
		ICOVOL OUT. MID ELEVONS INNER ELEVONS RUDDER	PILOT VALVES B1 B2 G1 G2	CONTROLS G1 G2 M1 M2	SELF LOCKING B/G1 B/G2 G/M1 G/M2	COMPARATORS B1 B2 G1 G2	
		STEP BY STEP 	INVERTERS B G	FAILURES DETECTION T F	LINEAR TRANSDUCER B G	SEIZURES B G PFC JACK RELAY JACK MECHANICAL LINKAGE	RELAY JACK SOLENOID VALVES B G Y/B Y/G
		FLT TEST 					

(AFTER SELECTION ON AIRCRAFT PANEL)

Test Set Display Panel - Test 3-06  
(Before selection on aircraft panel)  
Figure 556

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

(10) On Flight Control Unit, on overhead panel

- (a) Place O & M ELEVONS, IN ELEVONS and RUDDER selectors in BLUE position, then press and release RESET push-button located on RH side of each selector.

On ICOVOL indicator, magnetic indicators must display B.

Test set display panel must be as shown in figure (Ref. Fig. 556 ) TEST SET display panel - Test 3-06 (After selection on aircraft panel).

NOTE : The following operations described below enable the autostabilization system to be partially checked (specially the "open lanes")  
Test of autostabilization system with test set is dealt with in 22-22-00, Adjustment/  
Tests : system test.

(11) On overhead panel engage PITCH, ROLL and YAW switches of AUTO STAB No.1.  
- These switches must remain engaged.

(12) Test 3-07  
(Ref. Fig. 557 )

On test set, press then release RESET push-button.

- (a) Gong must sound
- (b) On overhead panel, PFC warning light must illuminate
- (c) On First Officer's instrument panel, INNER ELEV. indicator light (above ICOVOL indicator) must illuminate.
- (d) On ICOVOL indicator, magnetic indicators must still display B ; pointers corresponding to outer and middle elevons must indicate a deflection in opposite direction of LH wing elevons with respect to RH wing elevons.

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# Concorde

## MAINTENANCE MANUAL

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 2px; display: inline-block;">3 07</div>		SELECTION <div style="display: flex; justify-content: space-between;"> <div>           RESET A/S1 A/S2         </div> <div>           B.MODE G.MODE M.MODE         </div> </div>				TEST SERIES AUTOMATIC SELECTION  	
I/O VOL OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2		CONTROLS G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2	
STEP BY STEP 		INVERTERS B G		FAILURES DETECTION T F		LINEAR TRANSDUCER B G		SEIZURES B G PFC RELAY JACK MECHANICAL LINKAGE	
						RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 	

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Test Set Display Panel - Test 3-07  
Figure 557

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

(13) Test 3-08  
(Ref. Fig. 558 )

- On test set, press then release RESET push-button
- INNER ELEV indicator light must go off.
  - On ICOVOL indicator, pointers corresponding to the 6 elevons must indicate a deflection of the 6 elevons in the same direction.

CMA 27 17 00 5 EUM0

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 2px; display: inline-block;">3 08</div> CORRECT END FAIL		SELECTION RESET B.MODE A/S1 G.MODE A/S2 M.MODE				TEST SERIES SELECTION  ORDER ON	
ICOVOL OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2		CONTROLS G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2	
STEP BY STEP 		INVERTERS B G		FAILURES DETECTION T F		LINEAR TRANSDUCER B G		SEIZURES B G PFC RELAY JACK MECHANICAL LINKAGE	
						RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 	

Test Set Display Panel - Test 3-08  
Figure 558

EFFECTIVITY: ALL

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

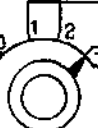



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## MAINTENANCE MANUAL

- (14) Test 3-09  
(Ref. Fig. 559 )

On test set, press then release RESET push-button

- (a) Gong must sound.
- (b) On overhead panel, PFC warning light must illuminate.
- (c) On First Officer's instrument panel, INNER ELEV indicator light must illuminate.
- (d) On ICOVOL indicator, pointers corresponding to rudders must indicate a deflection of the latter.

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">3 09</div>		SELECTION RESET    B.MODE A/S1    G.MODE A/S2    M.MODE				TEST SERIES SELECTION 		AUTOMATIC 			
CORRECT    END    FAIL		ICOVOL		PILOT VALVES		CONTROLS		SELF LOCKING		COMPARATORS			
OUT. MID ELEVONS INNER ELEVONS RUDDER		B G M A <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>		B1 B2 G1 G2 <input checked="" type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>		G1 G2 M1 M2 <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>		B/G1 B/G2 G/M1 G/M2 <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>		B1 B2 G1 G2 <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>			
STEP BY STEP 		INVERTERS B <input checked="" type="radio"/> <input type="radio"/> G <input checked="" type="radio"/> <input type="radio"/>		FAILURES DETECTION T <input type="radio"/> <input type="radio"/> F <input type="radio"/> <input type="radio"/>		LINEAR TRANSDUCER B <input type="radio"/> <input type="radio"/> G <input type="radio"/> <input type="radio"/>		SEIZURES B <input type="radio"/> <input type="radio"/> G <input type="radio"/> <input type="radio"/> PFC RELAY <input type="radio"/> <input type="radio"/> MECHANICAL LINKAGE <input type="radio"/> <input type="radio"/>		RELAY JACK SOLENOID VALVES B <input type="radio"/> <input type="radio"/> G <input type="radio"/> <input type="radio"/> Y/B <input type="radio"/> <input type="radio"/> Y/G <input type="radio"/> <input type="radio"/>		FLT TEST 	

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Test Set Display Panel - Test 3-09  
Figure 559

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## MAINTENANCE MANUAL

(15) Test 3-10  
(Ref. Fig. 560 )

- On test set, press then release RESET push-button
- On First Officer's instrument panel, INNER ELEV indicator light must go off.
  - On ICOVOL indicator, the 8 magnetic indicators must display G.
  - On Flight Control Unit FAIL warning light of BLUE INVERTER must illuminate.

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">                     3 10                 </div>		SELECTION RESET    B.MODE A/S1    G.MODE A/S2    W.MODE				TEST SERIES AUTOMATIC 0 1 2 3 STEP BY STEP 			
CORRECT    END    FAIL		ICOVOL B G M A OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2 B1 B2 G1 G2 B1 B2 G1 G2		CONTROLS G1 G2 M1 M2 G1 G2 M1 M2 G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2 B/G1 B/G2 G/M1 G/M2 B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2 B1 B2 G1 G2 B1 B2 G1 G2	
STEP BY STEP 		INVERTERS B G B G		FAILURES DETECTION T F T F		LINEAR TRANSDUCER B G B G		SEIZURES B G PFC RELAY JACK RELAY JACK MECHANICAL LINKAGE		RELAY JACK SOLENOID VALVES B G Y/B Y/G	
										FLT TEST 	

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Test Set Display Panel - Test 3-10  
Figure 560

EFFECTIVITY: ALL

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# MAINTENANCE MANUAL

On test set, press then release RESET push-button  
- On ICOVOL indicator, pointers corresponding to outer and middle elevons must indicate a deflection in opposite direction for LH wing elevons with respect to RH wing elevons.

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">           3 11         </div> <div style="display: flex; justify-content: space-around;"> <span>CORRECT</span> <span>END</span> <span>FAIL</span> </div>		SELECTION <div style="display: flex; justify-content: space-around;"> <div>             RESET               A/S1               A/S2           </div> <div>             B.MODE               G.MODE               M.MODE           </div> </div>		AUTOMATIC SERIES SELECTION   ORDER ON 							
IC/OVOL <div style="display: flex; justify-content: space-around;"> <div>OUT. MID ELEVONS</div> <div>B <input type="radio"/> G <input checked="" type="radio"/> M <input type="radio"/> A <input type="radio"/></div> </div> <div style="display: flex; justify-content: space-around;"> <div>INNER ELEVONS</div> <div><input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/></div> </div> <div style="display: flex; justify-content: space-around;"> <div>RUDDER</div> <div><input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/></div> </div>		PILOT VALVES <div style="display: flex; justify-content: space-around;"> <div>B1 <input type="radio"/> B2 <input type="radio"/> G1 <input checked="" type="radio"/> G2 <input checked="" type="radio"/></div> <div>B1 <input type="radio"/> B2 <input type="radio"/> G1 <input checked="" type="radio"/> G2 <input checked="" type="radio"/></div> </div> <div style="display: flex; justify-content: space-around;"> <div><input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></div> <div><input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/></div> </div>		CONTROLS <div style="display: flex; justify-content: space-around;"> <div>G1 <input type="radio"/> G2 <input type="radio"/> M1 <input type="radio"/> M2 <input type="radio"/></div> <div>G1 <input type="radio"/> G2 <input type="radio"/> M1 <input type="radio"/> M2 <input type="radio"/></div> </div> <div style="display: flex; justify-content: space-around;"> <div><input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></div> <div><input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></div> </div>		SELF LOCKING <div style="display: flex; justify-content: space-around;"> <div>B/G1 B/G2 G/M1 G/M2</div> <div>B/G1 <input type="radio"/> B/G2 <input type="radio"/> G/M1 <input type="radio"/> G/M2 <input type="radio"/></div> </div> <div style="display: flex; justify-content: space-around;"> <div><input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></div> <div><input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></div> </div>		COMPARATORS <div style="display: flex; justify-content: space-around;"> <div>B1 <input type="radio"/> B2 <input type="radio"/> G1 <input type="radio"/> G2 <input type="radio"/></div> <div>B1 <input type="radio"/> B2 <input type="radio"/> G1 <input type="radio"/> G2 <input type="radio"/></div> </div> <div style="display: flex; justify-content: space-around;"> <div><input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></div> <div><input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></div> </div>					
STEP BY STEP  RESET		INVERTERS <div style="display: flex; justify-content: space-around;"> <div>B <input type="radio"/> G <input checked="" type="radio"/></div> <div>T <input checked="" type="radio"/> F <input type="radio"/></div> </div> <div style="display: flex; justify-content: space-around;"> <div><input type="radio"/> <input type="radio"/></div> <div><input type="radio"/> <input type="radio"/></div> </div>		FAILURES DETECTION <div style="display: flex; justify-content: space-around;"> <div>T <input checked="" type="radio"/> F <input type="radio"/></div> <div>T <input type="radio"/> F <input type="radio"/></div> </div> <div style="display: flex; justify-content: space-around;"> <div><input type="radio"/> <input type="radio"/></div> <div><input type="radio"/> <input type="radio"/></div> </div>		LINEAR TRANSDUCER <div style="display: flex; justify-content: space-around;"> <div>B <input type="radio"/> G <input type="radio"/></div> <div>B <input type="radio"/> G <input type="radio"/></div> </div> <div style="display: flex; justify-content: space-around;"> <div><input type="radio"/> <input type="radio"/></div> <div><input type="radio"/> <input type="radio"/></div> </div>		SEIZURES <div style="display: flex; justify-content: space-around;"> <div>B <input type="radio"/> G <input type="radio"/></div> <div>PFC <input type="radio"/> RELAY <input type="radio"/></div> </div> <div style="display: flex; justify-content: space-around;"> <div><input type="radio"/> <input type="radio"/></div> <div><input type="radio"/> <input type="radio"/></div> </div> MECHANICAL LINKAGE		RELAY JACK SOLENOID VALVES <div style="display: flex; justify-content: space-around;"> <div>B <input type="radio"/> G <input type="radio"/></div> <div>Y/B <input type="radio"/> Y/G <input type="radio"/></div> </div> <div style="display: flex; justify-content: space-around;"> <div><input type="radio"/> <input type="radio"/></div> <div><input type="radio"/> <input type="radio"/></div> </div>		FLT TEST 	

Test Set Display Panel - Test 3-11  
Figure 561

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## MAINTENANCE MANUAL

- (17) Test 3-12  
(Ref. Fig. 562 )

On test set, press then release RESET push-button.  
- On ICOVOL indicator, pointers corresponding to the 6 elevons must indicate a deflection of the latter in the same direction.

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">                     3    12                 </div>		SELECTION RESET    B. MODE A/S1    G. MODE A/S2    M. MODE				TEST SERIES SELECTION 		AUTOMATIC ORDER ON 	
CORRECT    END    FAIL		ICOVOL OUT. MID ELEVONS    B    G    M    A INNER ELEVONS RUDDER		PILOT VALVES B1    B2    G1    G2		CONTROLS G1    G2    M1    M2		SELF LOCKING B/G1    B/G2    G/M1    G/M2		COMPARATORS B1    B2    G1    G2	
STEP BY STEP 		INVERTERS B    G		FAILURES DETECTION T    F		LINEAR TRANSDUCER B    G		SEIZURES PFC    B    G RELAY    JACK MECHANICAL LINKAGE		RELAY JACK SOLENOID VALVES B    G Y/B    Y/G	
										FLY TEST 	

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Test Set Display Panel - Test 3-12  
Figure 562

EFFECTIVITY: ALL

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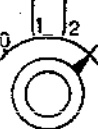


# Concorde

## MAINTENANCE MANUAL

(18) Test 3-13  
(Ref. Fig. 563 )

On test set, press then release RESET push-button  
- On ICOVOL indicator, pointers corresponding to  
rudders must indicate a deflection of the latter.

CMA 27 17 00 5 FEMO

 DIM  BRIGHT		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">           3 13         </div>		SELECTION <div style="display: flex; flex-wrap: wrap;"> <div style="margin-right: 5px;">RESET</div> <div style="margin-right: 5px;">B.MODE</div> <div style="margin-right: 5px;">A/S1</div> <div style="margin-right: 5px;">G.MODE</div> <div style="margin-right: 5px;">A/S2</div> <div style="margin-right: 5px;">M.MODE</div> </div>				TEST SERIES SELECTION 																			
CORRECT END FAIL																											
ICOVOL OUT. MID ELEVONS B G M A INNER ELEVONS RUDDER				PILOT VALVES B1 B2 G1 G2 G1 G2 M1 M2				CONTROLS G1 G2 M1 M2				SELF LOCKING B/G1 B/G2 G/M1 G/M2				COMPARATORS B1 B2 G1 G2											
STEP BY STEP 				INVERTERS B G				FAILURES DETECTION T F				LINEAR TRANSDUCER B G				SEIZURES PFC RELAY MECHANICAL LINKAGE				RELAY JACK SOLENOID VALVES B G Y/B Y/G				FLT TEST 			

Test Set Display Panel - Test 3-13  
Figure 563

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

(19) Test 3-14  
(Ref. Fig. 564 )

On test set, press then release RESET push-button

- On ICOVOL indicator, the 8 magnetic indicators must display B and the 8 red warning lights must illuminate.

Press ICOVOL ALARM RESET push-button to extinguish the red warning lights.

- On Flight Control Unit, FAIL warning light of BLUE INVERTER must illuminate.

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 2px; display: inline-block;">3 14</div>		SELECTION RESET    B.MODE A/S1    G.MODE M.MODE		TEST SERIES SELECTION 		AUTOMATIC 	
CORRECT    END    FAIL									
ICOVOL OUT. MID ELEVONS    B    G    M    A INNER ELEVONS RUDDER		PILOT VALVES B1    B2    G1    G2		CONTROLS G1    G2    M1    M2		SELF LOCKING B/G1    B/G2    G/M1    G/M2		COMPARATORS B1    B2    G1    G2	
STEP BY STEP 		INVERTERS B    G		FAILURES DETECTION T    F		LINEAR TRANSDUCER B    G		SEIZURES B    G PFC    JACK RELAY    JACK MECHANICAL LINKAGE	
						RELAY JACK SOLENOID VALVES B    G Y/B    Y/G		FLT TEST 	

CMA 27 17 00 5 FGMO

Test Set Display Panel - Test 3-14  
Figure 564

EFFECTIVITY: ALL

**27-17-00**

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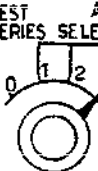


# Concorde

## MAINTENANCE MANUAL

- (20) On overhead panel, on AUTO STAB No.1 unit, disengage PITCH, ROLL and YAW switches then on AUTO STAB No.2 unit engage PITCH, ROLL and YAW switches.  
- These three switches must remain engaged.

- (21) Test 3-15  
(Ref. Fig. 565 )

On test set, press then release RESET push-button  
- On ICVOL indicator, pointers corresponding to outer and middle elevons must indicate a deflection in opposite direction for RH wing elevons and LH wing elevons.

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">                     3 15                 </div>		SELECTION RESET    B.MODE A/S1    G.MODE A/S2    M.MODE				TEST SERIES SELECTION 					
CORRECT    END    FAIL		ICVOL B G M A OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2 B1 B2 G1 G2 B1 B2 G1 G2		CONTROLS G1 G2 M1 M2 G1 G2 M1 M2 G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2 B/G1 B/G2 G/M1 G/M2 B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2 B1 B2 G1 G2 B1 B2 G1 G2			
STEP BY STEP 		INVERTERS B G B G		FAILURES DETECTION T F T F		LINEAR TRANSDUCER B G B G		SEIZURES B G PFC JACK RELAY JACK MECHANICAL LINKAGE		RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 	

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Test Set Display Panel - Test 3-15  
Figure 565

EFFECTIVITY: ALL

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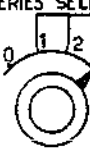


# Concorde

## MAINTENANCE MANUAL

(22) Test 3-16  
(Ref. Fig. 566 )

On test set, press then release RESET push-button  
- On ICOVOL indicator, pointers corresponding to the 6 elevons must indicate a deflection of the latter in the same direction.

CMA 27 17 00 5 FLMO

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">                     3 16                 </div>		SELECTION RESET B.MODE A/S1 G.MODE A/S2 M.MODE				TEST SERIES AUTOMATIC STEP BY STEP 			
CORRECT END FAIL		ICOVOL B G M A OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2 B1 B2 G1 G2 B1 B2 G1 G2		CONTROLS G1 G2 M1 M2 G1 G2 M1 M2 G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2 B/G1 B/G2 G/M1 G/M2 B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2 B1 B2 G1 G2 B1 B2 G1 G2	
STEP BY STEP 		INVERTERS B G B G		FAILURES DETECTION T F T F		LINEAR TRANSDUCER B G B G		SEIZURES B G PFC RELAY JACK MECHANICAL LINKAGE		RELAY JACK SOLENOID VALVES B G Y/B Y/G	
										FLT TEST 	

Test Set Display Panel - Test 3-16  
Figure 566

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

(23) Test 3-17  
(Ref. Fig. 567 )

On test set, press then release the RESET push-button  
- On ICOVOL indicator, pointers corresponding to  
rudders must indicate a deflection of the latter.

 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">                     3 17                 </div>		SELECTION RESET    B.MODE A/S1    G.MODE A/S2    M.MODE				TEST SERIES SELECTION  ORDER ON					
CORRECT    END    FAIL		ICOVOL B    G    M    A OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2 B1 B2 G1 G2 B1 B2 G1 G2		CONTROLS G1 G2 M1 M2 G1 G2 M1 M2 G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2 B/G1 B/G2 G/M1 G/M2 B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2 B1 B2 G1 G2 B1 B2 G1 G2			
STEP BY STEP 		INVERTERS B    G B    G		FAILURES DETECTION T    F T    F		LINEAR TRANSDUCER B    G B    G		SEIZURES B    G PFC    JACK RELAY    JACK MECHANICAL LINKAGE		RELAY JACK SOLENOID VALVES B    G Y/B    Y/G		FLT TEST 	

CMA 27 17 00 5 FNMO

Test Set Display Panel - Test 3-17  
Figure 567

EFFECTIVITY: ALL

**27-17-00**

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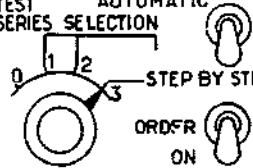


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# MAINTENANCE MANUAL

- On test set, press then release RESET push-button
- On Flight Control Unit, FAIL warning light of BLUE INVERTER must illuminate.
- On ICOVOL indicator, the 8 magnetic indicators must display G.

 		SERIES N°    TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">           3      18         </div> <div style="display: flex; justify-content: space-around;"> <span>CORRECT</span> <span>END</span> <span>FAIL</span> </div>		SELECTION <div style="display: flex; justify-content: space-around;"> <div>             RESET               A/S1               A/S2           </div> <div>             B.MODE               G.MODE               M.MODE           </div> </div>		TEST SERIES SELECTION 							
IC VOL OUT. MID    B    G    M    A ELEVONS <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> INNER <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> ELEVONS <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> RUDDER <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/>		PILOT VALVES B1    B2    G1    G2 <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/>		CONTROLS G1    G2    M1    M2 <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>		SELF LOCKING B/G1    B/G2    G/M1    G/M2 <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>		COMPARATORS B1    B2    G1    G2 <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>					
STEP BY STEP  RESET		INVERTERS B <input type="radio"/> G <input checked="" type="radio"/>		FAILURES DETECTION T    F <input checked="" type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/>		LINEAR TRANSDUCER B <input type="radio"/> G <input type="radio"/>		SEIZURES B    G PFC <input type="radio"/> JACK <input type="radio"/> RELAY <input type="radio"/> JACK <input type="radio"/> <input type="radio"/> MECHANICAL LINKAGE <input type="radio"/>		RELAY JACK SOLENOID VALVES B    G Y/B    Y/G <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>		FLT TEST 	

Test Set Display Panel - Test 3-18  
Figure 568

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EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

(25) Test 3-19  
(Ref. Fig. 569 )

On test set, press then release RESET push-button  
- On ICOVOL indicator, pointers corresponding to outer and middle elevons must indicate a deflection in opposite direction for RH and LH elevons.

  DIM BRIGHT		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">           3 19         </div>		SELECTION <div style="display: flex; justify-content: space-between;"> <div>           RESET            A/S1            A/S2         </div> <div>           B.MODE            G.MODE            M.MODE         </div> </div>				TEST SERIES SELECTION  STEP BY STEP  ORDER ON	
ICOVOL OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2		CONTROLS G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2	
STEP BY STEP  RESET		INVERTERS B G		FAILURES DETECTION T F		LINEAR TRANSDUCER B G		SEIZURES B G PFC JACK RELAY JACK MECHANICAL LINKAGE	
						RELAY JACK SOLENOID VALVES B G Y/B Y/G		FLT TEST 	

CMA 27 17 00 5 FSM0

Test Set Display Panel - Test 3-19  
Figure 569

EFFECTIVITY: ALL

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





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## MAINTENANCE MANUAL

(26) Test 3-20  
(Ref. Fig. 570 )

On test set, press then release RESET push-button  
- On ICOVOL indicator, pointers corresponding to the 6 elevons must indicate a deflection of these 6 elevons in the same direction.

 ON  DIM BRIGHT		SERIES N° TEST N° <div style="border: 1px solid black; padding: 5px; display: inline-block;">                     3    20                 </div>		SELECTION RESET    B.MODE A/S1    G.MODE A/S2    M.MODE				TEST SERIES AUTOMATIC 0 1 2 3 STEP BY STEP   ORDER ON	
ICOVOL OUT. MID ELEVONS    B    G    M    A INNER ELEVONS    B    G    M    A RUDDER    B    G    M    A		PILOT VALVES B1 B2 G1 G2 B1 B2 G1 G2 B1 B2 G1 G2		CONTROLS G1 G2 M1 M2 G1 G2 M1 M2 G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2 B/G1 B/G2 G/M1 G/M2 B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2 B1 B2 G1 G2 B1 B2 G1 G2	
STEP BY STEP  RESET		INVERTERS B    G B    G		FAILURES DETECTION T    F T    F		LINEAR TRANSDUCER B    G B    G		SEIZURES B    G PFC    JACK RELAY    JACK MECHANICAL LINKAGE	
						RELAY JACK SOLENOID VALVES B    G Y/B    Y/G		FLT TEST 	

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Test Set Display Panel - Test 3-20  
Figure 570

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

(27) Test 3-21  
(Ref. Fig. 571 )

On test set, press then release RESET push-button  
- On ICVOL indicator, pointers corresponding to the 2 rudders must indicate a deflection of these control surfaces.

		SERIES N° TEST N° <div style="border: 1px solid black; padding: 2px; display: inline-block;">3 21</div>		SELECTION RESET    B.MODE A/S1    G.MODE A/S2    M.MODE				TEST SERIES SELECTION 	
ICVOL OUT. MID ELEVONS    B    G    M    A INNER ELEVONS RUDDER		PILOT VALVES B1   B2   G1   G2		CONTROLS G1   G2   M1   M2		SELF LOCKING B/G1   B/G2   G/M1   G/M2		COMPARATORS B1   B2   G1   G2	
STEP BY STEP 		INVERTERS B    G		FAILURES DETECTION T    F		LINEAR TRANSDUCER B    G		SEIZURES B    G PFC    JACK RELAY    JACK MECHANICAL LINKAGE	
						RELAY JACK SOLENOID VALVES B    G Y/B    Y/G		FLT TEST 	

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Test Set Display Panel - Test 3-21  
Figure 571

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

(28) Test 3-22  
(Ref. Fig. 572 )

- On test set, pres then release RESET push-button
- On Flight Control Unit, FAIL warning light of BLUE INVERTER must go off.
  - On ICOVOL indicator, the 8 magnetic indicators must display B, and the 8 warning lights must go off.

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 		SERIES N° TEST N° <div style="border: 1px solid black; padding: 2px; display: inline-block;">3 22</div>		SELECTION RESET A/S1 A/S2		B.MODE G.MODE M.MODE		TEST SERIES SELECTION 		AUTOMATIC 	
CORRECT END FAIL		ICOVOL OUT. MID ELEVONS INNER ELEVONS RUDDER		PILOT VALVES B1 B2 G1 G2		CONTROLS G1 G2 M1 M2		SELF LOCKING B/G1 B/G2 G/M1 G/M2		COMPARATORS B1 B2 G1 G2	
STEP BY STEP 		INVERTERS B G		FAILURES DETECTION T F		LINEAR TRANSDUCER B G		SEIZURES B G PFC RELAY MECHANICAL LINKAGE		RELAY JACK SOLENOID VALVES B G Y/B Y/G	
										FLT TEST 	

Test Set Display Panel - Test 3-22  
Figure 572

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (29) On overhead panel, on AUTO STAB unit No.2 disengage PITCH, ROLL and YAW switches.
- (30) On Test set, press RESET push-button :
  - Wait 5 seconds approx then press push button again.
  - Number 3-23, then 3-00 must appear in display window.
  - The third test series is finished.

### G. Close-Up

- (1) On Test set : place switch, on control panel LH section, in off (down) position.
- (2) On overhead panel, on Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position.
- (3) Shut down pressurization of Blue and Green hydraulic systems (Ref. 29-12-00, Servicing) (Ref. 29-11-00, Servicing).
- (4) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).
- (5) On shelf 8-216 :
  - (a) Disconnect bundles TE 3015-301 and TE 3015-302
  - (b) Remove unit TE 3015-303
  - (c) Install and lock aircraft unit C110  
Take care to avoid damaging electrical connectors).
  - (d) On unit 2C31, disconnect bundle TE 3015-208 and install protective plugs on connectors ZA and ZB.
- (6) On shelf 8-215.  
Disconnect bundle TE 3015-207, connected to connectors ZA and ZB of unit 1C31 and install protective plugs on these connectors.
- (7) On panel 2-213, trip, safety and tag circuit breaker FLT. CONT & NAV. BUS 14XS (X355, Map ref H2)

EFFECTIVITY: ALL

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### 4. Functional Test - Substitute

**NOTE :** This test is to be performed only when the Flight Controls Electrical Circuits Test Set (Part Number 31-56-100) is not available.  
The following procedure shall be considered as a SUBSTITUTE which must not be applied under normal circumstances when above mentioned Test Set is available.  
Performing this test requires special items of equipment (cable extensions with expanded connector panel, voltage generators) which shall be assembled by the operator using the various diagrams included in the text.

#### A. General

This test is divided into 5 parts, each checking one or several functions :

- (1) First part : Check of PFCU and Relay Jack jamming detection logics.
- (2) Second part: Check :
  - of switching logic following comparator orders and pilot commands
  - of ICOVOL logic.
- (3) Third part : Check :
  - of linear transducers
  - of control surface position monitoring system
  - of inner elevon de-synchronization detection.
- (4) Fourth part: Check of 26V - 1800Hz static inverter protection units and of control mode switchings through these protection units
- (5) Fifth part : Check of autostabilization "open lanes" and of signal processing in the comparators.

#### B. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Wiring and items of equipment (test Set ups) assembled as per diagrams included in the text
---

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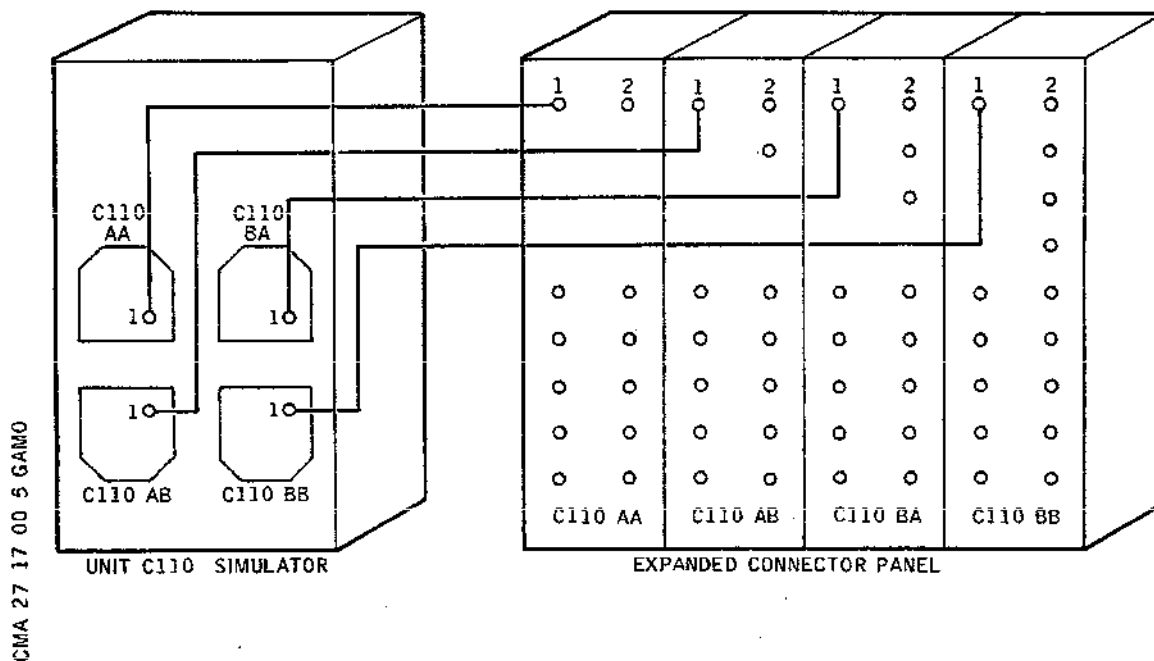


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## MAINTENANCE MANUAL

### C. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) On shelf 8-216, remove unit C110.
- (3) In place of this unit, install simulator unit C110 of wiring extension C110 shown in figure below.  
(Ref. Fig. 573 )



Wiring Extension C110  
Figure 573

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(4) On expanded connector panel of wiring extension shunt the following terminals :

- On connector C110AA : Shunt terminals : 10 and 21, 8 and 11, 40 and 41 and 26 and 42
- On connector C110AB : Shunt terminals : 10 and 21, 8 and 11, 20 and 34, 40 and 41, 42 and 39 and 26 and 27
- On connector C110BA : Shunt terminals 10 and 21, 8 and 11, 40 and 41, 26 and 42 and 49 and 50.  
On terminal 49 connect an additional lead, the free end of which shall be insulated.
- On connector C110BB : Shunt terminals 22 and 23, 26 and 40, and 21 and 34

(5) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
INNER ELVN CONT & MON. GRN. SUP 1	1-213	1C 53	M11
MID & OUTER ELVN CONT 2 MON GRN SUP		1C 55	M12
OUTER ELEVON NEUTRLN GRN SUP		1C 58	M13
INNER ELEVON CONT & MON GRN SUP 2		1C 59	M14
P.F.C.S. INV GRN FAIL IND		1C 73	M15
AUDIO WARN SYS SUP 1		W 379	M21
RUDDER CONT & MON GRN SUP		1C 62	N21
RUDDER MON LOGIC GRN SUP		1C 63	N12
P.F.C.S. ALL SURFACES MON GRN SUP		1C 54	N13
P.F.C.S. INV BLUE FAIL SUP		1C 67	N14
P.F.C.S. INV GRN PROTN CONT		1C 68	N15
RELAY JACK HYD SEL IND & SUP		C 281	N17
P.F.C. IND		C 287	N13
M.W.S. SUP 1		W 252	N21
P.F.C.S. INV GRN SUP		1C 65	P11
YELL/GRN GRN FAIL		C 285	P16
YELL/BLUE BLUE FAIL		C 286	P17
YELL L.L		C 288	P18

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT POSN IND CONT		C 83	R11
LAT ACCELMTR 1 26V SUP	2-213	1C 42	A 4
FLT CONT POSN IND 26V 400HZ SUP		C 84	B 4
OUTER ELEVON AMP BLUE SUP		2C 44	C 1
INNER ELEVON BLUE CONT SUP		2C 94	C 2
MID ELEVON AMP BLUE SUP		2C 93	C 3
MID & OUTER ELEVON BLUE CONT SUP		2C 92	C 4
INNER		2C 47	D 1
MIDDLE & OUTER		2C 46	D 2
RUDDER MON BLUE SUP		2C 49	D 3
RUDDER BLUE 26V 1800HZ CONT SUP		2C 76	D 4
P.F.C.S. INV. BLUE PROTN SUP		2C 71	D 5
OUTER ELEVON AMP GRN SUP		1C 44	E 1
INNER ELEVON GRN CONT SUP		1C 94	F 1
MID ELEVON AMP GRN SUP		1C 93	F 2
INNER		1C 47	G 1
MIDDLE & OUTER		1C 46	G 2
RUDDER MON GRN SUP		1C 49	G 3
P.F.C.S. INV. GRN. PROTN SUP		1C 71	G 5
MID & OUTER ELEVON GRN CONT SUP		1C 92	H 5
RUDDER GRN 26V 1800HZ CONT SUP		1C 76	H 6
YELL L/LEVEL	3-213	C 282	A 8
YELL/GRN GRN FAIL		C 283	A 9
YELL/BLUE BLUE FAIL		C 284	A10
P.F.C.S. INV BLUE SUP	5-213	2C 65	B14
RUDDER CONT & MON		2C 62	C11
RUDDER MON LOGIC		2C 63	C12
P.F.C.S. IN GRN FAIL SUP		2C 67	C13
P.F.C.S. INV. BLUE PROTN CONT		2C 68	C14
AUDIO WARN SYS SUP 2		W 372	C17
INNER ELEVON CONT & MON BLUE SUP 1		2C 53	D11
MID & OUTER ELEVON CONT & MON BLUE SUP		2C 55	D12
OUTER ELEVON NEUTRLN BLUE SUP		2C 58	D13

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
INNER ELEVON CONT & MON BLUE SUP 2		2C 59	D14
M.W.S. SUP 2		W 251	D15
P.F.C.S. INV BLUE FAIL IND		2C 73	E11
P.F.C.S. ALL SURFACES MON		2C 54	E12
P.F.C.S. TEST UNIT AC SUP	13-215	C 113	A 6
LAT ACCELMTR 2 26V SUP	13-216	2C 42	B16
AUTOSTAB 2 COMP SUP		2C 37	D17
P.F.C.S. TEST UNIT DC SUP	15-215	C 114	A 5

- (6) On panel 2-213, remove safety clip and tag and set circuit breaker :  
FLT CONT & NAV BUS 14XS (X355, Map Ref H2)
- (7) On overhead panel
- (a) On Flight Control Unit, make certain that BLUE INVERTER and GREEN INVERTER switches are in PWR OFF position, that O & M ELEVONS, IN ELEVONS and RUDDER switches are in PWR OFF position and that ANTI STALL SYSTEM switches are in OFF position.
- (b) On SERVO CONTROLS unit, make certain that both switches are in NORMAL position.
- (c) On RELAY JACK unit, make certain that switch is in NORM position.
- (8) Make certain that trim controls are at zero.
- (9) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing). (Do not take visual or aural warnings which are not mentioned into account).
- (10) Pressurize Blue and Green hydraulic systems (Ref. 29-12-00, Servicing ; 29-11-00, Servicing).
- (11) On overhead panel

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### (a) On Flight Control Unit :

- Place GREEN INVERTER and BLUE INVERTER switches in ON position
- Place O & M ELEVONS, IN ELEVONS and RUDDER switches in BLUE position, then press RESET push-button located on RH side of each switch.
  - On ICOVOL indicator (First Officer's instrument panel) the 8 magnetic indicators must display B.
- Press and release MECH JAM warning light
  - This warning light must go off.

### (b) On master warning panel, press and release PFC warning light

- This warning light must go off.

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### D. Test - First Part

**NOTE** : When, in "ACTIONS" column, it is indicated :  
"apply + 28V to terminal ...", this voltage must  
be taken from terminal 2 of connector C110-AA.

NO.	ACTIONS	RESULTS ON AIRCRAFT (OR EQUIPMENT)
1-1	Apply + 28V to terminal 14 of connector C110-AA (To simulate a green jamming signal from an outer or middle elevon PFCU).	GREEN JAM caption light illuminated on SERVO CONTROLS unit of overhead panel.
1-2	Remove + 28V from terminal 14 on connector C110-AA.	GREEN JAM caption light remains illuminated (Check of Fault indication self-hold function)
1-3	On SERVO CONTROLS unit place upper switch in GREEN JAM position then in NORMAL position (Momentary shut-down of Green hydraulic pressure)	GREEN JAM caption light goes off. (Check of warning cancellation by Green hydraulic pressure drop detection)
1-4	Apply + 28V to terminal 14 of connector C110-BA. (To simulate a Green jamming signal from an inner elevon PFCU)	Identical with 1-1 above
1-5	Remove + 28V from terminal 14 of connector C110-BA	Identical with 1-2 above
1-6	Repeat operation 1-3 above	Identical with 1-3
1-7	Apply + 28V to terminal 14 of connector C110-BB. (To simulate a Green jamming signal from a rudder PFCU)	Identical with 1-1
1-8	Remove + 28V from terminal 14 of connector C110-BB	GREEN JAM caption light remains illuminated (Check of Fault indication self-hold function)

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NO.	ACTIONS	RESULTS ON AIRCRAFT (OR EQUIPMENT)
1-9	On SERVO CONTROLS unit, place upper switch in GREEN JAM position, then in NORMAL position. (Momentary shut down of Green hydraulic pressure)	GREEN JAM caption light goes off (Check of warning cancellation by Green hydraulic pressure drop detection).
1-10	On Flight Control Unit, place O & M ELEVONS, IN. ELEVONS and RUDDER switches in GREEN position.	On ICOVOL indicator, the 8 magnetic indicators display G.
1-11	Apply + 28V to terminal 13 of connector C110-AA (to simulate a Blue jamming signal from an Outer or Middle elevon PFCU)	BLUE JAM caption light illuminates on SERVO CONTROLS unit.
1-12	Remove + 28V from terminal 13 of connector C110-AA	BLUE JAM caption light remains illuminated (Check of Fault indica- tion self-hold function).
1-13	On SERVO CONTROLS unit place upper switch in BLUE JAM position then in NORMAL position. (Momentary shut down of Blue hydraulic pressure)	BLUE JAM caption light goes off. (Check of warning cancellation by Blue hydraulic pressure drop detection)
1-14	Apply + 28V to terminal 13 of connector C110-BA. (To simulate a Blue jamming signal from an inner elevon PFCU)	Identical with 1-11 above
1-15	Remove + 28V from terminal 13 of connector C110-BA	BLUE JAM caption light remains illuminated
1-16	Repeat operation 1-13 above	Identical with 1-13 above
1-17	Apply + 28V to terminal 13 of connector C110-BB (To simulate a Blue jamming signal from a rudder PFCU)	BLUE JAM caption light illuminates on SERVO CONTROLS unit

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NO.	ACTIONS	RESULTS ON AIRCRAFT (OR EQUIPMENT)
1-18	Remove + 28V from terminal 13 of connector C110-BB	BLUE JAM caption light remains illuminated. (Check of Fault indication self-hold function)
1-19	On SERVO CONTROLS unit, place upper switch in BLUE JAM position then in NORMAL position. (Momentary shut down of Blue hydraulic pressure)	BLUE JAM caption light goes off. (Check of warning cancellation by Blue hydraulic pressure drop detection)
1-20	On Flight Control Unit, place O & M ELEVONS, IN ELEVONS and RUDDER switches in MECH position.	On ICOVOL indicator, the 8 magnetic indicators display M.
1-21	Apply + 28V to terminals 13 and 14 of connector C110-AA	BLUE JAM and GREEN JAM caption lights illuminate
1-22	Remove + 28V from terminals 13 and 14 of connector C110-AA, then, on SERVO CONTROLS unit, place upper switch in BLUE JAM position then in GREEN JAM and finally in NORMAL position.	BLUE JAM then GREEN JAM caption lights go off.
1-23	Apply + 28V to terminals 13 and 14 of connector C110-BA	Identical with 1-21 above
1-24	Repeat operation 1-22 above	Identical with 1-22 above
1-25	Apply + 28V on terminals 13 and 14 of connector C110-BB	Identical with 1-21 above
1-26	Repeat operation 1-22 above	Identical with 1-22 above
1-27	Apply + 28V to terminal 30 of connector C110-AB (to simulate a Blue jamming signal from a Relay Jack)	On RELAY JACK unit, BLUE JAM caption light illuminates. Check for 28VDC between terminals 65, then 67 of connector

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NO.	ACTIONS	RESULTS ON AIRCRAFT (OR EQUIPMENT)
		C110-AB and ground. (Check for shut down of Blue and Yellow/Blue hydraulic supply to Relay jacks)
1-28	Remove +28V from terminal 30 of connector C110-AB. Apply + 28V to terminal 52 of connector C110-AB (To simulate Green jamming after Blue jamming of a Relay Jack)	On RELAY JACK unit, BLUE JAM and GREEN JAM caption lights are illuminated (Check of Blue jamming indication self-hold function and check that Green jamming indication is normally inhibited after a Blue jamming)
1-29	Remove + 28V from terminal 52 of connector C110-AB ; apply briefly + 28V to terminal 64 of connector C110-AB. (To simulate successive selections of BLUE ONLY and GREEN ONLY for the RELAY Jacks)	BLUE JAM and GREEN JAM caption lights are off. Check that there is 0 V between terminal 65, then terminal 67 of connector C110-AB and ground. (Check of jamming indi- cation cancellation af- ter a pressure shut down)
1-30	Apply + 28V to terminal 43 of connector C110-AB. (To simulate Green jamming of a Relay Jack)	GREEN JAM caption light illuminated. Check for 28 VDC between terminal 62, then 63 of connector C110-AB and ground. Check for Green and Yellow/Green hydraulic supply shut down)
1-31	Remove + 28V from terminal 43 of connector C110-AB ; apply + 28V to terminal 51 of connector C110-AB. (To simulate Blue jamming after Green jamming of a Relay Jack)	BLUE JAM and GREEN JAM caption lights illumina- ted. (Check of Green jamming indication self- hold function and check that Blue Jamming indi- cation is normally inhi- bited after Green jam- ming)
1-32	Remove + 28V from terminal	BLUE JAM and GREEN JAM

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NO.	ACTIONS	RESULTS ON AIRCRAFT (OR EQUIPMENT)
	51 of connector C110-AB ; apply briefly + 28V to terminal 64 of connector C110-AB. (To simulate BLUE ONLY and GREEN ONLY successive selections)	caption lights are off. Check that there is 0 V between terminal 62, then 63 of connector C110-AB and ground)
1-33	On Flight Control Unit, place O & M ELEVONS, IN ELEVONS and RUDDER switches in BLUE position then press each RESET push-button located on RH side of switches	On ICOVOL indicator, the 8 magnetic indicators display B

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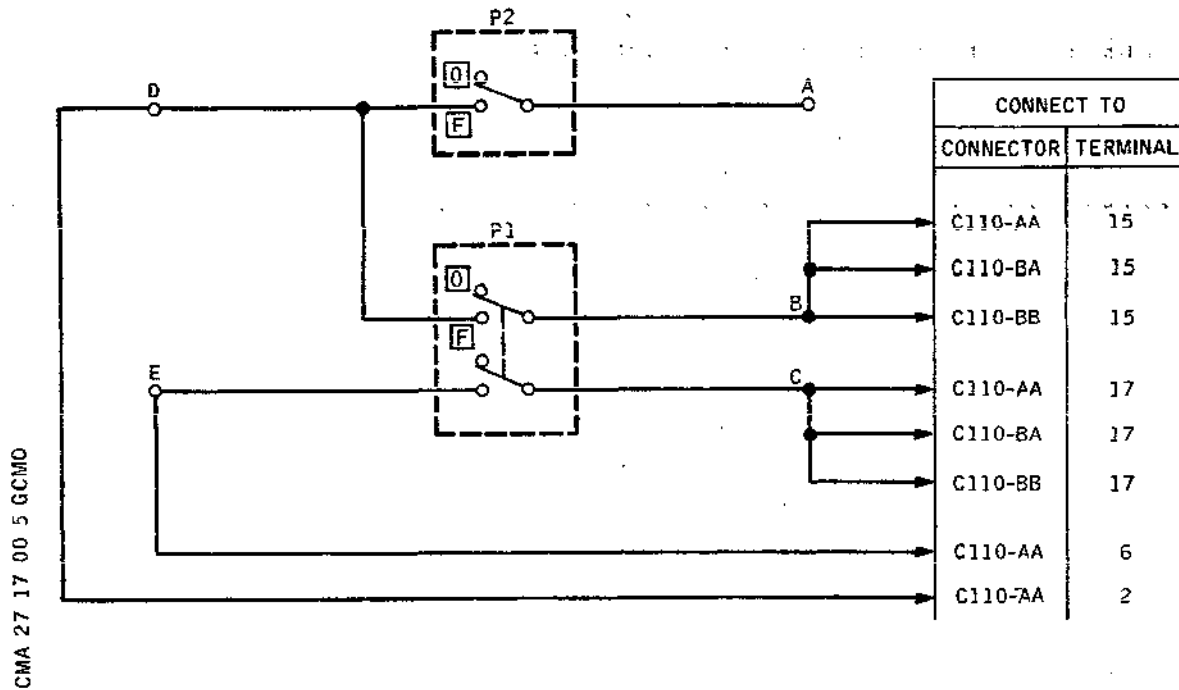
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### E. Test - Second Part

#### (1) Preliminary operations

- (a) Assemble test Wiring as per diagram below.  
(Ref. Fig. 574 )



Test Wiring No.1  
Figure 574

- (b) With both switches, P1 and P2, of test set up in 0 (open) position, connect points B, C, D and E to terminals of connectors facing these points as shown in figure.
- (c) On static monitoring change over unit C56 (on shelf 8-216) make certain that the 6 Blue indicator lights are illuminated and the 6 Green indicator lights are off.

#### (2) Test Procedure

NOTE : ACTIONS must be carried out following indicated

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order.

NO.	ACTIONS	RESULTS ON AIRCRAFT (OR EQUIPMENT)
2-1	Connect point A of wiring No.1 to terminal 66 of connector C110-AA. Place P1 switch, then P2 switch in F (ON) position. (Permanent reset and fault-simulation detected by a channel of Blue comparator of each associated control surface assembly	<ul style="list-style-type: none"><li>- On unit C56, the 6 Blue indicator lights go off and the 6 Green indicator lights illuminate</li><li>- On ICOVOL indicator the 8 magnetic indicator display G and the 8 red warning lights are illuminated</li><li>- Gong sounds and PFC warning light is illuminated on master warning panel of overhead panel</li><li>- Check for 28VDC between terminal 18 then 29 of connector C110-AA and ground. (Check of Green channel self-hold after channel change over from Blue to Green)</li></ul>
2-2	Place P2 switch in O (OFF) position. Disconnect point A of wiring. Place P1 switch in O (OFF) position <ul style="list-style-type: none"><li>- On ICOVOL indicator press and release RESET push button</li></ul>	<ul style="list-style-type: none"><li>- On unit C56, the 6 Green indicator lights go off and the 6 Blue indicator lights illuminate</li><li>- On ICOVOL indicator, the 8 magnetic indicators display B and the 8 red warning lights are off.</li><li>- PFC warning light is off</li></ul>
2-3	Connect point A of test Wiring to terminal 66 of connector C110-AB. Place P1 switch, then P2 switch in F (ON) position. (Permanent reset and fault simulation detected by the second channel of Blue comparator of each	Identical with 2-1

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NO.	ACTIONS	RESULTS ON AIRCRAFT (OR EQUIPMENT)
	associated control surface assembly)	
2-4	Repeat operation 2-2 above	Identical with 2-2
2-5	On Flight Control Unit (overhead panel) place O & M ELEVONS, IN ELEVONS and RUDDER switches in GREEN position	<ul style="list-style-type: none"><li>- On unit C56, the 6 Blue indicator lights go off and the 6 green indicator lights illuminate</li><li>- On ICOVOL indicator, the 8 magnetic indicators display G</li><li>- Check for 28VDC between ground and terminal 38 of each connector C110-AA, C110-BA and C110-BB and also terminal 58 of each of the three connectors. (Check that both stages of O &amp; M ELEVONS, IN ELEVONS and RUDDER switches correctly transmit Blue to Green channel change over signal)</li></ul>
2-6	Connect point A of test wiring to terminal 66 of connector C110-BA. Place switch P1, then P2 in F (ON) position. (Permanent reset and failure simulation detected by one channel of the Green comparator of each associated control surface assembly)	<ul style="list-style-type: none"><li>- On unit C56, all indicator lights are off.</li><li>- On ICOVOL indicator, the 8 magnetic indicators display M ; the 8 red warning lights are illuminated</li><li>- PFC warning light is illuminated and gong sounds</li><li>- Check for 28VDC between terminal 9, then 28 of connector C110-AA and ground. (Check of mechanical channel self-hold after Green to mechanical change over)</li></ul>

EFFECTIVITY: ALL

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NO.	ACTIONS	RESULTS ON AIRCRAFT (OR EQUIPMENT)
2-7	Place switch P2 in 0 (OFF) position then disconnect point A of test wiring Place switch P1 in 0 (OFF) position Press and release RESET push-button on ICOVOL indicator	<ul style="list-style-type: none"> <li>- On unit C56, the 6 Green indicator lights illuminate, and the 6 Blue indicator lights go off.</li> <li>- On ICOVOL indicator, the 8 magnetic indicators display G and the 8 red warning lights are off</li> <li>- PFC warning light goes off</li> </ul>
2-8	Connect point A of test wiring to terminal 66 of connector C110-BB Place switch P1, then P2 in F (ON) position (Permanent reset and failure simulation, detected by the second channel of the Green comparator of each associated control surface assembly)	Identical with 2-6
2-9	Repeat operation 2-7 above	Identical with 2-7
2-10	On Flight Control Unit place 0 & M ELEVONS, IN ELEVONS and RUDDER switches in MECH position	<ul style="list-style-type: none"> <li>- On unit C56, all indicator lights are off</li> <li>- On ICOVOL indicator, the 8 magnetic indicators display M.</li> <li>- Check for 28VDC between ground and each terminal 33 of each connector C110-AA, C110-BA and C110-BB, and each terminal 64 of each above mentioned connector</li> </ul> <p>(Check that both stages of 0 &amp; M ELEVONS, IN ELEVONS and RUDDER switches correctly transmit Green to mechanical channel change over signal).</p>

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NO.	ACTIONS	RESULTS ON AIRCRAFT (OR EQUIPMENT)
2-11	On Flight Control Unit, place O & M ELEVONS, IN ELEVONS and RUDDER switches in BLUE position, then press any one of the three RESET push-buttons (RH side of switches)	<ul style="list-style-type: none"><li>- On unit C56, the 6 Blue indicator lights are illuminated</li><li>- On IC0VOL indicator, the 8 magnetic indicators display B.</li></ul>
2-12	Momentarily apply + 28V to terminal 38 of each connector C110-AA, C110-BA and C110-BB (To simulate Green channel selection by only one stage of O & M ELEVONS, IN ELEVONS and RUDDER switches)	<ul style="list-style-type: none"><li>- On unit C56, the 6 Blue indicator lights go off ; the 6 Green indicator lights are illuminated</li><li>- On IC0VOL indicator, the 8 magnetic indicators display G. (Only one channel of each card of the static monitoring change over unit C56 is sufficient to cause a channel change over : Blue to Green)</li></ul>
2-13	Momentarily apply + 28V to terminal 33 of each connector C110-AA, C110-BA and C110-BB (To simulate a mechanical channel selection by only one stage of O & M ELEVONS, IN ELEVONS and RUDDER)	<ul style="list-style-type: none"><li>- On unit C56, all indicator lights are off</li><li>- On IC0VOL indicator, the 8 magnetic indicators display M. (Only one channel of each board of the static monitoring change over unit C56 is sufficient to cause a channel change over : Green to Mechanical)</li></ul>
2-14	On Flight Control Unit press and release any one of the three RESET push-buttons located on RH side of above mentioned switches	Identical with 2-2
2-15	Momentarily apply + 28V to terminal 58 of each connector C110-AA, C110-BA	

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NO.	ACTIONS	RESULTS ON AIRCRAFT (OR EQUIPMENT)
	and C110-BB. (To simulate a Green channel selection by the second stage of O & M ELEVONS, IN ELEVONS and RUDDER switches)	Identical with 2-12
2-16	Momentarily apply + 28V to terminal 64 of each connector C110-AA, C110-BA and C110-BB (To simulate mechanical channel selection by the second stage of above mentioned switches)	Identical with 2-13
2-17	Disconnect test wiring No.1 On Flight Control Unit press the 3 RESET push buttons (RH side of above mentioned switches)	Identical with 2-2

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### F. Test - Third Part

#### (1) Preliminary Operations

- (a) Assemble the 3 test set ups as per diagrams below  
(Ref. Fig. 575, 576 and 577)
- (b) Connect Test Wiring No.3 to terminals of connectors C110-AA, C110-BA and C110-BB, indicated on test wiring diagram ; make certain that switch P4 is in 0 (open) position.
- (c) Connect terminals 1, 6 and 2 of test set up No.4 to terminals 1, 6 and 2 of connector C110-AA ; terminals G and H of this set up are, momentarily not connected and insulated.

EFFECTIVITY: ALL

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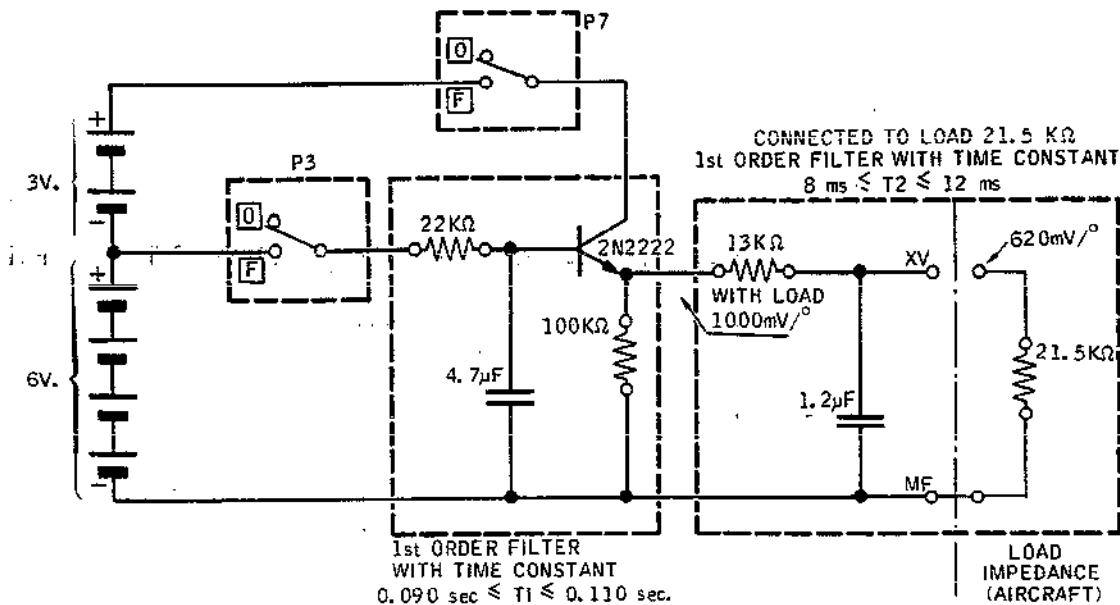
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## MAINTENANCE MANUAL

CMA 27 17 00 5 GEMO



NOTE : POWER SUPPLY MUST BE ISOLATED FROM THE AIRCRAFT GROUND

Test Set up No.2  
Figure 575

NOTE : This set up is designed to supply a voltage :

- isolated from the aircraft ground. (This must be taken into account if another method is used to obtain this voltage).
- varying from 0 V to 5.5 Volt approximately with double integration to obtain a ramp representing an order of a 40°/sec approximate maximum rate and with a rate progressively increasing from the start
- the output being connected to a 21.5 KΩ load impedance

EFFECTIVITY: ALL

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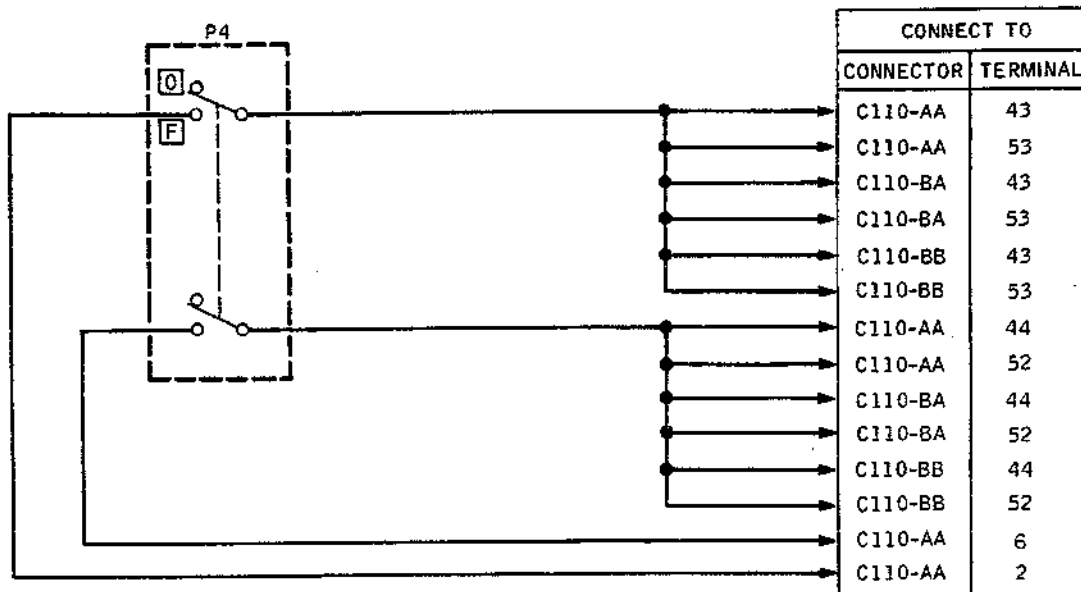
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CMA 27 17 00 5 GCMO



Test Wiring No.3  
Figure 576

**NOTE :** This test wiring is designed to cut off the connection (in static monitoring change over unit C56) between the comparators and the switching logic circuits by simultaneously applying + 28V and a ground, and to switch the comparator to the test sockets.

EFFECTIVITY: ALL

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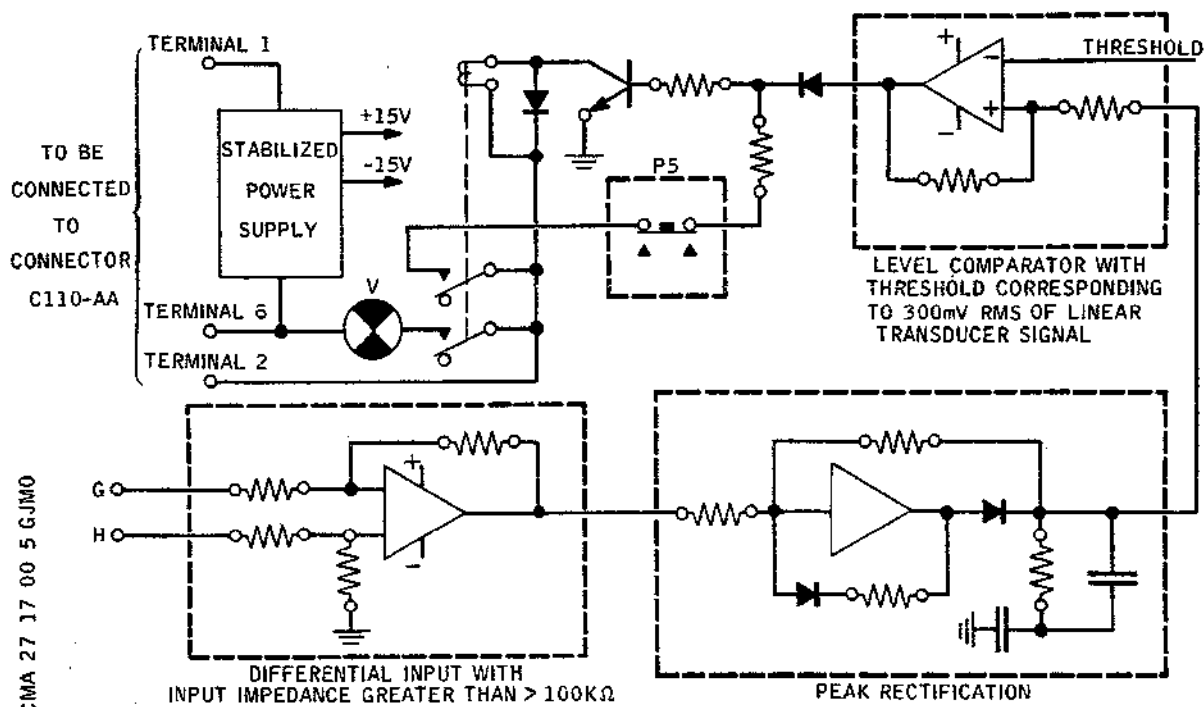
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Test Set up No.4  
Figure 577

**NOTE :** The purpose of this set up is to detect transient signals (of less than 100 milliseconds) from the linear transducers and to memorize this information by self maintaining illumination of indicator light V.

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### (2) Test procedure

NOTE : In the various "ACTIONS" listed below, it is indicated to connect some terminals of the test set ups or wiring to terminals of connectors C110-AA, C110-AB, C110-BA or C110-BB. Some of these terminals are already occupied by shunts connected during operations of Prepare paragraph. In this case, the shunt is removed and terminal of test wiring is connected to terminal of indicated connector C110. It is not necessary to re-connect this shunt before the end of the test.

NO.	ACTIONS	RESULTS ON AIRCRAFT (OR EQUIPMENT)
3-1	Connect terminal MF of Test set up No.2 to terminal 27 of connector C110-AB and terminal XV of this set up to terminal 42 of connector C110-AA (input of LH outer elevon Blue amplifier). Connect terminal G of test set up No.4 to terminal 50 of connector C110-AA and terminal H of this set up to terminal 37 of the same connector C110-AA (LH outer elevon Blue linear transducer) Place switch P4 of test wiring No.3 in F (ON) position.	
3-2	On test set up No.2, place switch P7 then P3 in F (ON) position. (To simulate failure on LH outer elevon in Blue mode)	V indicator light on test set up No.4 illuminate (B linear transducer has correctly transmitted its signal) - On ICOVOL indicator, LH outer elevon deflects, 5 to 6 degrees - Check for 28 volts between terminal 54 then 55 of connector C110-AA and ground (Fault is detected by the two channels of

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NO.	ACTIONS	RESULTS ON AIRCRAFT (OR EQUIPMENT)
		the blue comparator)
3-3	On Test set up No.2, place switch P3 in 0 (OFF) position, then disconnect terminal VX of this set up	- On ICOVOL indicator, LH OUTER elevon return to neutral
3-4	On Test set up No.4, press and release push button P5, then place switch P4 of test wiring No.3 in 0 (OFF) position.	V indicator light on test set up No.4 goes off
3-5	Connect terminal XV of Test Set up No.2 to terminal 42 of connector C110-AB (input of LH MIDDLE elevon Blue amplifier) Disconnect terminals G and H of Test set up No.4 then connect these terminals respectively to terminals 50 and 37 of connector C110-AB (LH MIDDLE elevon linear transducer) Place switch P4 of test wiring No.3 in F position (disconnecting of comparators, then place switch P3 of test set up No.2 in F position (to simulate a failure of LH MIDDLE elevon in Blue mode)	V indicator light on test set up No.4 illuminates (as in 3-2) - On ICOVOL indicator, LH MIDDLE elevon deflects, 5 to 6 degrees - Check for 28V between terminals 54 then 55 of connector C110-AA and ground (as in 3-2)
3-6	Identical with 3-3	Identical with 3-3
3-7	Identical with 3-4	Identical with 3-4
3-8	Connect terminal XV of test set up No.2 to terminal 41 of connector C110-AB (input of RH MIDDLE elevon Blue amplifier) Disconnect terminals G and H of test set up No.4, then connect these terminals	V indicator light of test set up No.4 illuminates (as in 3-2) - On ICOVOL indicator, RH MIDDLE elevon deflects, 5 to 6 degrees - Check for 28 volts

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NO.	ACTIONS	RESULTS ON AIRCRAFT (OR EQUIPMENT)
	respectively to terminals 61 and 49 of connector C110-AB (RH MIDDLE elevon Blue linear transducer) - Place switch P4 of test wiring No.3 in F position, then switch P3 of test set up No.2 in F position (to simulate a failure of RH middle elevon in Blue mode)	between terminals 54 then 55 of connector C110-AA and ground (as in 3-2)
3-9	Identical with 3-3	Identical with 3-3
3-10	Identical with 3-4	Identical with 3-4
3-11	Connect terminal XV of set up No.2 to terminal 41 of connector C110-AA (input of RH OUTER elevon Blue amplifier). Disconnect terminals G and H of test set up No.4, then connect these terminals respectively to terminals 61 and 49 of connector C110-AA (RH OUTER elevon Blue linear transducer) - Place switch P4 of test wiring No.3 in F position, then switch P3 of test set up No.2 in F position (to simulate failure of RH OUTER elevon in Blue mode)	V indicator light of test set up NO.4 illuminates (as in 3-2) - On ICOVOL indicator, RH OUTER elevon deflects, 5 to 6 degrees. - Check for 28 volts between terminal 54, then 55 of connector C110-AA and ground (as in 3-2)
3-12	Identical with 3-3	Identical with 3-3
3-13	Identical with 3-4	Identical with 3-4
3-14	Connect terminal XV of test set up No.2 to terminal 42 of connector C110-BA (input of LH INNER elevon Blue amplifier) - Disconnect terminals G	V indicator light of test set up No.4 illuminates (as in 3-2) - On ICOVOL indicator, LH INNER elevon deflects, 5 to 6

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NO.	ACTIONS	RESULTS ON AIRCRAFT (OR EQUIPMENT)
	and H of test set up No.4, then connect these terminals respectively to connectors 23 and 12 of connector C110-AA (LH INNER elevon Blue linear transducer) - Place switch P4 of test wiring No.3 in F position, then switch P3 of test set up No.2 in F position (to simulate failure of LH inner elevon)	degrees - Check for 28V between terminal 54, then 55 of connector C110-BA and ground (as in 3-2)
3-15	Identical with 3-3	Identical with 3-3
3-16	Identical with 3-4	Identical with 3-4
3-17	Connect terminal XV of set up NO.2 to terminal 41 of connector C110-BA (input of RH INNER elevon Blue amplifier) - Disconnect terminals G and H of set up No.4, then connect respectively these terminals to terminals 23 and 12 of connector C110-AB (RH INNER elevon Blue linear transducer) Place switch P4 of test wiring No.3 in F position, then switch P3 of set up No.2 in F position (to simulate failure of RH INNER elevon in Blue mode)	V indicator light of set up No.4 illuminates (as in 3-2) - On ICOVOL indicator, RH INNER elevon deflects, 5 to 6 degrees - Check for 28 volts between terminal 54 then 55 of connector C110-BA and ground (as in 3-2)
3-18	Identical with 3-3	Identical with 3-3
3-19	Identical with 3-4	Identical with 3-4
3-20	Connect terminal XV of set up No.2 to terminal 26 of connector C110-AB (input of UPPER rudder Blue amplifier)	V indicator light of set up No.4 illuminates (as in 3-2) - On ICOVOL indicator, UPPER rudder deflects

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NO.	ACTIONS	RESULTS ON AIRCRAFT (OR EQUIPMENT)
	Disconnect terminals G and H of set up No.4, then connect them respectively to terminals 22 and 35 of connector C110-AB (UPPER rudder Blue linear transducer) - Place switch P4 of wiring No.3 in F position then switch P3 of set up No.2 in F position (to simulate failure of UPPER rudder in Blue mode)	7 to 8 degrees - Check for 28 volts between terminals 54 then 55 of connector C110-BB and ground (as in 3-2)
3-21	Identical with 3-3	Identical with 3-3
3-22	Identical with 3-4	Identical with 3-4
3-23	Connect terminal XV of set up No.2 to terminal 26 of connector C110-BB (input of LOWER rudder Blue amplifier) - Disconnect terminals G and H of set up No.4, then connect them respectively to terminals 22 and 34 of connector C110-AA (LOWER rudder Blue linear transducer) - Place switch P4 of wiring No.3 in F position then switch P3 of set up No.2 in F position (to simulate failure of LOWER rudder in Blue mode)	V indicator light illuminates (as in 3-2) - On ICOVOL indicator, LOWER rudder deflects, 7 to 8 degrees - Check for 28V between terminals 54, then 55 of connector C110-BB and ground. (as in 3-2)
3-24	Identical with 3-3	Identical with 3-3
3-25	Identical with 3-4	Identical with 3-4
3-26	On Flight Control Unit, place O & M ELEVONS, IN ELEVONS and RUDDER switches in GREEN position.	On ICOVOL indicator the 8 magnetic indicators display G.

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NO.	ACTIONS	RESULTS ON AIRCRAFT (OR EQUIPMENT)
	- Disconnect terminal MF of test set up No.2 from terminal 27 of connector C110-AB and connect it to terminal 20 of connector C110-AB	
3-27	Connect terminal XV of set up No.2 to terminal 11 of connector C110-AA (input of LH OUTER elevon Green amplifier). Disconnect terminals G and H of set up No.4, then connect them respectively to terminals 1 and 2 of connector C110-BA (LH OUTER elevon Green linear transducer) Place switch P4 of wiring No.3 in F position, then switch P3 of set up No.2 in F position (to simulate failure of LH OUTER elevon in Green mode)	V indicator light of set up No.4 illuminates (Green linear transducer has transmitted its signal correctly) - On ICOVOL indicator, LH OUTER elevon deflects, 5 to 6 degrees - Check for 28 volts between terminals 45, then 65 of connector C110-AA and ground (failure is detected by the two channels of the Green comparator)
3-28	Identical with 3-3	Identical with 3-3
3-29	Identical with 3-4	Identical with 3-4
3-30	Connect terminal XV of set up No.2 to terminal 11 of connector C110-AB (input of LH MIDDLE elevon Green amplifier) Disconnect terminals G and H of set up No.4, then connect them respectively to terminals 1 and 2 of connector C110-BB (LH MIDDLE elevon Green linear transducer) - Place switch P4 of wiring No.3 in F position then switch P3 of set up No.2 in F position (to simulate	V indicator light illuminates (as in 3-27) - On ICOVOL indicator, LH MIDDLE elevon deflects, 4 to 5 degrees - Check for 28 volts between terminals 45 then 65 of connector C110-AA and ground (as in 3-27)

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NO.	ACTIONS	RESULTS ON AIRCRAFT (OR EQUIPMENT)
	failure of LH MIDDLE elevon)	
3-31	Identical with 3-3	Identical with 3-3
3-32	Identical with 3-4	Identical with 3-4
3-33	<p>Connect terminal XV of set up No.2 to terminal 10 of connector C110-AB (input of RH MIDDLE elevon Green amplifier)</p> <p>- Disconnect terminals G and H of set up No.4 then connect them respectively to terminals 24 and 25 of connector C110-BB (RH MIDDLE elevon Green linear transducer)</p> <p>- Place switch P4 of wiring No.3 in F position then switch P3 of set up No.2 in F position (to simulate failure of RH MIDDLE elevon)</p>	<p>V indicator light illuminates (as in 3-27)</p> <p>- On ICOVOL indicator, RH MIDDLE elevon deflects, 4 to 5</p> <p>Check for 28 volts between terminals 45 then 65 of connector C110-AA and ground (as in 3-27)</p>
3-34	Identical with 3-3	Identical with 3-3
3-35	Identical with 3-4	Identical with 3-4
3-36	<p>Connect terminal XV of set up No.2 to terminal 10 of connector C110-AA (input of RH OUTER elevon Green amplifier)</p> <p>- Disconnect terminals G and H of set up No.4, then connect them respectively to terminals 24 and 25 of connector C110-BA (RH OUTER elevon Green linear transducer)</p> <p>Place switch P4 of wiring No.3 in F position, then switch P3 of set up No.2 in F position (to simulate failure on RH OUTER elevon)</p>	<p>V indicator light illuminates (as in 3-27)</p> <p>- On ICOVOL indicator, RH OUTER elevon deflects 4 to 5 degrees</p> <p>Check for 28 volts between terminals 45, then 65 of connector C110-AA and ground (as in 3-27)</p>

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NO.	ACTIONS	RESULTS ON AIRCRAFT (OR EQUIPMENT)
3-37	Identical with 3-3	Identical with 3-3
3-38	Identical with 3-4	Identical with 3-4
3-39	<p>Connect terminal XV of set up No.2 to terminal 11 of connector C110-BA (input of LH INNER elevon Green amplifier)</p> <p>Disconnect terminals G and H of set up No.4, then connect them respectively to terminals 7 and 16 of connector C110-BA (LH INNER elevon Green linear transducer)</p> <p>Place switch P4 of wiring No.3 in F position, then switch P3 of set up No.2 in F position (to simulate failure on LH INNER elevon)</p>	<p>V indicator light illuminates (as in 3-27)</p> <p>On ICOVOL indicator, LH INNER elevon deflects, 5 to 6 degrees</p> <p>Check for 28 V between terminal 45 then 65 of connector C110-BA and ground (as in 3-27)</p>
3-40	Identical with 3-3	Identical with 3-3
3-41	Identical with 3-4	Identical with 3-4
3-42	<p>Connect terminal XV of set up No.2 to terminal 10 of connector C110-BA (input of RH INNER elevon Green amplifier)</p> <p>Disconnect terminals G and H of set up No.4, then connect them respectively to terminals 7 and 16 of connector C110-BB (RH INNER elevon Green linear transducer)</p> <p>- Place switch P4 of wiring No.3 in F position, then switch P3 of set up No.2 in F position (to simulate failure of RH INNER elevon)</p>	<p>V indicator light illuminates (as in 3-27)</p> <p>- On ICOVOL indicator, RH INNER elevon deflects, 5 to 6 degrees</p> <p>- Check for 28 V between terminal 45 then 65 of connector C110-BA and ground (as in 3-27)</p>
3-43	Identical with 3-3	Identical with 3-3

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NO.	ACTIONS	RESULTS ON AIRCRAFT (OR EQUIPMENT)
3-44	Identical with 3-4	Identical with 3-4
3-45	Connect terminal XV to terminal 34 of connector C110-AB (input of UPPER rudder Green amplifier) - Disconnect terminals G and H, then connect them respectively to terminals 27 and 39 of connector C110-BA (UPPER rudder Green linear transducer) Place switch P4 of wiring No.3, then switch P3 of set up No.2 in F position (to simulate failure of UPPER rudder)	V indicator light illuminates (as in 3-27) - On ICOVOL indicator, UPPER rudder deflects, 7 to 8 degrees - Check for 28 V between terminals 45 then 65 of connector C110-BB (as in 3-27)
3-46	Identical with 3-3	Identical with 3-3
3-47	Identical with 3-4	Identical with 3-4
3-48	Connect terminal XV of set up No.2 to terminal 34 of connector C110-BB (input of LOWER rudder Green amplifier) Disconnect terminals G and H then connect them respectively to terminals 27 and 39 of connector C110-BB (LOWER rudder Green linear transducer) Place switch P4 of wiring No.3 then switch P3 of set up No.2 in F position (to simulate failure of LOWER rudder)	V indicator light illuminates (as in 3-27) - On ICOVOL indicator LOWER rudder deflects, 7 to 8 degrees - Check for 28 V between terminals 45 then 65 of connector C110-BB and ground (as in 3-27)
3-49	Identical with 3-3	Identical with 3-3
3-50	Identical with 3-4	Identical with 3-4
3-51	Connect free end of lead, connected to terminal 49 of connector C110-BA, to	INNER ELEV indicator light (located on RH upper corner of ICOVOL

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NO.	ACTIONS	RESULTS ON AIRCRAFT (OR EQUIPMENT)
	terminal 36 of connector C110-AB (without removing shunt between pins 49 and 50 of connector C110-BA) (to simulate signal of LH INNER elevon Blue linear transducer)	indicator First Officer's instrument panel) illuminates
3-52	Disconnect terminal 36 of connector C110-AB	INNER ELEV indicator light goes off
3-53	Connect free end of lead connected to terminal 49 of connector C110-BA to terminal 38 of connector C110-AB (without removing shunt between terminals 49 and 50 of connector C110-BA) (to simulate signal of RH INNER elevon Blue linear transducer)	INNER ELEV indicator light illuminates.
3-54	Disconnect terminal 38 of connector C110-AB	INNER ELEV indicator light goes off
3-55	Disconnect test set ups No.2 and 4. Test wiring No.3 remains connected (with switch P4 placed in 0 (open) position) Place shunts on connectors C110-AA, C110-AB, C110-BA and C110-BB as per indications given in "Prepare" paragraph.	On ICOVOL indicator the 8 magnetic indicators display G
3-56	On Flight Control Unit, place O & M ELEVONS, IN ELEVONS and RUDDER switches in BLUE position, then press and release RESET push button, located on RH side of each selector switch	On ICOVOL indicator, the 8 magnetic indicators display G

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### G. Test - Fourth Part

#### (1) Preliminary actions

- (a) On Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in OFF INV position  
- On ICOVOL indicator, the 8 magnetic indicators must display M
- (b) Test wiring No.3 used in : F - third part, is connected as shown on figure, with switch P4 placed in 0 (open) position.
- (c) Assemble test set up as per diagram below.  
(Ref. Fig. 578 )
- (d) Remove shunts between terminals 49 and 50 of connector C110-BA, and terminals 22 and 23 of connector C110-BB.
- (e) Connect terminals of test set up No.5 as per diagram (switch P6 and P7 in 0 (open) position).

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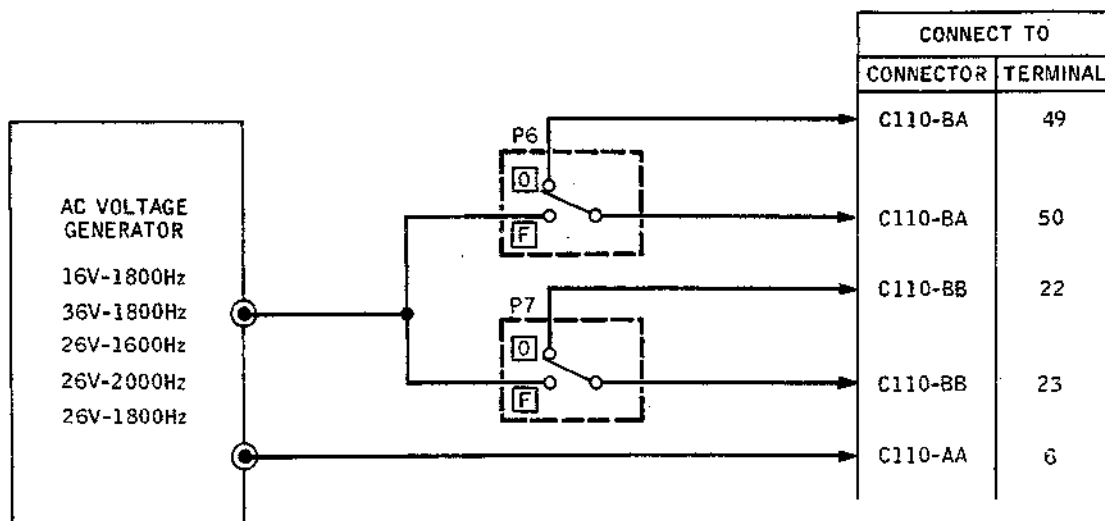
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Test Set up No.5  
Figure 578

**NOTE :** Generator must have the following characteristics :

- voltage : adjustable from 16 to 36 volts
- frequency : adjustable from 1600 to 2000 Hz
- minimum power : 15 VA
- voltage stability : better than 3 %
- frequency stability : better than 1 %
- output voltage is referenced to aircraft ground (terminal 6 of connector C110-AA)

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### (2) Test Procedure

NO.	ACTIONS	RESULTS ON AIRCRAFT (OR EQUIPMENT)
4-1	On Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in ON position	Corresponding FAIL caption lights are off
4-2	On Flight Control Unit press and release RESET push button located on RH side of each O & M ELEVONS, IN ELEVONS and RUDDER switches	On ICOVOL indicators, the 8 magnetic indicators display B
4-3	Adjust output voltage of test generator (test set up No.5) to obtain 16 V 1800 Hz. Place switch P4 (wiring No.3) then switch P6 (set up No.5 in F (ON) position (comparator disconnection then simulation of Blue inverter under voltage)	Gong sounds - On overhead panel, PFC warning light illuminates with FAIL warning light of BLUE INVERTER switch - On ICOVOL indicator the 8 magnetic indicators display G - On front panel of Blue comparator 2C48 (shelf 8-216) the 6 Green indicator lights are illuminated (Blue comparator has detected lack of Blue 26 V 1800 Hz) - Check for 28 VDC between ground (-) and terminal 51 of connector C110-AA, then terminal 51 of connector C110BA. (Blue inverter under voltage (normal and safety) detection operates correctly) Press and release PFC warning light to extinguish it
4-4	Place switch P6 in O (OFF) position then place switch P7	Gong sounds - On overhead panel PFC

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NO.	ACTIONS	RESULTS ON AIRCRAFT (OR EQUIPMENT)
	(set up No.5) in F (ON) position (to simulate under voltage of Green inverter, comparators still disconnected)	warning light illuminates with FAIL warning light of GREEN INVERTER On ICOVOL indicator, the 8 magnetic indicators display M On front panel of Green comparator 1C48 (shelf 8-215) the 6 green indicator lights are illuminated (Green comparator has detected lack of Green 26V 1800 Hz) - Check for 28 VDC between ground (-) and terminal 31 of connector C110-AA, then terminal 31 of connector C110-BA (Green inverter under voltage (normal and safety) detection operates correctly)
4-5	Place switch P7, then switch P4 in O (OFF) position. On Flight Control Unit, place each BLUE INVERTER and GREEN INVERTER switch in OFF INV position then in ON position. - Then press and release RESET push button, located near each O & M ELEVONS, IN ELEVONS and RUDDER switches	PFC warning light and the two FAIL caption lights go off On ICOVOL indicator, the 8 magnetic indicators display B - The 6 green indicator lights of the Blue comparator 2C48 and the Green comparator 1C48 go off
4-6	Adjust output voltage of test generator to obtain 36 V 1800 Hz, then place switch P4 and switch P6 in F (ON) position (comparators disconnection (to simulate over voltage of Blue inverter)	Gong sounds On overhead panel, PFC warning light and FAIL warning light of BLUE INVERTER illuminate. On ICOVOL indicator the 8 magnetic indicators display G

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NO.	ACTIONS	RESULTS ON AIRCRAFT (OR EQUIPMENT)
		On Front panel of Blue comparator 2C48, the 6 Green indicator lights are illuminated. Check for 28 VDC between terminal 51 of connector C110-AA and ground, and check there is 0 V between terminal 51 of connector C110-BA and ground (only over voltage detection of Blue inverter has operated) (Press and release PFC warning light to extinguish it)
4-7	Place switch P6 in O (OFF) position, then switch P7 in F (ON) position (to simulate over voltage of green inverter)	Gong sounds - PFC warning light and FAIL caption light of GREEN INVERTER illuminate (FAIL caption light of BLUE INVERTER remains illuminated) - On ICOVOL indicator, the 8 magnetic indicators display M - On front panel of Green comparator 1C48, the 6 Green indicator lights are illuminated - Check for 28 VDC between terminal 31 of connector C110-AA and ground, and check that there is 0 V between terminal 31 of connector C110-BA and ground (only over voltage detection of Green inverter has operated)
4-8	Identical with 4-5	Identical with 4-5
4-9	Adjust output voltage of test generator to obtain	Gong sounds - PFC warning light

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NO.	ACTIONS	RESULTS ON AIRCRAFT (OR EQUIPMENT)
	26 V 1600 Hz, then place switch P4, then switch P6 in F (ON) position (to disconnect comparators, and to simulate under frequency of Blue inverter)	and FAIL warning light of BLUE INVERTER illuminate - On ICOVOL indicator, the 8 magnetic indicators display G - On front panel of comparator 2C48, the 6 green indicator lights are illuminated - Check for 28 VDC between terminal 51 of C110-BA and ground and check that there is zero volt between terminal 51 of connector C110-AA and ground (Only under frequency detection of Blue inverter has operated) (Press and release PFC warning light to extinguish it)
4-10	Place switch P6 in 0 (OFF) position, then switch P7 in F (ON) position (to simulate under frequency of Green inverter ; comparator are still disconnected	- Gong sounds - PFC warning light and FAIL warning light of GREEN INVERTER illuminate - On ICOVOL indicator, the 8 magnetic indicators display M - On front panel of comparator 1C48, the 6 Green indicator lights are illuminated - Check for 28 VDC between terminal 31 of connector C110-BA and ground, and check that there is zero volt between terminal 31 of connector C110-AA and ground (only under frequency detection of Green inver-

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NO.	ACTIONS	RESULTS ON AIRCRAFT (OR EQUIPMENT)
		ter has operated)
4-11	Identical with 4-5	Identical with 4-5
4-12	Adjust output voltage of test generator to obtain 26 V 2000 Hz, then place switch P4 and then switch P6 in F (ON) position (to disconnect comparators then to simulate over frequency of Blue inverter)	Identical with 4-9 (but over frequency detection of Blue inverter has operated)
4-13	Place switch P6 in 0 (OFF) position, then switch P7 in F (ON) position (to simulate over frequency of Green inverter ; comparators are still disconnected)	Identical with 4-10 (but over frequency detection of Green inverter has operated)
4-14	Place switch P7 in 0 (OFF) position - Adjust output voltage of test generator to obtain 26 V 1800 Hz, then place switch P6 in F (ON) position. - On Flight Control Unit press and release RESET push button located on RH side of each O & M ELEVONS, IN ELEVONS and RUDDER switch (Check of Blue inverter fault detection self hold)	No visible change (PFC warning light and the two FAIL caption lights remain illuminated) : the 8 magnetic indicators on IC0VOL indicator display M : the 6 green indicator lights of Blue and green comparators (2C48) and (1C48) remain illuminated - Check for 28 VDC between terminal 51 of connector C110-AA and ground (28 VDC still present between terminal 51 of C110-BA and ground) (over frequency fault detection remains operative ; under voltage detection became operative during action on switch P6

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NO.	ACTIONS	RESULTS ON AIRCRAFT (OR EQUIPMENT)
		placed in 0 [OFF] position : Blue inverter switched off)
4-15	Place switch P6 in 0 (OFF) position then switch P7 in F (ON) position. - Press RESET push button located on RH side of each above mentioned switch (Check of Green inverter fault detection self hold)	PFC warning light and FAIL warning lights remain illuminated ; the 8 magnetic indicators on IC0VOL indicator still display M and the 6 Green indicator lights of each Blue (2C48) and Green (1C48) comparator remain illuminated Check for 28 VDC between terminal 31 of connector C110-AA and ground (28 VDC is still present between terminal 31 of C110-BA and ground) (over frequency fault detection remains operative ; under voltage detection became operative during action on switch P7 placed in 0 [OFF] position : aircraft Green inverter switched off)
4-16	Disconnect items of equipment and test set ups ; place shunts between terminals 22 and 23 of connector C110-BB and terminals 49 and 50 of connector C110BA. On Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in OFF INV position, then in ON position. Press RESET push button located on RH side of each O & M ELEVON, IN ELEVONS and RUDDER switches	- BLUE INVERTER FAIL warning light, then PFC warning light and FAIL warning light of GREEN INVERTER go off with the 6 indicator lights of each comparator, 1C48 and 2C48 - On IC0VOL indicator, the 8 magnetic indi-

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

NO.	ACTIONS	RESULTS ON AIRCRAFT (OR EQUIPMENT)
-----	---------	---------------------------------------

cators display B

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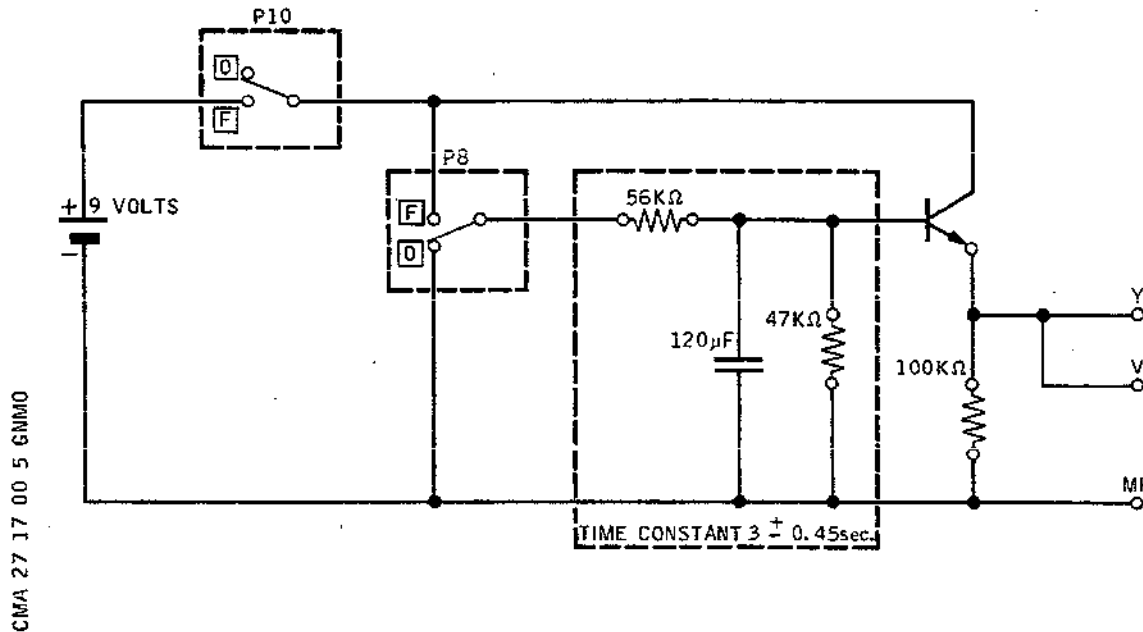
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## MAINTENANCE MANUAL

### H. Test - Fifth Part

#### (1) Preliminary operations

- (a) Assemble test set ups No.6 and 7 as per the following diagrams  
(Ref. Fig.579 and 580)



Test Set up No.6  
Figure 579

- (b) On computers 1C31 (shelf 8-215) and 2C31 (shelf 8-216) unscrew and remove protective caps from connectors ZA and ZB.
- (c) On centre console, on ADC control unit, place ADC1 and ADC2 switches in ON position.  
- If amber ADC1 and ADC2 caption lights illuminate, press and release them, they must go off.
- (d) On overhead panel, make certain that the three AUTOSTAB No.1 and AUTOSTAB No.2 engage switches are disengaged and indicate OFF.

EFFECTIVITY: ALL

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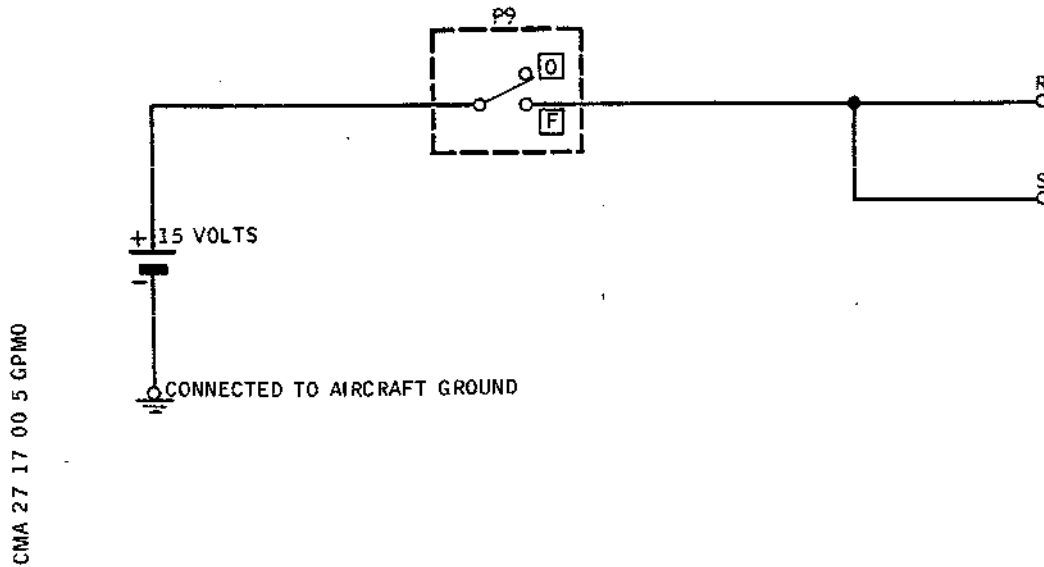
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## MAINTENANCE MANUAL



Test Set up No.7  
Figure 580

- (e) Instructions of "Prepare" paragraph being fulfilled, begin with test procedure.

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## MAINTENANCE MANUAL

### (2) Test procedure

NO.	ACTIONS	RESULTS ON AIRCRAFT (OR EQUIPMENT)
5-1	With switches of Test set ups No.6 and No.7 in 0 (OFF) position, connect : <ul style="list-style-type: none"><li>- Terminal MF of set up No.6 to terminal 27 of connector C110-AB</li><li>- Terminals Y and V of set up No.6 to terminals ZA86 and ZB86 of computer 1C31</li><li>- Terminals R and S of set up No.7 to terminals ZA82 and ZB82 of computer 1C31</li><li>- On overhead panel, engage the three AUTOSTAB No.1 engage switches</li></ul>	
5-2	On set up No.7, place switch P9 in F (ON) position On set up No.6, place switch P10, then switch P8 in F (ON) position (neutralization of auto stabilization computer monitoring circuits and to simulate an auto stabilization pitch signal).	On ICOVOL indicator, the 8 magnetic indicators display B : the 6 elevons deflects 6 degrees approximately
5-3	Place switch P8 in 0 (OFF) position	On ICOVOL indicator, the 6 elevons return to zero
5-4	Place switch P9 in 0 (OFF) position then disconnect terminals Y and V of set up No.6 then terminals R and S of set up No.7	No results
5-5	Connect terminals Y and V of set up No.6 to terminals ZA88 and ZB88 of computer 1C31 Connect terminals R and S of set up No.7 to terminals ZA84 and ZB84 of computer 1C31. Place switch P9 then switch P8 in F (ON) position (Neutralization of auto	On ICOVOL indicator, the 8 magnetic indicators still display B ; OUTER and MIDDLE elevons deflect, 6 degrees approximately

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

NO.	ACTIONS	RESULTS ON AIRCRAFT (OR EQUIPMENT)
	stabilization computer monitoring circuits and to simulate an auto- stabilization roll signal)	
5-6	Identical with 5-3	Identical with 5-3
5-7	Identical with 5-4	Identical with 5-4
5-8	Connect terminals Y and V of set up No.6 to terminals ZA-91 and ZB-91 of computer 1C31. Connect terminals R and S of set up No.7 to terminals ZA-84 and ZB-84 of computer 1C31. Place switch P9 then switch P8 in F (ON) position (Neutralization of auto-stabilization computer monitoring circuits and to simulate autostabilization yaw signal)	On ICOVOL indicator, the 8 magnetic indicators still display B ; both rudders deflect, 7 de- grees approx.
5-9	Identical with 5-3	Identical with 5-3
5-10	Identical with 5-4	Identical with 5-4
5-11	On Flight Control Unit place BLUE INVERTER switch in OFF INV position	On ICOVOL indicator, the 8 magnetic indicators display G
5-12	Connect terminals Y and V of set up No.6 to terminals ZA-86 and ZB-86 of unit 1C31 Connect terminals R and S of set up No.7 to terminals ZA-82 and ZB-82.	
5-13	Identical with 5-2	On ICOVOL indicator, the 8 magnetic indicators display G ; the 6 elevons deflect, 6 de- grees approx.
5-14	Identical with 5-3	Identical with 5-3

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

NO.	ACTIONS	RESULTS ON AIRCRAFT (OR EQUIPMENT)
5-15	Identical with 5-4	No results
5-16	Identical with 5-5	On ICOVOL indicator, the 8 magnetic indicators still display G : OUTER and MIDDLE elevons deflect, 6 degrees approx.
5-17	Identical with 5-3	Identical with 5-3
5-18	Identical with 5-4	No results
5-19	Identical with 5-8	On ICOVOL indicator, the 8 magnetic indicators still display G : both rudders deflect 7 degrees approx.
5-20	Identical with 5-3	Identical with 5-3
5-21	Identical with 5-4	No results
5-22	On overhead panel, disengage the three AUTOSTAB No.1 engage switches and engage the three AUTOSTAB No.2 engage switches. On Flight Control Unit, place BLUE INVERTER switch in ON position, then press RESET push button located on RH side of each O & M ELEVONS IN ELEVONS and RUDDER switches - Disconnect terminal MF of set up No.6 and connect it to terminal 20 of connector C110-AB	On ICOVOL indicator, the 8 magnetic indicators display B.
5-23	Connect terminals Y and V of set up No.6 to terminals ZA-86 and ZB-86 of computer 2C31 (shelf 8-216) - Connect terminals R and S of set up No.7 to	Identical with 5-2

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NO.	ACTIONS	RESULTS ON AIRCRAFT (OR EQUIPMENT)
	terminals ZA-82 and ZB-82 of computer 2C31. - Place switch P9, then switch P8 in F (ON) position (Neutralization of auto stabilization computer monitoring circuits, and to simulate an auto stabilization pitch signal)	
5-24	Identical with 5-3	Identical with 5-3
5-25	Identical with 5-4	Identical with 5-4
5-26	Connect terminals Y and V of set up No.6 to terminals ZA-88 and ZB-88 of computer 2C31 - Connect terminals R and S of set up No.7 to terminals ZA-84 and ZB-84 of computer 2C31 Place switch P9, then switch P8 in F (ON) position (Neutralization of auto stabilization computer monitoring circuits, and to simulate an auto-stabiliza- tion roll signal)	Identical with 5-5
5-27	Identical with 5-3	Identical with 5-3
5-28	Identical with 5-4	Identical with 5-4
5-29	Connect terminals Y and V of set up No.6 to terminals ZA-91 and ZB-91 of computer 2C31. Connect terminals R and S of set up No.7 to terminals ZA-84 and ZB-84 of computer 2C31 - Place switch P9, then switch P8 in F (ON) position (Neutralization of auto-	Identical with 5-8

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NO.	ACTIONS	RESULTS ON AIRCRAFT (OR EQUIPMENT)
	stabilization computer monitoring circuits, and to simulate an auto- stabilization yaw signal	
5-30	Identical with 5-3	Identical with 5-3
5-31	Identical with 5-4	No results
5-32	Identical with 5-11	Identical with 5-11
5-33	Identical with 5-23	Identical with 5-23
5-34	Identical with 5-3	Identical with 5-3
5-35	Identical with 5-4	No results
5-36	Identical with 5-26	Identical with 5-16
5-37	Identical with 5-3	Identical with 5-3
5-38	Identical with 5-4	No results
5-39	Identical with 5-29	Identical with 5-19
5-40	Identical with 5-3	Identical with 5-3
5-41	Identical with 5-4	No results
5-42	Disconnect terminal MF of set up No.6 - On overhead panel, disengage AUTOSTAB No.2 switches - On Flight Control Unit place BLUE INVERTER switch in ON position then press RESET push button, located on RH side of O & M ELEVONS, IN ELEVONS and RUDDER switches	On ICOVOL indicator, the 8 magnetic indicators display B

### I. Close-Up

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## MAINTENANCE MANUAL

- (1) On Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position, then the three O & M ELEVONS, IN ELEVONS and RUDDER switches in MECH position.
- (2) Shut down pressurization of Blue and Green hydraulic systems (Ref. 29-12-00, Servicing) (Ref. 29-11-00, Servicing).
- (3) De-energize the aircraft electrical network and remove electrical ground power unit (Ref. 24-41-00, Servicing)
- (4) Disconnect test set up No.7.
- (5) Disassemble simulator unit C110 (shelf 8-216).
- (6) Install unit C110 (proceed with care to avoid damaging connecting pins)
- (7) On panel 2-213, trip, safety and tag circuit breaker : FLT CONT & NAV BUS 14XS (X355, Map Ref. H2).

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**END OF THIS  
SECTION**

**NEXT**



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## MAINTENANCE MANUAL

### YAW CONTROL - DESCRIPTION AND OPERATION

#### 1. General (Ref. Fig. 001 )

##### A. Manual Control

The rudder pedals transmit their movement by bell crank levers and rods through the artificial feel (AF) to :

- (1) the electrical resolvers of the rudder power flight control units (PFCUs).
- (2) the control lever of the relay jack, which drives the PFCU mechanical controls.

The trim wheel, mounted on the centre console, operates the PFCU control resolvers and the relay jack without altering the artificial feel.

The rudder deflections are obtained by electrical control, with the resolvers.

##### B. Automatic Pilot

The aircraft is fitted with two automatic pilot system (AP1 and AP2). These two systems are independent and electrically control the relay jack which, by an auto pilot force limiter drives :

- The PFCU electrical control resolvers and Captain's controls
- The PFCU mechanical control linkage.

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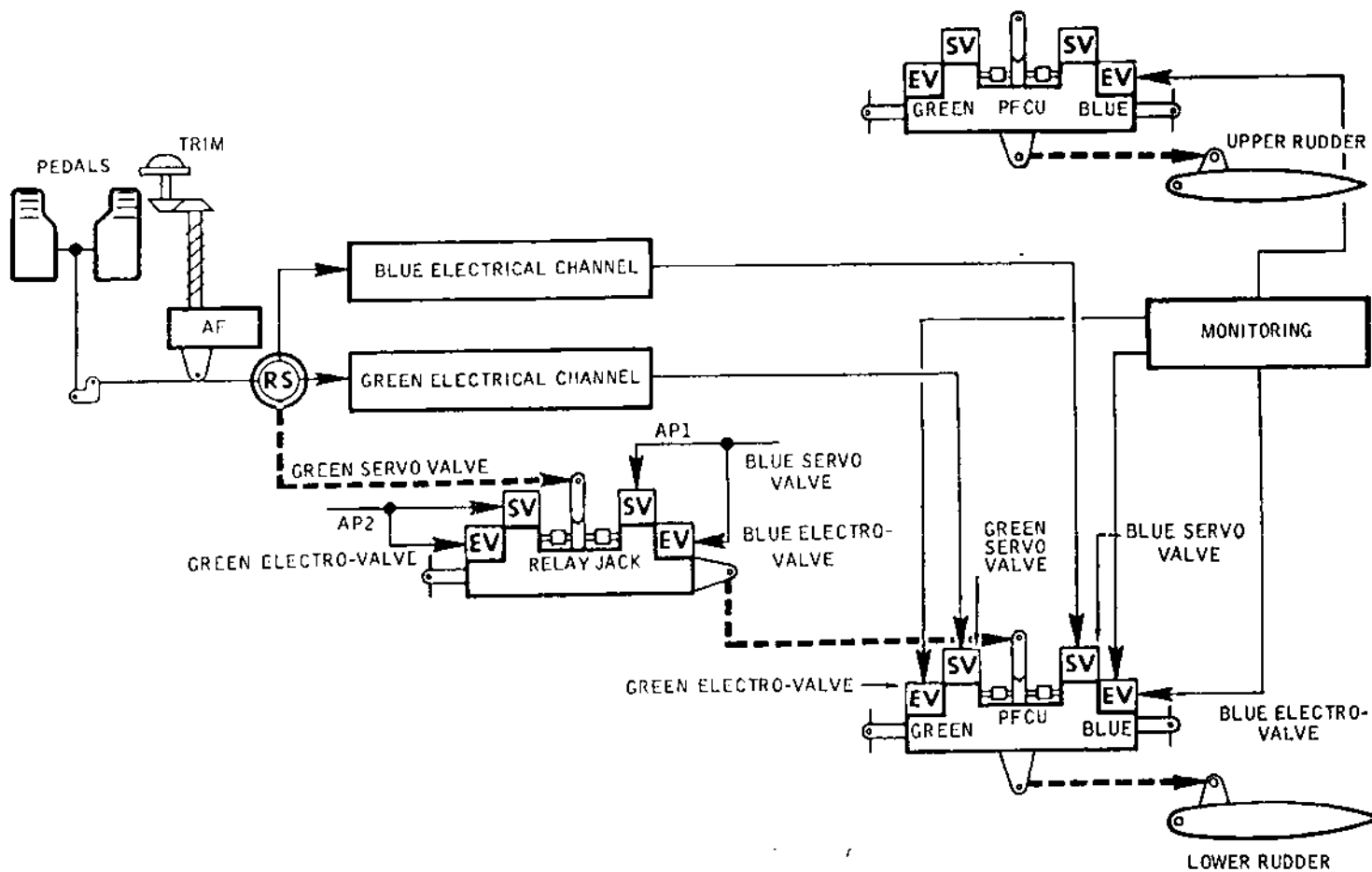
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## MAINTENANCE MANUAL

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Rudder Control Principles - Schematic  
Figure 001

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## MAINTENANCE MANUAL

### 2. Operation

#### A. Electrical Control of PFCUs (Ref. Fig. 002 )

After leaving the resolvers, the control of the PFCUs is divided into two channels. The Blue channel and the Green channel. The Blue channel takes priority.

Each PFCU comprises a body which is mechanically linked to the rudders and is moved by two jacks in tandem attached to the aircraft structure.

Each half of the PFCU body contains an electrically controlled spool valve which is associated with a servo-valve and an electro-valve.

The hydraulic pressure in each half of the body is controlled by the spool valve and the electro-valve.

By analogy with the hydraulic system which supplies them, the components of each body-half are termed Blue if they use the BLUE system and Green if they use the GREEN system.

If nothing abnormal is disclosed by the electrical monitoring system, the Blue electro-valve opens and pressure is admitted to the Blue electro-valve. The Green electro-valve remains closed.

Electrical signals, transmitted by the Blue channel, control the proportional opening of the servo-valve.

The signal regulated servo-valves receives the hydraulic pressure admitted by the electro-valve.

The regulated pressure displaces the blue spool valve which, because of the mechanical linkage, moves the green spool valve.

The blue and green hydraulic pressures at the spool valves are directed to the annular section of the jacks and the PFCU body then moves in the same direction as the spool valves.

The movement stops when the PFCU finds a position of rest relative to the new position of the spool valves thus blocking the hydraulic pressure inlet ports.

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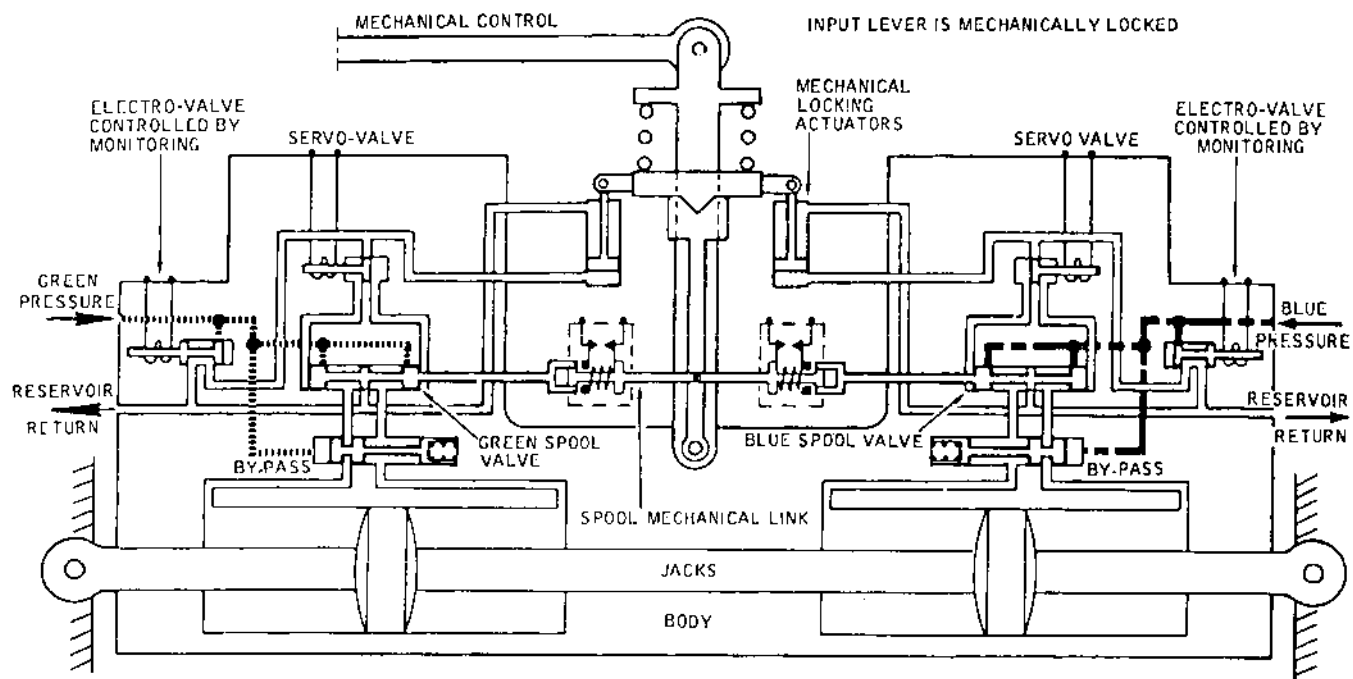
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## MAINTENANCE MANUAL

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SERVO-CONTROL IN THE NEUTRAL POSITION  
SUPPLIED BY BLUE AND GREEN PRESSURE.  
ELECTRO VALVES CLOSED  
SERVO VALVES NOT SUPPLIED  
MECHANICAL CONTROL LOCKED.

PFCU Control Principles - Schematic  
Figure 002

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## MAINTENANCE MANUAL

### B. Monitoring System

The Blue and Green electro-valves are controlled by an electronic monitoring system.

In normal control, when this system detects a fault during flight phase, it automatically closes the Blue electro-valve and opens the Green electro-valve.

The Green electro-valve is then controlled by the Green electrical channel and activates the Green spool valve.

If the monitoring system detects a new fault, it closes the Green electro-valve.

An internal hydraulic system in the PFCU then locks the spool valves mechanical control lever.

### C. Mechanical control (Ref. Fig. 003 )

The relay jack, mechanically controlled by the flight controls, operates the PFCU spool valves by means of cables rods and relays.

Each relay jack comprises a body attached to the PFCU spool valve control linkage.

The body is moved by two jacks in tandem which are attached to the aircraft structure.

Each half of the body contains an electrically controlled spool valve which is associated with a servo-valve and an electro-valve.

Hydraulic pressure in each half of the body is held back by the spool valve and the electro-valve and locks the relay jack control lever on the spool valve.

This lever, mechanically operated by the flight controls, moves the spool valves.

The Blue and Green hydraulic pressures are then directed to the annular sections of the jacks and the relay jack body moves in the same direction as the spool valves.

The movement stops when the body finds a position of rest relative to the position of the spool valves thus blocking the hydraulic pressure inlet ports.

### D. Automatic Pilot

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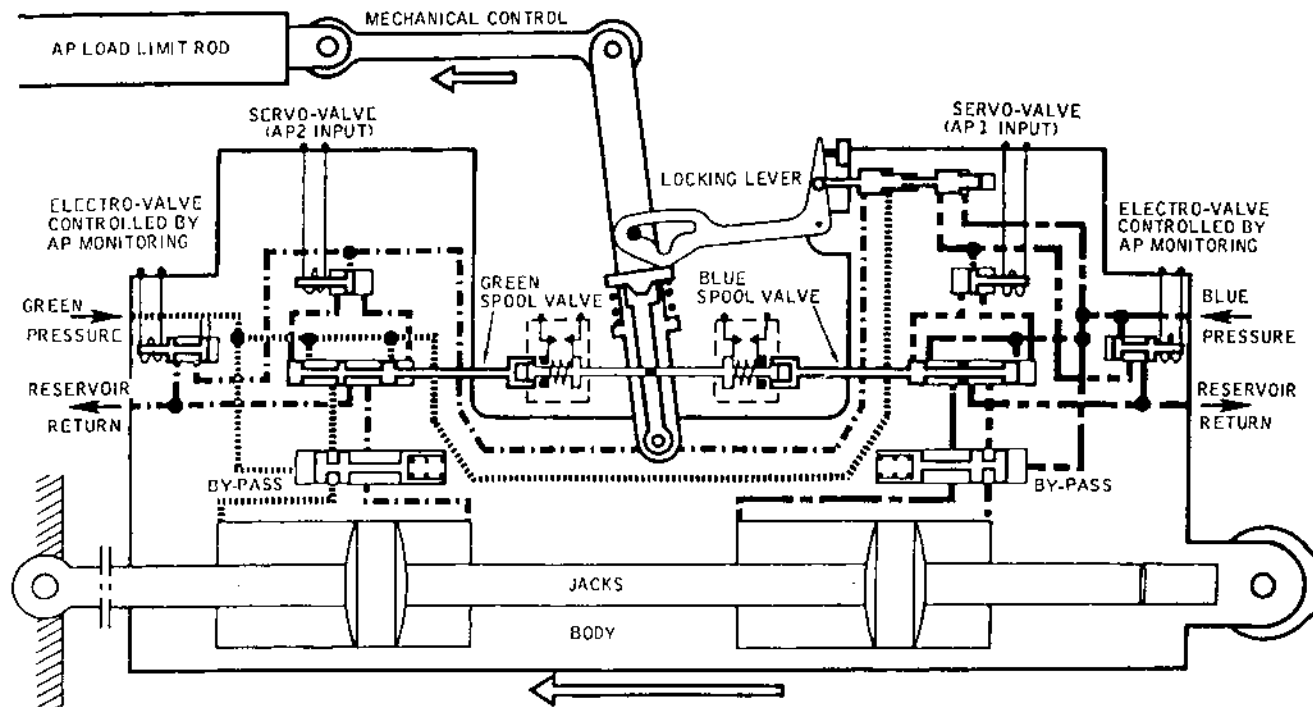
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## MAINTENANCE MANUAL

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SERVO-CONTROL IN MECHANICAL MODE  
LEVER LOCKED ON SPOOL VALVES



SCR Control Principles - Schematic  
Figure 003

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## MAINTENANCE MANUAL

By analogy with the hydraulic pressure which supplies them, the components of each body half are called Blue if they use the BLUE system and Green if they use the Green system.

AP1 electrically controls the relay jack via the Blue servo-valve, AP2 via the Green servo-valve.

If nothing abnormal is disclosed by the AP electronic monitoring system, the Blue electro-valve opens, Blue hydraulic pressure is admitted to the Blue servo-valve and operates on the servo-valve mechanical control lever locking system.

This hydraulic locking jack unlocks the control lever from the spool valves and locks it on to the relay jack body.

The AP1 control signal opens the blue servo-valve proportionally which regulates the hydraulic pressure admitted to the electro-valve.

This regulated pressure moves the Blue spool valve which, being mechanically attached to the Green spool valves, is also moved.

The Blue and Green hydraulic pressures held back by the spool valves are now directed to the annular sections of the jacks, the relay jack body moves in the same direction as the spool valves thus blocking the pressure inlet ports.

The relay jack displacement moves the input lever, which is locked on to its body, together with the PFCU mechanical control linkage.

The input lever displacement controls the PFCU electrical resolvers and the manual flight controls via the AP force limiter.

In the AP1 mode, the relay jack monitoring system is supplied and opens the blue electro-valve.

When the system detects a fault during flight phase, it automatically closes the blue electro-valve and trips AP1.

The input lever is again locked on to the spool valves thus re-establishing manual control. If the pilot wishes to continue his flight in AP, he must switch on AP2, which functions in the same way as AP1 but using the Green hydraulic system.

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## MAINTENANCE MANUAL

### YAW CONTROL - TROUBLE SHOOTING

#### 1. General

Trouble shooting is carried out by means of the FLIGHT CONTROLS ELECTRICAL CIRCUITS TEST SET (Ref. 31-56-100).

This trouble shooting being common to the three sections ; 27-10-00 (Roll), 27-20-00 (Yaw), and 27-30-00 (Pitch), it is dealt with only once.

Refer to Topic 27-10-00, Trouble Shooting.

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## MAINTENANCE MANUAL

### MECHANICAL CONTROL - DESCRIPTION AND OPERATION

#### 1. General

R Mechanical control linkage located between the flight compartment and the PFCU's is a stand-by system used in the event of  
R electrical channel failure.

#### 2. Description (Ref. Fig. 001 )

The mechanical control is made up of the following items :

- Rudder pedal assembly
- Torque tubes
- Control rods
- R - Artificial feel and integral trim assembly
- Synchro packs
- R - Autopilot force limiter
- Relay jack
- Load limiting mechanism
- Cable tension regulator
- Control cables
- Pressure seal bulkhead connection
- Cable quadrant
- R - Load limiting mechanisms
- R - Power flight control units (PFCU's)
- R - Rudders.

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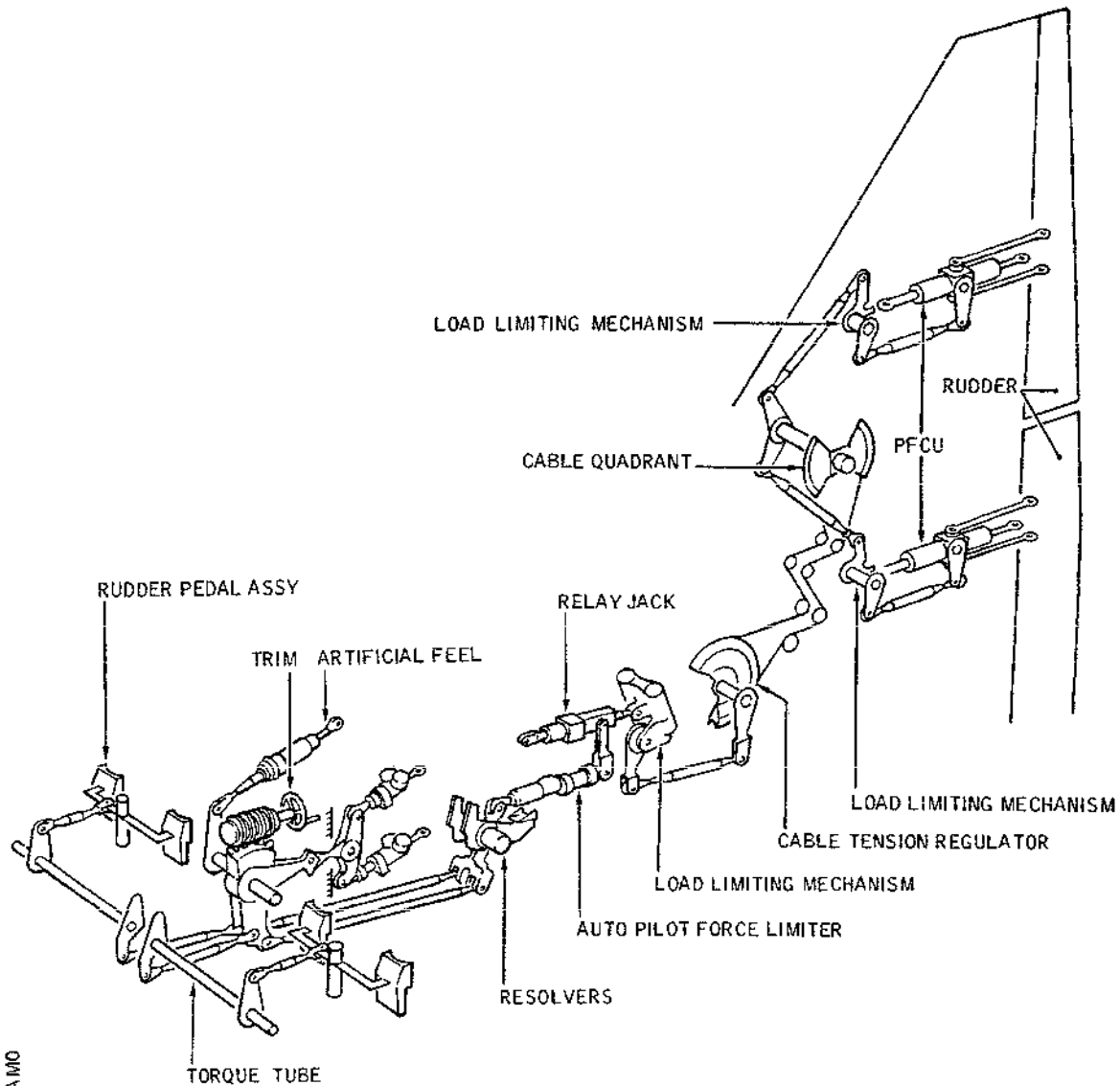
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Rudder Mechanical Control  
Figure 001

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## MAINTENANCE MANUAL

### 3. Rudder Pedal Assembly (Ref. Fig. 002 )

Captain's and First Officer's sides

R The pedals and upper crank levers are mounted on a support hinged at its base. Each hinge pin supports the lower crank lever, connected to the upper crank lever by rods. The cranks via link-rods, control the rotation of the torque tube, installed under the flight compartment floor. Through the link-rods and the position of the torque tube integral fork fittings, the movement of the LH and RH pedals is reciprocal.

R Rudder Pedal Adjuster

R A machined fork fitting at the upper part of each pedal support is connected to an adjustment cylinder which retains the pedal support in the desired position. The body of the cylinder is attached to the aircraft structure and the piston rod to the pedal support. Adjustment is achieved by a flexible control cable which via a bellcrank, withdraws a locking-stud. With the pilot applying pressure to the pedal the rod slides in compressing a return spring. On attaining the desired pedal position the pilot releases the cable handle and the locking stud engages in the hole nearest to the selected position.

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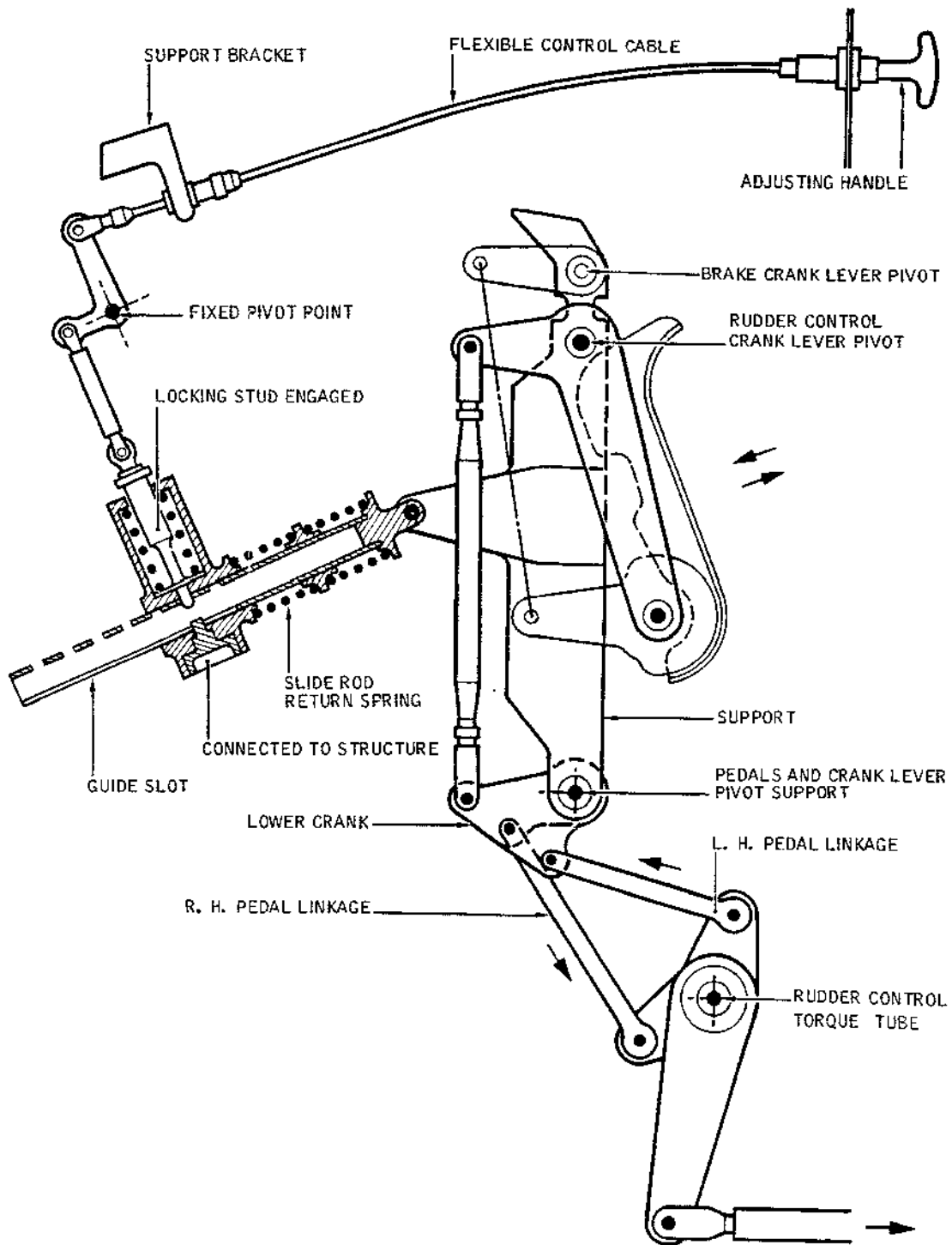
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## MAINTENANCE MANUAL

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Pedal Operation and Adjustment  
Figure 002

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## MAINTENANCE MANUAL

### 4. Load Limiting Mechanism (Ref. Fig.004 and 003)

- R The load limiting mechanism is composed of two parts pivoting  
R about a common axis and installed on the relay jack support  
chassis. It comprises a spring pot directly controlled by the  
relay jack and an output lever to the control linkage down-  
stream.
- R The spring pot consists of two chambers, each equipped with two  
R concentric springs fitted around and loading a spring retainer.  
R The spring retainers each receive a piston operated by a spigot  
R hinged on the roller carrying arm.  
R The roller carrying arm pivots on the spring pot housing.
- R The output lever is equipped with a cam which engages the roller  
R on the roller carrying arm.
- R Under the action of the relay jack, the spring pot drives the  
R output lever via the roller maintained in the cam notch by the  
R loading of the springs. If the load exerted on the output lever  
R exceeds the opposing load of the springs, the roller carrying  
R arm compresses the springs via the pistons and the spring ret-  
R tainers. The roller leaves its notch and rolls on the cam profi-  
R le.
- R As the load exerted on the lever decreases, the cam profile and  
R the action of the springs tend to return the roller to its neu-  
R tral position in the cam notch.

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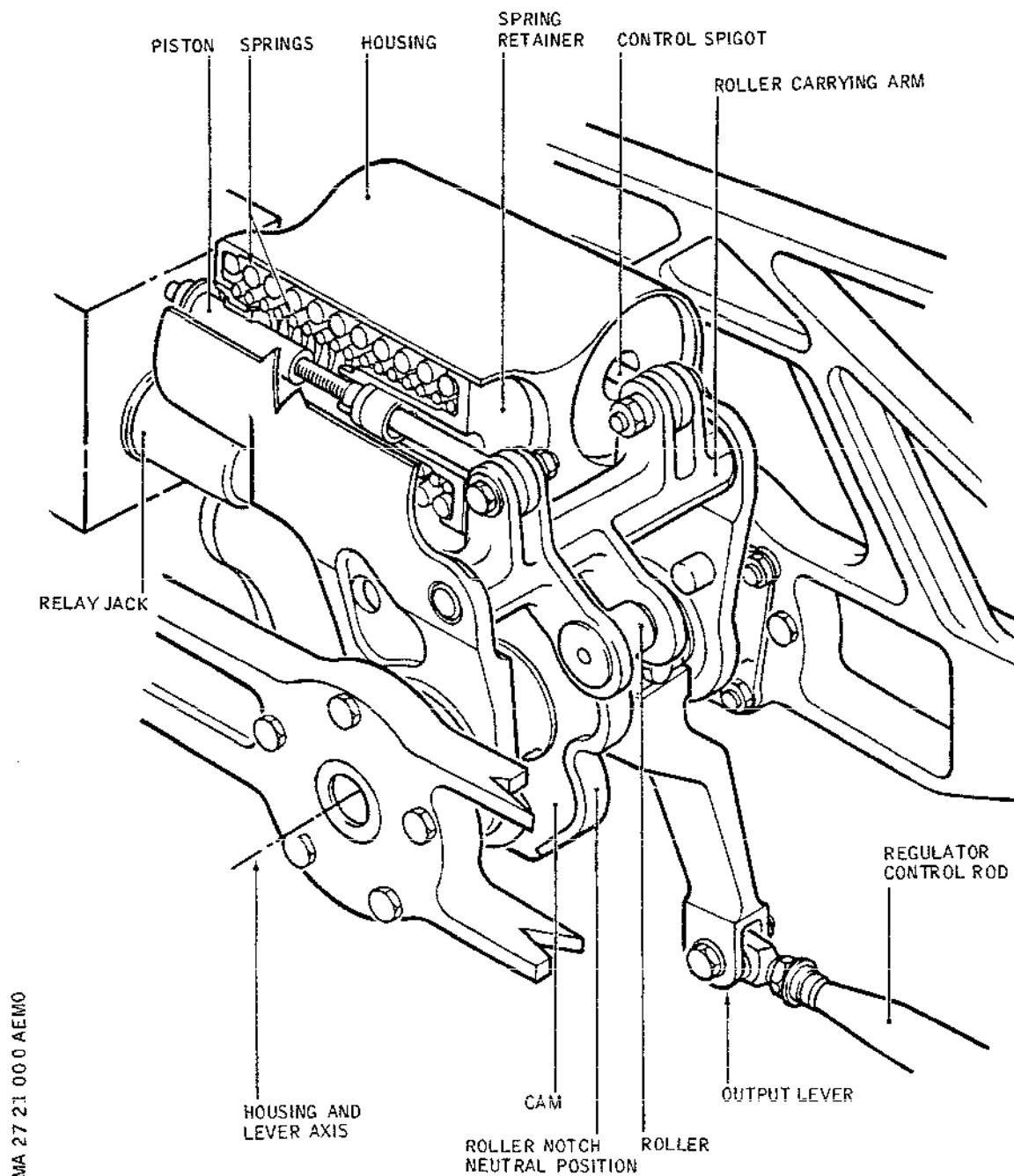
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## MAINTENANCE MANUAL



Load Limiting Mechanism  
Figure 003

R

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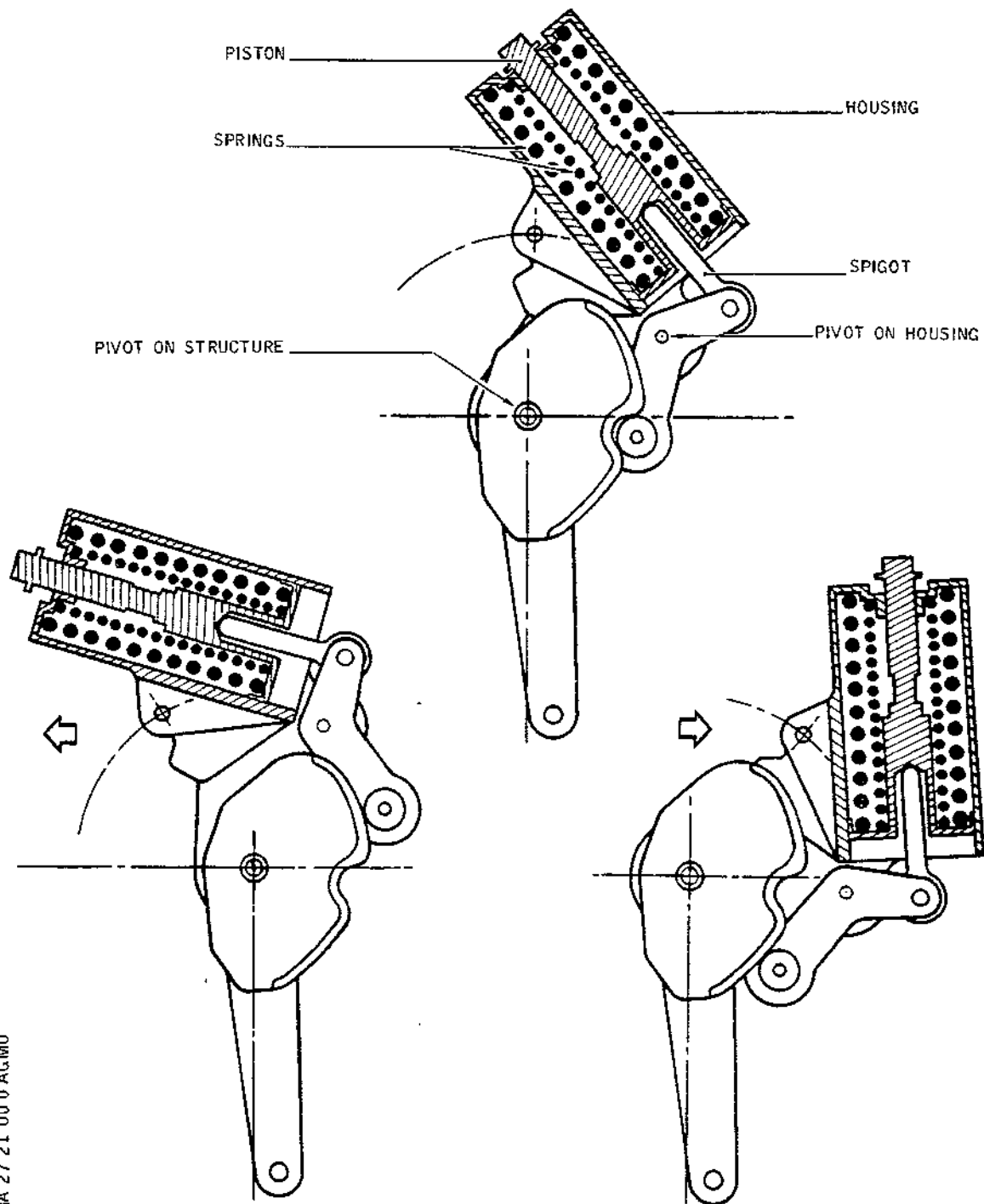
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## MAINTENANCE MANUAL



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Load Limiting Mechanism - Operation  
Figure 004

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## MAINTENANCE MANUAL

### 5. Cable Tension Regulator (Ref. Fig.006 and 005)

- R The tension regulator, fitted aft of the relay jack chassis  
R beneath the passenger compartment floor, comprises a compensating mechanism two cable quadrants and two slack absorber jacks.
- R The compensating system forms an assembly pivoting between two support plates attached to the structure. The hub, the main part of the system, comprises two machined flanges perpendicular to the pivoting axis. Between these two flanges are attached two split cylinders guiding two springs and a balance arm sliding on a locking shaft.
- R The cable quadrants pivot independently about the compensating system on bearings.
- R The slack absorber jacks connect each quadrant to one end of the compensating system balance arm.
- R Because of different coefficients of expansion of materials (structure/cables), the temperature variations cause a change in cable tensions. The object of the regulator is to compensate for these differences in tension.
- R When cable tension increases, the quadrants pivot, pulling on the balance arm via the slack absorber jacks. Under the effect of the balanced load applied, the balance arm slides along the locking shaft compressing the compensating springs. A new balanced position of the system is obtained, corresponding to an adjusted cable tension.
- R When cable tension decreases, the compensating springs push back the balance arm along the locking shaft. The slack absorber jacks transmit the movement and pivot the quadrants. Correct cable tension is maintained.
- R When a control load is applied, the control lever operates the compensating mechanism assembly. The quadrant which actuates the cables must overcome the inertia and friction of the control linkage. The balance arm held by the slack absorber jack of the quadrant loaded, pivots and wedges against the locking shaft, neutralizing the compensating system. The regulator assembly then acts as a single pulley. The balance arm, via the second slack absorber jack, maintains a load opposite to the movement of the assembly on the second quadrant and consequently, a tension on the cable.

### 6. Load Limiting Mechanism (Ref. Fig. 007 )

- R A breakout lever fitted with a disc spring and a roller, drives

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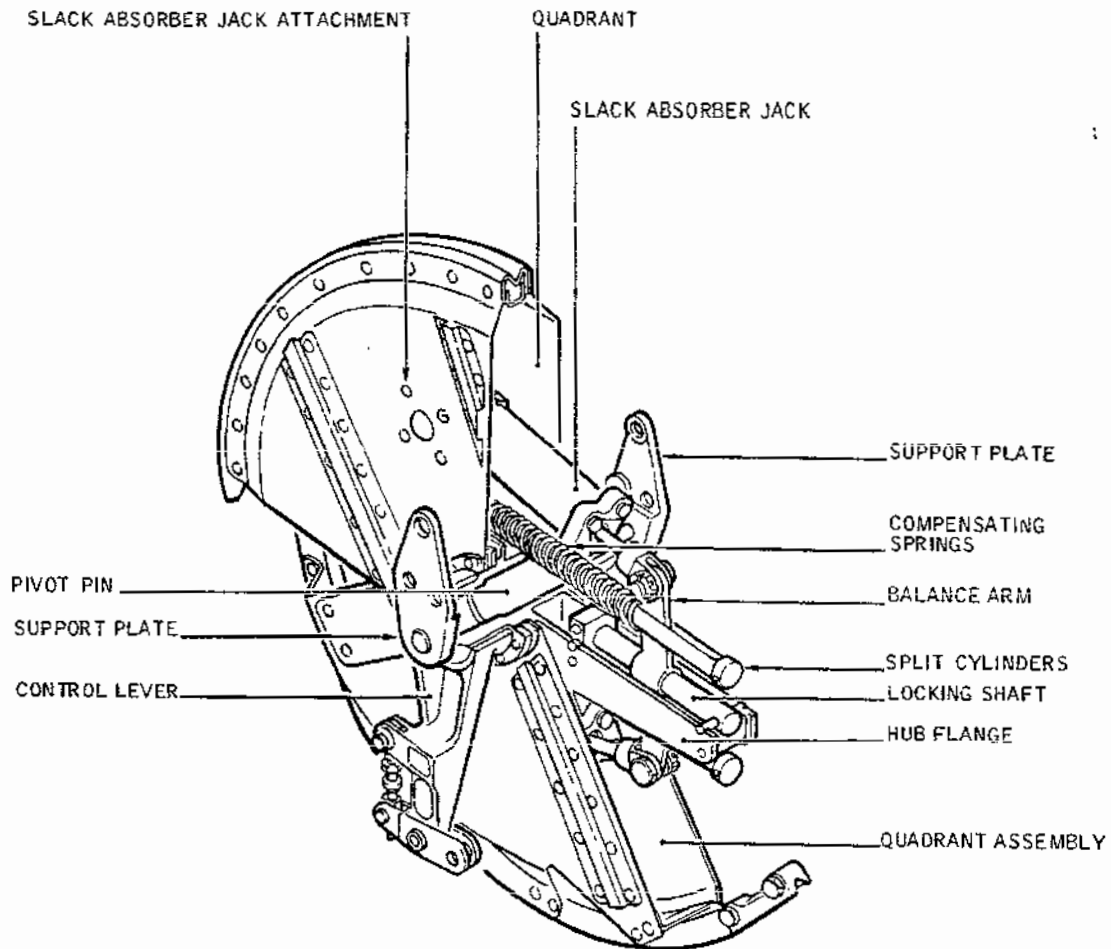
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## MAINTENANCE MANUAL



CMA 27 21 00 0 AJM0

Cable Tension Regulator  
Figure 005

R

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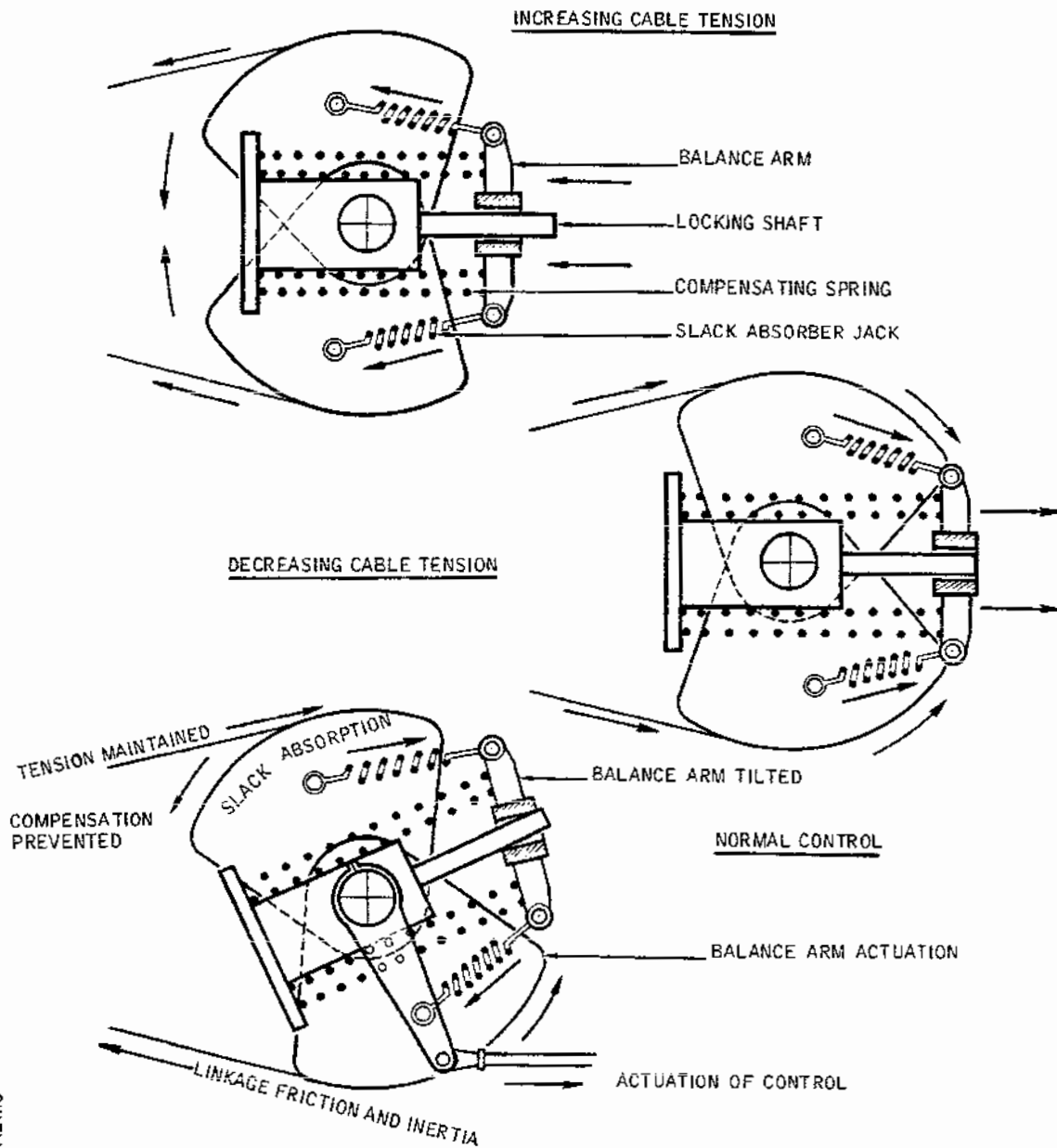
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## MAINTENANCE MANUAL



CMA 27 21 00 0 ALMO

Cable Tension Regulator Operation  
Figure 006

R

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R a cam attached to a torque tube. The later is attached to the  
R control lever of the corresponding PFCU.  
R The roller is maintained in the cam recess by the spring loading  
R and drives the torque tube for a load at the breakout lever-to-  
R control rod connection of up to 20 lbf. (9 daN). As the load  
R exerted by the control rod decreases the cam profile and the  
R action of the spring tend to return the roller to its recess.

### 7. Rudders (Ref. Fig. 008 )

The two rudders are independent. Each is pivoted at four points, the bottom rudder at ribs 1, 2, 3 and 4 and the top rudder at ribs 5, 6, 7 and 8. The control fittings are situated at fin ribs 3 and 6.

EFFECTIVITY: ALL

BA

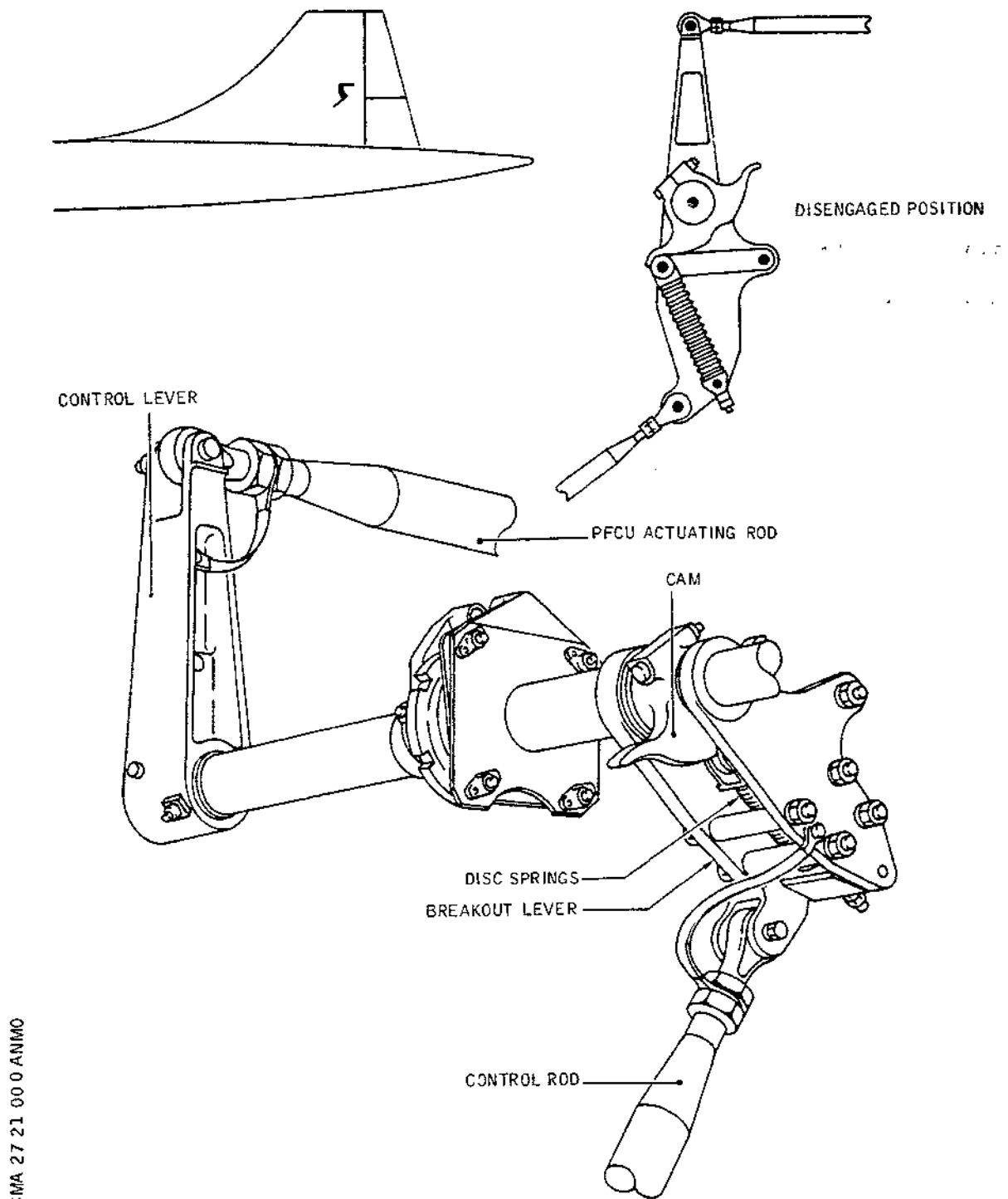
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Load Limiting Mechanism  
Figure 007

R

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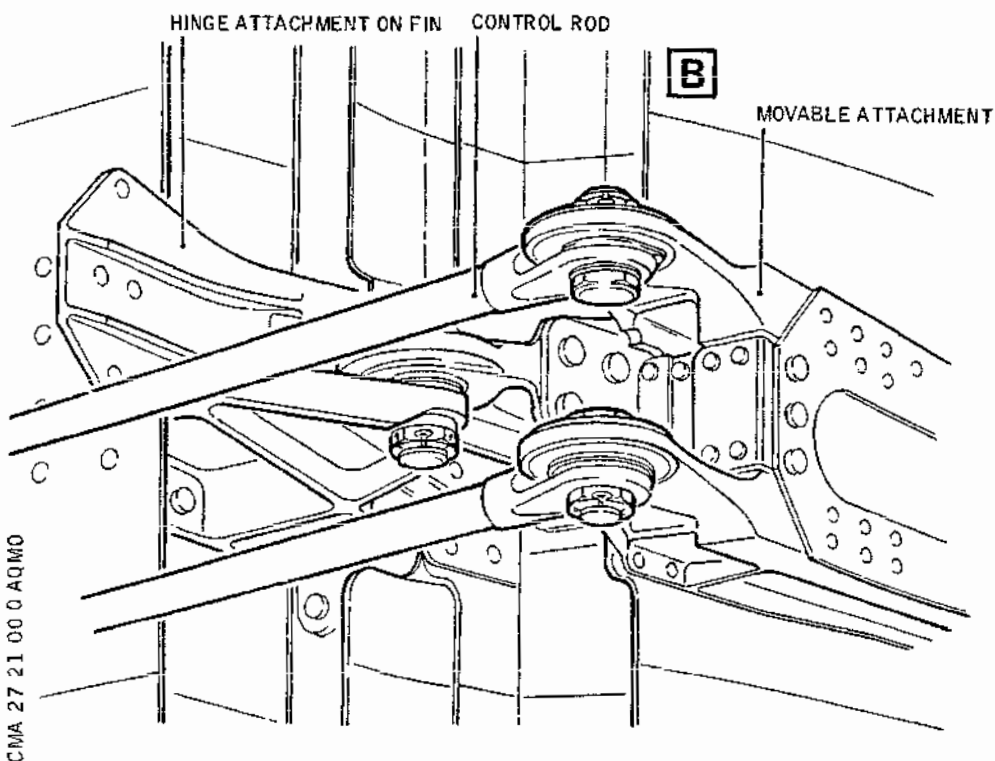
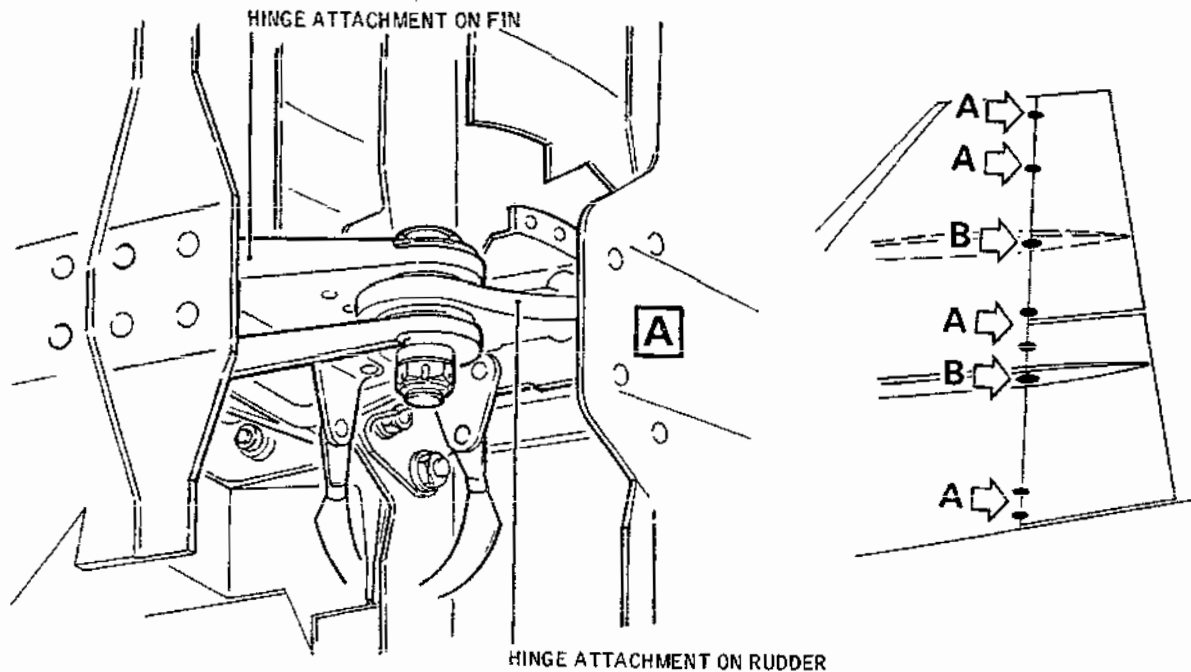
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Rudder Controls - Installation  
Figure 008

R

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### R 8. Operation of Each Control

#### A. Forward Fuselage (Ref. Fig. 009 )

R The independently adjustable rudder pedals operate the  
R Captain's and First Officer's torque tubes, below the flight  
compartment floor, via bellcranks and rods.  
R The torque tubes operate the artificial feel system input  
levers through two adjustable rods.

R In addition to the yaw control input and output levers the  
R First Officer's torque tube is fitted with a yaw deflection  
R sensor control lever.

R In addition to the yaw control input and output levers the  
R Captain's torque tube is fitted with a flight data recorder  
R rudder pedal position potentiometer control lever.

R After the artificial feel input lever the control system  
is common. This common pivot point may also be controlled by  
R the trim control knob on the centre pedestal in the flight  
compartment, through universal joints, pinions, chains and a  
R reduction gearbox called the integral trim assembly.  
Twin rods in parallel connect the artificial feel input lever  
to the electrical channel synchro pack control lever. The  
R synchro pack input crank drives the autopilot force limiter  
R by its upper arm. This rod directly actuates the input  
R lever of the yaw relay jack, which compensates for the iner-  
R tia due to the length of the control linkage run and serves  
R as an interconnection between the autopilot and the flight  
controls. The relay jack drives the mechanical linkage  
through a load limiting mechanism.

#### B. Centre Fuselage

R From the load limiting mechanism, a rod operates the cable  
tension regulator which maintains correct cable tension,  
when there are changes in length due to thermal expansion.  
The cables anchored to the tension regulator, are  
channelled below the cabin floor, guided by pulleys, and  
anchored to quadrants in the fin. The cables pass through  
R two pressure seals in the pressure bulkhead at the rear of  
R the fuselage.

#### C. Controls in Fin (Ref. Fig. 010 )

The quadrant is installed in the fin at rib 12. It is fitted  
with two bellcranks which simultaneously actuate, through  
two rods, two crank levers each one situated level with a  
PFCU.

EFFECTIVITY: ALL

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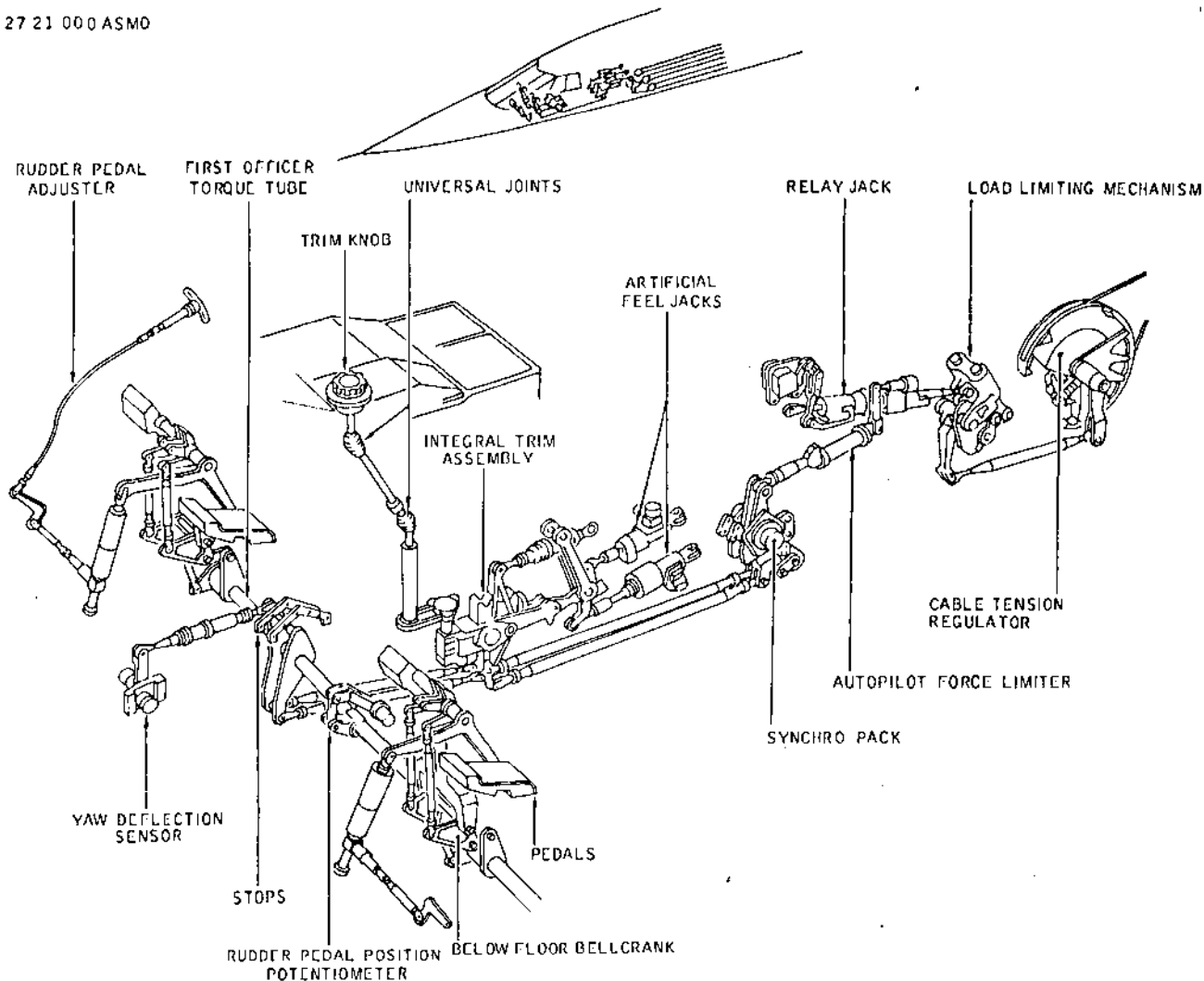
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CMA 27 21 000 ASMO



Rudder Control in Forward Fuselage  
Figure 009

R

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R These crank levers are each fitted with a load limiting  
R mechanism driving a torque tube fitted with a bellcrank  
which, through an adjustable rod drives the input lever of  
the corresponding PFCU. The PFCU's are installed at fin ribs  
8 and 15, the lower PFCU on the left hand side and the  
upper PFCU on the right hand side. The PFCU's each drive  
a rudder through two rods.

### 9. Operation

R The torque tube translates the rudder pedal movement into linear  
R movement. This movement is transmitted to the relay jack input  
R lever. The relay jack spool valves admit hydraulic pressure to  
the relay jack which moves and rotates the cable tension regula-  
R tors. The cables, via a quadrant and crank levers move the PFCU  
input levers, which open the spool valves and admit hydraulic  
R pressure. The PFCU jack body moves and operates the rudder.

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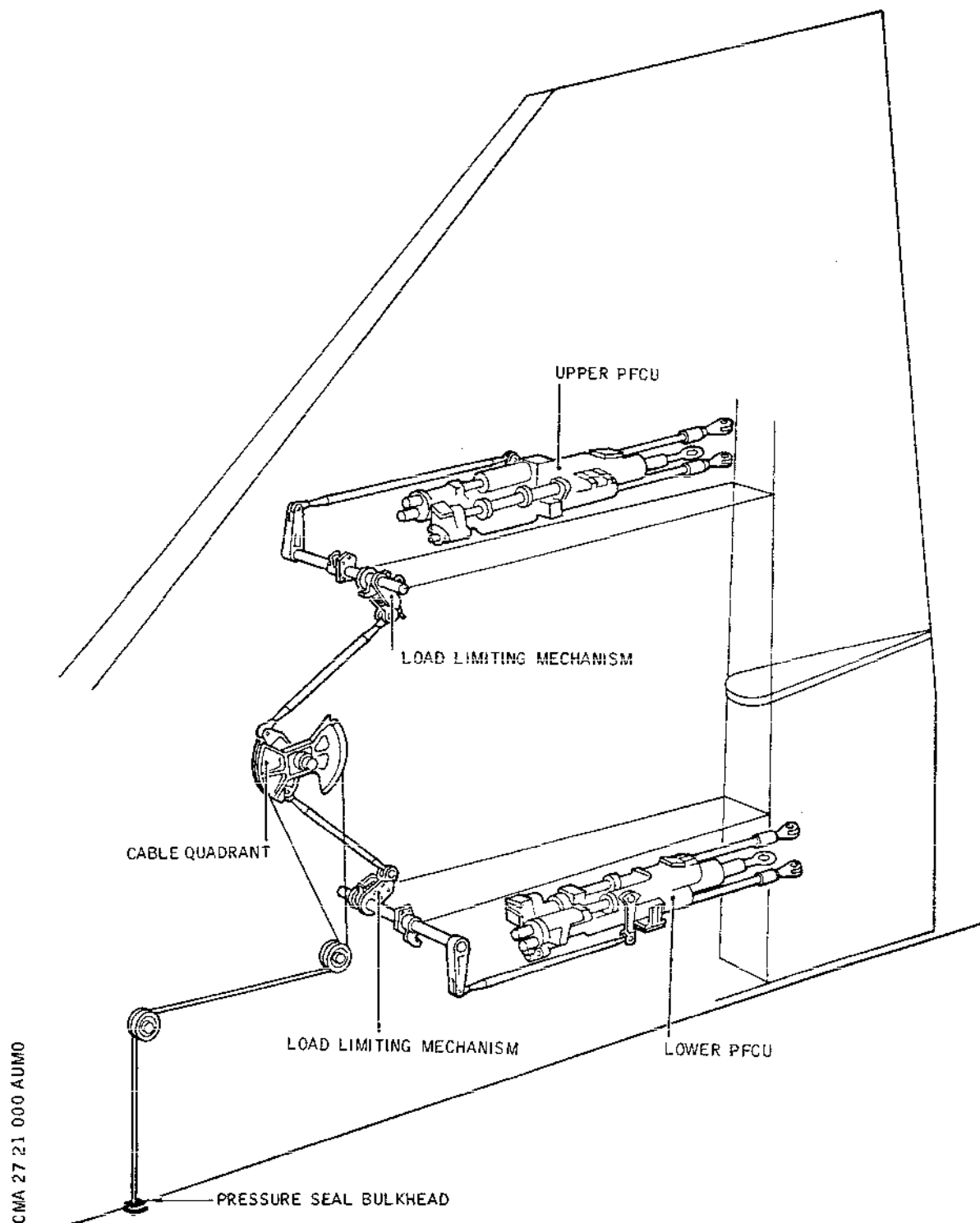
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## MAINTENANCE MANUAL



Rudder Controls in Fin  
Figure 010

R

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## MAINTENANCE MANUAL

### MECHANICAL CONTROL - TROUBLE SHOOTING

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The following trouble shooting procedures are intended to enable faults found in the yaw mechanical channel to be rectified.

These procedures are divided as follows :

- Trouble shooting in the event of resistance (friction) encountered when moving Flight Controls.
- Trouble shooting ; Control surfaces (rudders) do not return to neutral.

The defect can be isolated with the aid of the trouble shooting procedures and traced through OK and NOT OK paths to the appropriate charts or other specified rectification action as may be necessary. If a defect occurs perform the appropriate rectification action, then repeat the operation at which the defect was encountered to ensure the operation is OK.

Bracketed numbers in the procedures and charts indicate items on the component identification table (Ref. table 101)

The table provides information, including component location.

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R

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## MAINTENANCE MANUAL

### 2. Resistance (friction) encountered when moving Flight Controls

#### A. General

This chapter provides a method of locating resistance (friction) encountered in a limited range of rudder deflection when moving Flight Controls.

This friction which may occur within a limited range of the total deflection of the Flight Controls corresponds to mechanical problems located between Flight Controls and the associated Relay Jack.

The proposed method is valid only for this type of fault and must not, under any circumstances, be used following reports that excessive load must be applied to deflect Flight Controls throughout their total travel range.

In this case, refer to paragraph 3 :

Control surfaces (rudders) do not return to neutral.

#### B. Prepare

- (1) Equipment and Materials.

---

#### DESCRIPTION

#### PART NO.

---

Access platform 9 ft. 8 in. (2.96m)

- (2) Take the precautions described in the previous WARNING paragraph.

- (3) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).

- (4) Deflect rudder pedals from stop to stop and check for friction during actuation.

EFFECTIVITY: ALL

R

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## MAINTENANCE MANUAL

### C. Trouble Shooting

\*\*\*\*\*  
\* Remove artificial feel spring rod [1] \*  
\* With Flight Controls in mechanical mode and hydrau \*  
\* -lic system pressurized, deflect rudder pedals \*  
\* from stop to stop. \*  
\* Resistance (friction) encountered. \*  
\*\*\*\*\*

OK	NOT OK--	Replace spring rod [1].
----	----------	-------------------------

\*\*\*\*\*  
\* Shut down pressurization of hydraulic systems (Ref \*  
\* 27-00-00, Servicing, Procedure to set Flight \*  
\* Controls in mechanical mode). \*  
\* Open door 121 DB, disconnect the 4 rods from \*  
\* integral trim assembly lower lever. \*  
\* Operate artificial feel mechanism by actuating \*  
\* integral trim assembly lower lever. \*  
\* Actuation is carried out freely \*  
\*\*\*\*\*

OK	NOT OK--	Actuation is not carried out freely : Resistance (friction) encountered. Ref. chart 101.
----	----------	--

\*\*\*\*\*  
\* Remove the two rods between torque tube and inte- \*  
\* gral trim assembly lower lever. \*  
\* Deflect Captain's then First Officer's rudder \*  
\* pedals. \*  
\* Actuation is carried out freely \*  
\*\*\*\*\*

OK	NOT OK--	Actuation is not carried out freely. Resistance (friction) encountered. Ref. chart 102.
----	----------	---

\*\*\*\*\*  
\* Remove AP force limiter [2] \*  
\* Actuate lever of synchro pack. \*  
\* Actuation is carried out freely. \*  
\*\*\*\*\*

OK	NOT OK--	Replace synchro pack [10]
----	----------	---------------------------

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* Install AP force limiter without safetying it. \*  
\* Immobilize synchro pack with rigging pin D 925252 \*  
\* 002. Take the precautions described in the \*  
\* previous WARNING paragraph. \*  
\* Set Flight Controls in mechanical mode (Ref 27-00-- \*  
\* 00, Servicing). \*  
\* Remove AP Force limiter [2] \*  
\* CAUTION: DO NOT ALTER POSITION OF RELAY JACK INPUT \*  
\* LEVER WHEN REMOVING OR INSTALLING AP \*  
\* FORCE LIMITER \*  
\* By means of a spring scale, check load required to \*  
\* actuate input lever of relay jack. Load applied to \*  
\* the end of input lever is less than 1 daN. \*  
\* (2.25 lbf.) \*  
\*\*\*\*\*

||  
OK  
||

NOT OK--

-----  
Load applied to input lever is greater than  
1 daN (2.25 lbf.)  
Replace Relay Jack [3]  
-----

\*\*\*\*\*  
\* Replace AP Force limiter [2] \*  
\* Install spring rods [1] \*  
\* Install rod between integral trim assembly \*  
\* and torque tube. \*  
\* Bolt, special washer, flat washer, nut. \*  
\* Torque to between : \*  
\* On integral trim assembly, 45 and 50 lbf. in. \*  
\* (0.52 and 60 m.daN) \*  
\* On torque tube, 27 and 32 lbf. in. (0.30 and 0.60 \*  
\* m.daN). Safety with cotter pin. \*  
\* Install rods between integral trim assembly and \*  
\* synchro pack. \*  
\* Bolt, special washer, flat washer, nut. \*  
\* Torque to between 27 and 32 lbf. in. (0.30 and 0.60 \*  
\* m.daN). Safety with cotter pin. \*  
\* Remove rigging pins from resolvers. \*  
\* Shut down pressurization of hydraulic systems. \*  
\* (Ref 27-00-00, Servicing, Procedure to set Flight \*  
\* Controls in mechanical mode) \*  
\* Close access doors and panels. \*  
\* Remove tools and access platforms. \*  
\*\*\*\*\*

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* ACTUATION IS NOT CARRIED OUT FREELY\*  
\* RESISTANCE (FRICTION) ENCOUNTERED \*  
\*\*\*\*\*

\*\*\*\*\*  
\* The 4 rods are disconnected ; integral trim \*  
\* assembly lower lever is free. \*  
\* Manually rotate rocker arm of artificial feel \*  
\* jacks. \*  
\* This operation is carried out freely. \*  
\*\*\*\*\*

||  
OK  
||

\*\*\*\*\*  
\* Replace integral trim \*  
\* assembly [4] \*  
\*\*\*\*\*

NOT OK

-----  
| Disconnect Green artificial feel jack. |  
| check that piston slides freely and pivots freely |  
on its attachment point.

||  
OK  
||

| NOT OK-----| Replace Green jack [5]|  
-----

\*\*\*\*\*  
\* Disconnect Blue artificial feel jack \*  
\* Check that piston slides freely and pivots freely \*  
\* on its attachment point \*  
\*\*\*\*\*

||  
OK  
||

| NOT OK-----| Replace Blue jack [6] |  
-----

-----  
Replace artificial feel jack rocker arm [11]

Chart 101

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* ACTUATION IS NOT CARRIED OUT FREELY\*  
\* RESISTANCE (FRICTION) ENCOUNTERED \*  
\* WHEN MOVING FLIGHT CONTROLS \*  
\*\*\*\*\*

\*\*\*\*\*  
\* Disconnect all controls (rods) connected to \*  
\* Captain's and First Officer's torque tubes \*  
\* [7] \*  
\* Check that torque tubes pivot freely about \*  
\* their hinge points. \*  
\*\*\*\*\*

		-----	
OK	NOT OK--	Replace defective torque tube [7]	
		-----	

\*\*\*\*\*  
\* Check that Captain's and First Officer's \*  
\* rudder pedal deflection is carried out freely\*  
\*\*\*\*\*

		-----	
OK	NOT OK--	Remove defective rudder pedals	
		-----	

\*\*\*\*\*  
\* At First Officer's side only. \*  
\* Check that yaw deflection sensor moves \*  
\* freely. \*  
\*\*\*\*\*

		-----	
OK	NOT OK--	Replace yaw deflection sensor [9]	
		-----	

\*\*\*\*\*  
\* At Captain's side only. \*  
\* Check that Flight data recorder potentiometer\*  
\* moves freely. \*  
\*\*\*\*\*

		-----	
	NOT OK--	Replace potentiometer [8]	
		-----	

Chart 102

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## MAINTENANCE MANUAL

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[1] Artificial feel spring rod	213AF	121		Under Flight Compartment Floor	27-22-12 R/I	
[2] AP force limiter	121FB	121			27-21-16 R/I	
[3] Relay jack	121FB	121			27-24-12 R/I	
[4] Integral trim assembly	121DB	121			27-23-12 R/I	
[5] Green artificial feel jack	121DB	121			27-24-11 R/I	
[6] Blue artificial feel jack	213AF	121			27-24-13 R/I	
[7] Torque tbe	113DB 121AB	121			27-21-12 R/I	
[8] Flight data recorder potentiometer	113DB 121AB	121			31-31-17 R/I	
[9] Deflection sensor potentiometer	113DB 121AB	121			27-22-11 R/I	
[10] Synchro pack	121FB	121			27-26-11 R/I	
[11] Artificial feel jack Rcker arm	121DB	121			27-22-13 R/I	

Component Identification  
Table 101

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### 3. Control Surfaces (Rudders) do not Return to Neutral

#### A. General

This chapter provides a rapid method of locating play and resistance (friction) encountered in yaw Flight Controls : play and resistance result in unaccurate control of the aircraft.

Non-return of control surfaces is dealt with :

- in Blue, then Green, electrical channel.
- in mechanical channel only.

During non-return test and after flight control has reached the position corresponding to the required deflection, allow the latter to return to neutral slowly and without jerks up to balanced point, then note reading immediately. Only the operator required to perform test shall be present on the aircraft to the exclusion of other personnel.

#### B. Equipment and Materials

DESCRIPTION	PART NO.
Protractor, Elevon and Rudder	TE2012000
Rigging pins - Synchro Pack	D925252000
Access Platform 3.672 m (12 ft)	
Electrical Ground Power Unit	
Circuit breaker Safety Clips	

#### C. Prepare

- (1) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (2) Set yaw trim control to zero.
- (3) Deflect RH and LH rudder pedals several times.
- (4) Trip, safety and tag the following circuit breakers :

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## MAINTENANCE MANUAL

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
---------	-------	--------------------	-------------

STICK SHAKER SUP                      1-213      W 513      P15

(5) Check that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
---------	-------	--------------------	-------------

LH UC WEIGHT "A" SYS SUP      1-213      G 292      M17  
ADC 1 28V SUP                                      1F 74      P12

ADC 26V SUP                      2-213      1F 78      A 2  
YAW ART FEEL COMP 1 SUP                      1C 242      E 2  
ADC 1 115V SUP                                      1F 73      F 3

RH UC WEIGHT SW "B" SYS SUP 3-213      G 294      B 9

(6) On ADC control panel (centre console)

(a) Place ADC 1 switch in ON position.

(b) Place ADC 1 TEST selector switch in position 1.

(b1) Amber ADC 1 warning light must illuminate.

(b2) After approximately 30 seconds Blue TEST indicator light must illuminate.

(b3) Press then release amber ADC 1 warning light ; it must go off.

(7) On overhead panel, on ARTIFICIAL FEEL engage switch unit No.1, engage YAW switch, it must remain engaged.

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## MAINTENANCE MANUAL

### D. Trouble Shooting

\*\*\*\*\*  
\* Non-return to neutral in Blue, then Green, \*  
\* electrical channel. \*  
\* Set Flight Controls in Blue electrical mode (Ref. \*  
\* 27-00-00, Servicing). Make certain that yaw trim \*  
\* controls are set to zero. \*  
\* On overhead panel, on ARTIFICIAL FEEL No.1 engage \*  
\* switch unit, engage YAW switch. \*  
\* Install protractor on fin. \*  
\* A 25 daN (56.3 lbf.) load is applied perpendicu- \*  
\* larly to the trailing edge of each rudder. \*  
\* Deflect RH and LH rudder pedals several times. \*  
\* Deflect LH pedal up to stop in LH turn configura- \*  
\* -tion. Allow rudder pedal to return to neutral \*  
\* slowly and without jerks. \*  
\* Note position of rudders (reading on voltmeter) \*  
\* Repeat operation in RH turn configuration and \*  
\* note position of rudders. \*  
\* On Flight Control Unit, place O & M ELEVONS, \*  
\* IN ELEVONS and RUDDER switches in GREEN \*  
\* position. \*  
\* Deflect up to stop rudder in LH turn configu- \*  
\* ration. \*  
\* Allow rudder pedal to return to neutral slowly and \*  
\* without jerks. \*  
\* Note position of rudders \*  
\* Repeat operation in RH turn configuration and note \*  
\* position of rudders. \*  
\* Difference between the two positions noted for \*  
\* each rudder is equal to or less than 20 minutes \*  
\*\*\*\*\*

OK

NOT OK-----

Difference between the two positions  
is greater than 20 minutes for one or  
for the two rudders and on one or on  
the two electrical control channels  
Ref. Chart 103 (Sheet 1)

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||  
OK  
||

\*\*\*\*\*  
\* Non-return to neutral in mechanical channel \*  
\* On Flight Control Unit place O & M ELEVONS, IN \*  
\* ELEVONS and RUDDER switches in MECH position. \*  
\* Deflect RH and LH rudder pedals several times. \*  
\* Deflect rudders up to stop in LH turn configura- \*  
\* tion. \*  
\* Allow rudder pedal to return to neutral slowly and \*  
\* without jerks. \*  
\* Note position of rudders (reading on voltmeter) \*  
\* Repeat operation in RH turn configuration and note \*  
\* position of rudders. \*  
\* Difference between the two positions of each \*  
\* rudder is equal to or less than 30 minutes \*  
\*\*\*\*\*

||  
OK  
||

||  
NOT OK  
||

-----  
| Difference between the two |  
| positions is greater than 30 |  
| minutes on one or on the two |  
rudders. Ref. Chart 104 (Sheet 1)

\*\*\*\*\*  
\* Rudder "non return to neutral" \*  
\* tests are conclusive in electrical \*  
\* and mechanical channels. \*  
\* Flight Controls are in correct ope- \*  
\* rating condition. \*  
\*\*\*\*\*

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\*\*\*\*\*  
\* DIFFERENCE IS GREATER THAN 20 \*  
\* MINUTES FOR ONE OR FOR THE TWO \*  
\* RUDDERS AND ON ONE OR ON THE TWO \*  
\* ELECTRICAL CONTROL CHANNELS. \*  
\*\*\*\*\*

\*\*\*\*\*  
\* Difference is present on the two \*  
\* rudders \*  
\*\*\*\*\*

For one channel-----

-----  
| Play at CX pack of relevant channel |  
Replace synchro pack [10].

For both channels-----

-----  
| Play or resistance (friction) at |  
| front section upstream of synchro |  
| pack. |  
Ref. Chart 105.

Chart 103 (Sheet 1 of 2)

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\*\*\*\*\*  
\* Difference is present on one rudder\*  
\* only. \*  
\*\*\*\*\*

For one channel-----

Check play take-up device of  
relevant PFCU CT resolver.  
Replace synchro pack on PFCU [16]

For both channels----

Play in feedback linkage of  
relevant PFCU.  
Replace feedback lever [16].

Chart 103 (Sheet 2 of 2)

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*****		-----	
* DIFFERENCE BETWEEN THE TWO POSI-	*	GROUND EQUIPMENT REQUIRED	
* -TIONS IS GREATER THAN 30 MINUTES	*	-----	
* ON ONE OR THE TWO RUDDERS, FOR	*	DESCRIPTION	PART NO.
* MECHANICAL CHANNEL.	*	-----	
*****		RIGGING PINS-	
		SYNCHRO PACK.	D925252000
		COMPARATOR	-----
		-----	

\*\*\*\*\*

\* Difference is present on both rudders. \*

\* On Flight Control Unit, place O & M ELEVONS, IN \*

\* ELEVONS and RUDDER switches in BLUE position. \*

\* Open door 121 FB and immobilize yaw resolvers \*

\* with rigging pin D 925252002. \*

\* On SERVO CONTROLS unit, place lower selector \*

\* switch in YELLOW/BLUE position. \*

\* On RELAY JACK unit, place switch in BLUE position \*

\* Disconnect AP force limiter [2]. \*

\* Check that when a load of plus or minus 56 daN. \*

\* (126 lbf.) is applied, difference between eye-end \*

\* fitting centre distances is equal to or less \*

\* than 0.24 mm (0.0094 in.). \*

\*\*\*\*\*

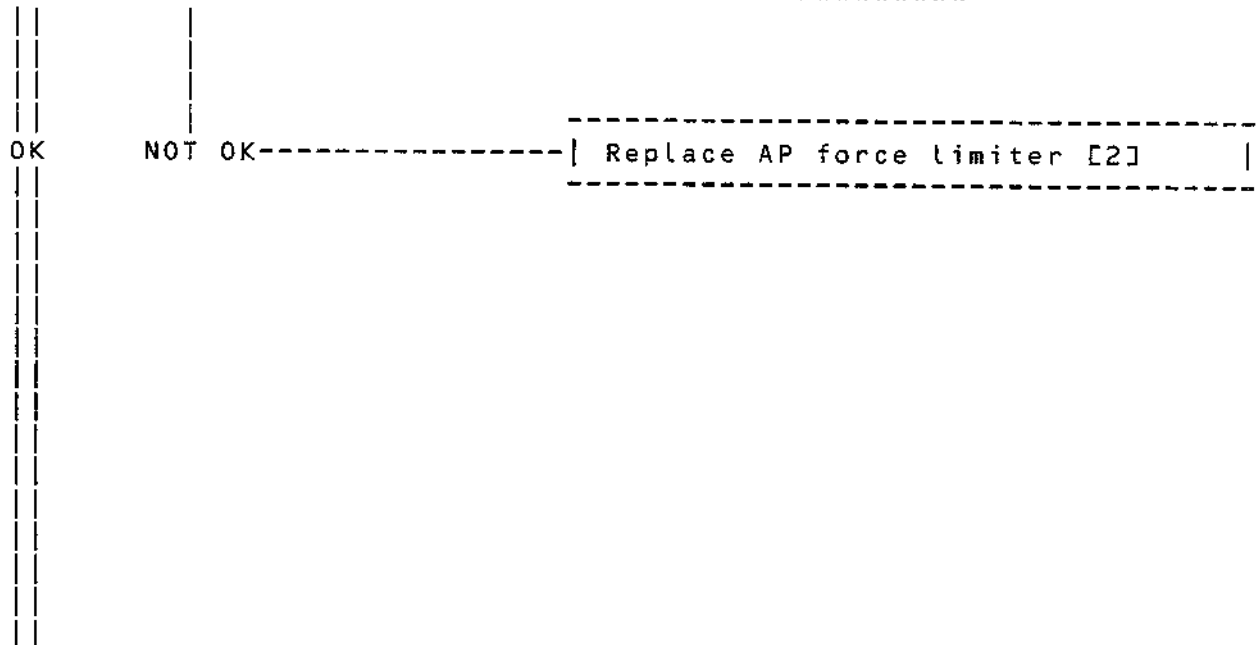


Chart 104 (Sheet 1 of 5)

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||  
OK  
||

\*\*\*\*\*  
\* Install AP force limiter [2] \*  
\* On SERVO CONTROLS Unit place lower selector \*  
\* switch in NORMAL position. \*  
\* On RELAY JACK unit place switch in NORM position. \*  
\* Remove rigging pin D 925252002 from resolvers \*  
\* On Flight Control Unit, place O & M ELEVONS, IN \*  
\* ELEVONS and RUDDER switches in MECH position. \*  
\* Install a comparator to measure displacement of an \*  
\* attachment fork end of the Relay Jack (play at \*  
\* spherical bearings). \*  
\* Measurement is performed by setting yaw trim to \*  
\* plus or minus 1 degree with a tolerance of minus \*  
\* 0, minus 0.2. \*  
\* Measured difference must be equal to or less than \*  
\* 0.2 mm (0.0079 in.) \*  
\*\*\*\*\*

||  
OK  
||

NOT OK-----| Replace Relay Jack [3]. |

\*\*\*\*\*  
\* Immobilize yaw resolvers with rigging pin D 925252 \*  
\* 002. \*  
\* Disconnect rod between load limiting mechanism \*  
\* and tension regulator : cotter pin, flat washer, \*  
\* special washer, bolt. \*  
\* NOTE: For removing bolt, it is necessary to press \*  
\* plunger on head of bolt to free the locking \*  
\* balls. \*  
\* Check resistance (friction) or play at spherical \*  
\* bearings of this rod \*  
\*\*\*\*\*

||  
OK  
||

NOT OK-----| Replace ends of rod between load limiting  
mechanism and cable tension regulator. |

\*\*\*\*\*  
\* Check that there is no play at load limiting \*  
\* mechanism. \*  
\*\*\*\*\*

||  
OK  
||  
||

NOT OK-----| Replace load limiting mechanism [12] |

Chart 104 (Sheet 2 of 5)

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* Actuate control linkage \*  
\* Load applied to head of cable tension regu- \*  
\* lator bellcrank must be equal to or less \*  
\* than 3.5 daN (7.87 lbf.) \*  
\*\*\*\*\*

||  
OK  
||

||  
NOT OK  
||

-----  
Resistance (friction) is caused by :  
- ball bearings of cable tension regulator  
- wear of cables  
- wear of fairleads  
- ball bearings of guide pulleys  
- jamming at pressure seals.  
- ball bearings of cable quadrant in fin.  
-----

\*\*\*\*\*  
\* Actuating cable tension regulator bellcrank \*  
\* throughout its full travel range, play measured \*  
\* between head of bellcrank and a cable quadrant \*  
\* must be equal to or less than 1.2 mm (0.0472 \*  
\* in.) \*  
\*\*\*\*\*

||  
OK  
||

||  
NOT OK  
||

-----  
Replace cable tension regulator [15]  
-----

-----  
| Check cable tension by reading cable |  
tension regulator marker indication.

Chart 104 (Sheet 3 of 5)

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* Difference is present on one rudder only. \*  
\* Shut down pressurization of hydraulic system (Ref \*  
\* 27-00-00, Servicing, Procedure to set Flight \*  
\* Controls in electrical mode). \*  
\* Open access door 151 DB and depressurize Blue, \*  
\* Green and Yellow hydraulic systems. \*  
\* Open access door 153 BB and depressurize hydraulic \*  
\* tanks unscrewing tank depressurization valves by \*  
\* a few turns. Check pressure drop on pressure \*  
\* indicators. Screw in tank depressurization valves \*  
\* and safety with lock pins. \*  
\* Open access panel 323 MR. \*  
\* Disconnect rod between cable quadrant and crank \*  
\* arm, at cable quadrant : cotter pin, flat washer, \*  
\* special washer, bolt. \*  
\* NOTE: For removing bolt, it is necessary to press \*  
\* plunger on head of bolt in order to free the \*  
\* locking balls. \*  
\* This operation deals with the upper or lower rod \*  
\* depending on the rudder involved. \*  
\* Check that there is no play between cable quadrant \*  
\* and its bellcrank. \*  
\*\*\*\*\*

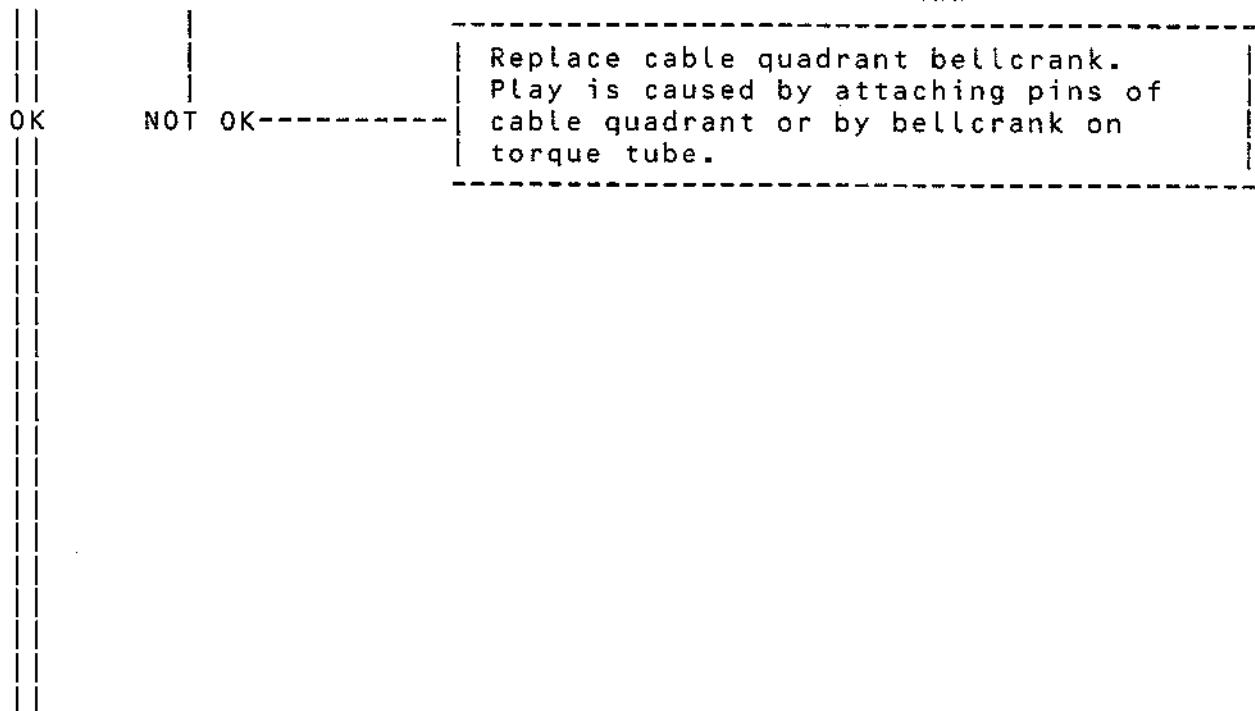


Chart 104 (Sheet 4 of 5)

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

\*\*\*\*\*  
\* Remove fairing 351 BL (lower bellcrank) or 352 BR \*  
\* (upper bellcrank) depending on rudder involved. \*  
\* Disconnect rod between lever of bellcrank and PFCU\*  
\* input lever, at bellcrank lever ; cotter pin, nut,\*  
\* flat washer, special washer, bolt. \*  
\* NOTE: For removing bolt, it is necessary to press \*  
\* plunger on head of bolt to free the locking balls \*  
\* Check that when applying a load of plus or minus \*  
\* 7.5 daN (16.8 lbf.), play at bellcrank is less \*  
\* than 1 mm (0.0394 in.) \*  
\*\*\*\*\*

		-----	Replace upper or lower bellcrank [13] or [14] depending on rudder involved.
OK	NOT OK	-----	
		-----	

\*\*\*\*\*  
\* Check that there is no play between breakout lever\*  
\* and lever of bellcrank. Check that this lever \*  
\* rotates freely. \*  
\*\*\*\*\*

		-----	Replace bellcrank [13] or [14] :
OK	NOT OK	-----	- Resistance is caused by the torque tube ball bearings.
		-----	- Play is caused by breakout lever attaching pins or by lever on torque tube.
		-----	

\*\*\*\*\*  
\* Play is caused by spherical bearings on : \*  
\* - Cable quadrant bellcrank \*  
\* - Upper or lower bellcrank breakout lever \*  
\* - lever of upper or lower bellcrank \*  
\* - input lever of PFCU. \*  
\*\*\*\*\*

||  
\*\*\*\*\*  
\* Connect rod between cable quadrant and bellcrank; \*  
\* bolt, special washer, flat washer, nut, cotter \*  
\* pin. \*  
\* Connect rod between bellcrank and PFCU input \*  
\* lever : bolt, special washer, flat washer, nut, \*  
\* cotter pin. \*  
\* Install fairings and access panels. \*  
\* Remove access platform \*  
\*\*\*\*\*

Chart 104 (Sheet 5 of 5)

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

*****	*****
* DIFFERENCES ARE GREATER THAN 20	* GROUND EQUIPMENT REQUIRED
* MINUTES FOR ONE OR FOR THE TWO	* -----
* RUDDERS AND ON ONE OR ON THE TWO	* DESCRIPTION PART NO.
* ELECTRICAL CONTROL CHANNELS ; 30	* -----
* MINUTES FOR ONE OR FOR THE TWO	* PROTRACTOR-ELEVON
* RUDDERS ON MECHANICAL CHANNEL	* AND RUDDER. TE 2012000
*****	* COMPARATOR.
	* RIGGING PINS-
	* SYNCHRO PACK. D.925252000
	* SPRING SCALE
	* 50 daN WITH
	* 0.3 PER CENT
	* ERROR OR LESS. -----
	* ACCESS PLATFORM
	* 11.25 m (36 ft.
	* 11 in.). -----
	* -----

\*\*\*\*\*

\* Set Flight Controls in electrical mode (Ref 27-00-\*

\* 00, Servicing) Make certain that yaw trim controls\*

\* are set to zero. \*

\* On overhead panel, on ARTIFICIAL FEEL engage \*

\* switch unit No 1 engage YAW switch. \*

\* Install protractor on fin. \*

\* A 25 daN (56.3 lbf.) load is applied perpendicu- \*

\* larly to the trailing edge of each rudder. \*

\* Deflect RH and LH rudder pedals several times. \*

\* Deflect rudder pedals so that rudder deflects 10° \*

\* minimum in RH turn configuration. \*

\* Allow rudder pedals to return to neutral slowly \*

\* and without jerks. \*

\* Place a comparator under horizontal arm of inte- \*

\* gral trim assembly at 180 mm (7.086 in.) of its \*

\* hinge point. \*

\* Deflect rudder pedals so that rudder deflects 10° \*

\* minimum in LH turn configuration. \*

\* Allow rudder pedals to return to neutral slowly \*

\* and without jerks. \*

\* Non-return of integral trim assembly horizontal \*

\* arm read on comparator is equal to or less than \*

\* 0.3 mm (0.011 in.). \*

\*\*\*\*\*

OK	NOT OK

Chart 105 (Sheet 1 of 8)

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

OK

NOT OK

Ref. chart 105 (Sheet 4)

\*\*\*\*\*  
\* On SERVO CONTROLS unit, place lower selector \*  
\* switch in YELLOW/BLUE position. \*  
\* On RELAY JACK unit, place switch in BLUE position \*  
\* Open access panel 121 FB \*  
\* Disconnect rods between trim and synchro pack from \*  
\* synchro pack: cotter pin, nut, special washer, \*  
\* flat washer, bolt. \*  
\* NOTE: For removing bolt, it is necessary to press \*  
\* plunger on head of bolt to free the locking \*  
\* balls. \*  
\* Apply a load of plus or minus 2 daN (4.52 lbf.) to \*  
\* resolver input bellcrank and at rod attachment \*  
\* point. Play measured at the same point is equal \*  
\* to or less than 0.44 mm (0.0173 in.). \*  
\*\*\*\*\*

OK

NOT OK

Replace synchro pack [10]

\*\*\*\*\*  
\* On integral trim assembly, disconnect rods bet- \*  
\* ween trim and torque tube ; cotter pin, nut, \*  
\* special washer, flat washer, bolt. \*  
\* NOTE: for removing bolt, it is necessary to press \*  
\* plunger on head of bolt to free the locking \*  
\* balls \*  
\* Apply a load of plus or minus 11 daN (24.7 lbf.) \*  
\* to rod attachment point. \*  
\* Play at the same point is equal to or less than \*  
\* 0.64 mm (0.0252 in.) \*  
\*\*\*\*\*

OK

NOT OK

Replace integral trim assembly [04]

Chart 105 (Sheet 2 of 8)

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* Shut down pressurization of hydraulic systems \*  
\* (Ref 27-00-00, Servicing, procedure to set Flight \*  
\* Controls in electrical mode) \*  
\* Open access door 151 DB and depressurize Blue, \*  
\* Green and Yellow hydraulic systems. \*  
\* Open access door 153 BB and depressurize hydraulic \*  
\* tanks by unscrewing depressurization valves by a \*  
\* few turns. Check pressure drop on pressure \*  
\* indicators. Tighten depressurization valves and \*  
\* safety with lock pins. Disconnect AP force limiter \*  
\* [02]. \*  
\* Resolver driving load, applied to input bellcrank \*  
\* at rod attachment point (Bellcrank at balanced \*  
\* point) must be equal to or less than 0.15 daN \*  
\* (0.33 lbf.). \*

\*\*\*\*\*

||  
OK  
||

NOT OK-----! Replace synchro pack [10] |

\*\*\*\*\*  
\* Replace ends of rods between integral trim assem- \*  
\* bly and synchro pack. \*  
\*\*\*\*\*

\*\*\*\*\*  
\* Install AP force limiter [2] \*  
\* Connect rods between trim and torque tube ; bolt, \*  
\* special washer, flat washer, nut. \*  
\* Torque to between 0.3 and 0.35 m.daN (27 and 32 \*  
\* lbf. in.) \*  
\* Safety with cotter pin. \*  
\* Close access panels \*  
\* Remove access platform. \*  
\*\*\*\*\*

Chart 105 (Sheet 3 of 8)

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

\*\*\*\*\*  
\* Open access door 121 FB and immobilize yaw \*  
\* resolvers with rigging pin D 925252002. \*  
\* Disconnect artificial feel spring rod [1] \*  
\* Check that when a load of plus or minus 13 daN \*  
\* (31.5 lbf.) is applied, eye-end fitting to eye-end \*  
\* fitting centre distance varies by a value equal to \*  
\* or less than 0.38 mm (0.015 in) \*  
\*\*\*\*\*

OK	NOT OK-----	Replace artificial feel spring rod, [1]

\*\*\*\*\*  
\* At torque tube, disconnect rods between torque \*  
\* tube and integral trim assembly. \*  
\* By means of a spring scale, actuate Captain's \*  
\* rudder pedals. \*  
\* Fully deflect LH and RH rudder pedals and release. \*  
\* Results must correspond with graph No.1. \*  
\*\*\*\*\*

OK	NOT OK-----	Ref. chart 105 (Sheet 6)

\*\*\*\*\*  
\* Repeat the same operation on First Officer's \*  
\* rudder pedals. Results must correspond with graph \*  
\* No.2 \*  
\*\*\*\*\*

OK	NOT OK-----	Resistance (friction) is caused by : -ball bearings of torque tube. -ball bearings of pedal hinge points -ball bearings or spherical bearings of pedal mechanisms.

\*\*\*\*\*  
\* Check for resistance (friction) or play at spheri- \*  
\* cal bearings of rods between torque tube and inte- \*  
\* gral trim assembly \*  
\*\*\*\*\*

OK	NOT OK-----	Replace ends of rods between torque tube and integral trim assembly

Chart 105 (Sheet 4 of 8)

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* Set Flight Controls in Blue electrical mode (Ref \*  
\* 27-00-00, Servicing) \*  
\* On SERVO CONTROLS unit, place lower selector \*  
\* switch in YELLOW/BLUE position. \*  
\* On RELAY JACK unit, place switch in BLUE position \*  
\* Disconnect AP force limiter [2] \*  
\* On SERVO CONTROLS unit, place lower selector \*  
\* switch in NORMAL position. \*  
\* On RELAY JACK unit, place switch in NORM position \*  
\* On Flight Control Unit place O & M ELEVONS, IN \*  
\* ELEVONS and RUDDER switches in MECH position. \*  
\* Check that actuating load of Relay Jack, applied \*  
\* to input lever head is equal to or less than \*  
\* 1 daN (2.2 lbf.) \*  
\*\*\*\*\*

||  
OK  
||

NOT OK-----| Replace Relay Jack [3] |

\*\*\*\*\*  
\* Check for resistance (friction) at spherical \*  
\* bearings of AP force limiter \*  
\*\*\*\*\*

||  
OK  
||

NOT OK-----| Replace AP force limiter [2] |

\*\*\*\*\*  
\* Shut down pressurization of hydraulic system (Ref \*  
\* 27-00-00, Servicing, Procedure to set Flight \*  
\* Controls in electrical mode) \*  
\* Open access door 151 DB, depressurize Blue, Green \*  
\* and Yellow hydraulic systems. \*  
\* Open access door 153 BB and depressurize hydraulic \*  
\* tanks by unscrewing tank depressurization valves \*  
\* by a few turns, Check pressure drop on pressure \*  
\* indicators. Tighten depressurization valves and \*  
\* safety with lockpins. \*  
\* Disconnect artificial feel jacks. \*  
\* There must be no resistance (friction). \*  
\*\*\*\*\*

||  
||  
OK  
||

NOT OK  
|

Chart 105 (Sheet 5 of 8)

EFFECTIVITY: ALL

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# *Concorde*

## MAINTENANCE MANUAL

NOT OK-----| Ref. chart 105, sheet 7 |

\*\*\*\*\*  
\* Replace integral trim assembly [4] \*  
\* (Resistance (friction) present at hinge \*  
\* points) \*  
\*\*\*\*\*

Chart 105 (Sheet 6 of 8)

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# Concorde

## MAINTENANCE MANUAL

\*\*\*\*\*  
\* Captain's side \*  
\* At torque tube, disconnect spring rod linking yaw \*  
\* torque tube to control unit G 94, cotter pin, nut, \*  
\* washer, bolt. \*  
\* Disconnect Flight data recorder potentiometer [8] \*  
\* By means of a spring scale, deflect CAPTAIN'S \*  
\* rudder pedals. \*  
\* Fully deflect rudder pedals in LH and RH direction \*  
\* then release. \*  
\* Results must correspond with Graph No.2, First \*  
\* Officer's side. \*  
\*\*\*\*\*

		Resistance (friction) is caused by :
		- ball bearings of torque tube
		- ball bearings at pedal hinge points.
OK	NOT OK-----	- ball bearings of pedal linkage
		hinge points

\*\*\*\*\*  
\* Resistance (friction) is caused by : \*  
\* -Spring rod between yaw torque tube and control \*  
\* unit G 94. \*  
\* -Potentiometer of yaw deflection sensor [9] \*  
\* -Potentiometer of Flight data recorder system [8] \*  
\*\*\*\*\*

Chart 105 (Sheet 7 of 8)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* Disconnect Green artificial feel jack [5] \*  
\* Check that jack rod slides easily and that spheri-\*  
\* cal bearings rotate freely. \*  
\*\*\*\*\*

OK	NOT OK-----	Replace Green artificial feel jack [5]
----	-------------	--

\*\*\*\*\*  
\* Disconnect Blue artificial feel jack [6] \*  
\* Check that jack rod slides easily and that spheri-\*  
\* cal bearings rotate freely. \*  
\*\*\*\*\*

OK	NOT OK-----	Replace Blue artificial feel jack [6]
----	-------------	---------------------------------------

-----  
Replace artificial feel jack rocker arm [11]

(Ref. Fig.101 and 102)

Chart 105 (Sheet 8 of 8)

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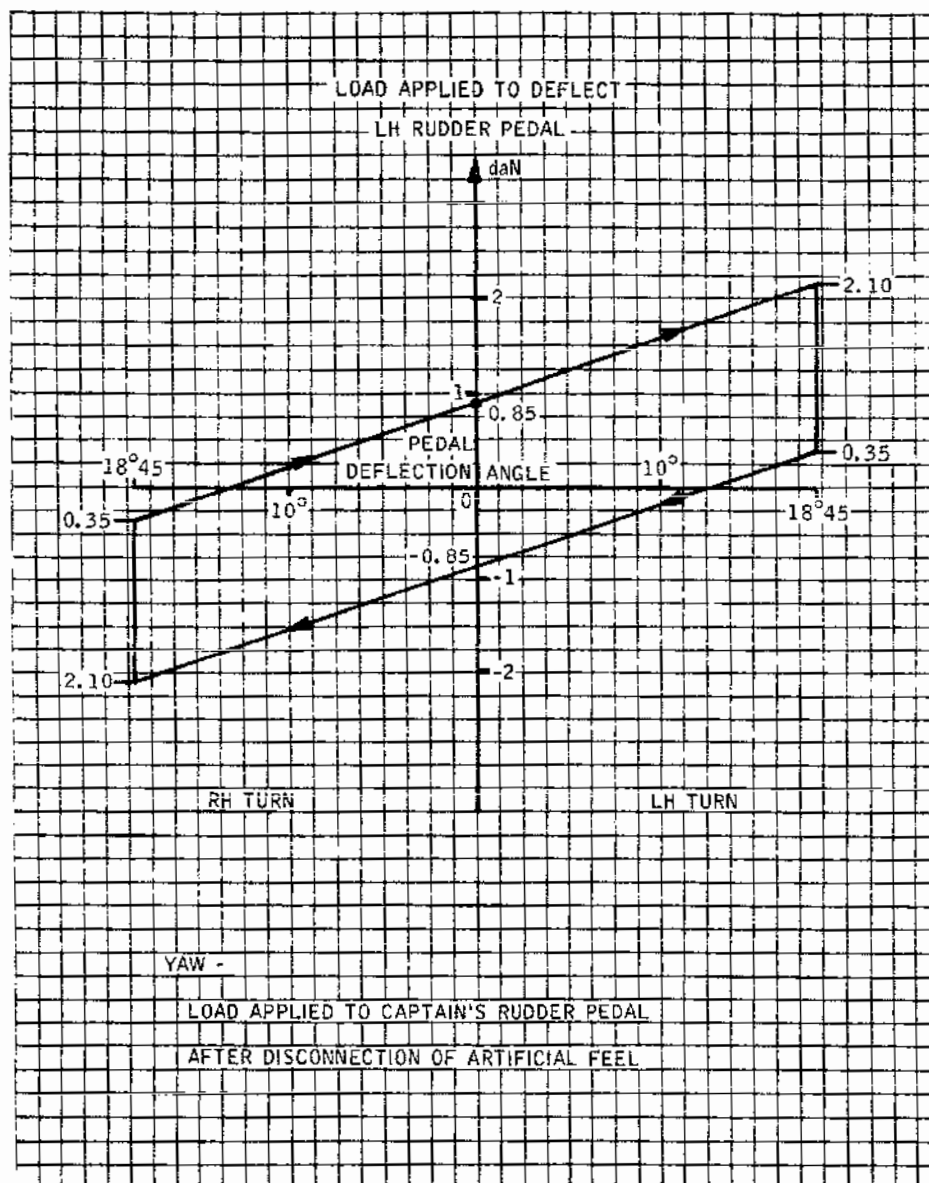
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## MAINTENANCE MANUAL



CMA 27 21 00 1 AAWO

Graph No.1  
Figure 101

EFFECTIVITY: ALL

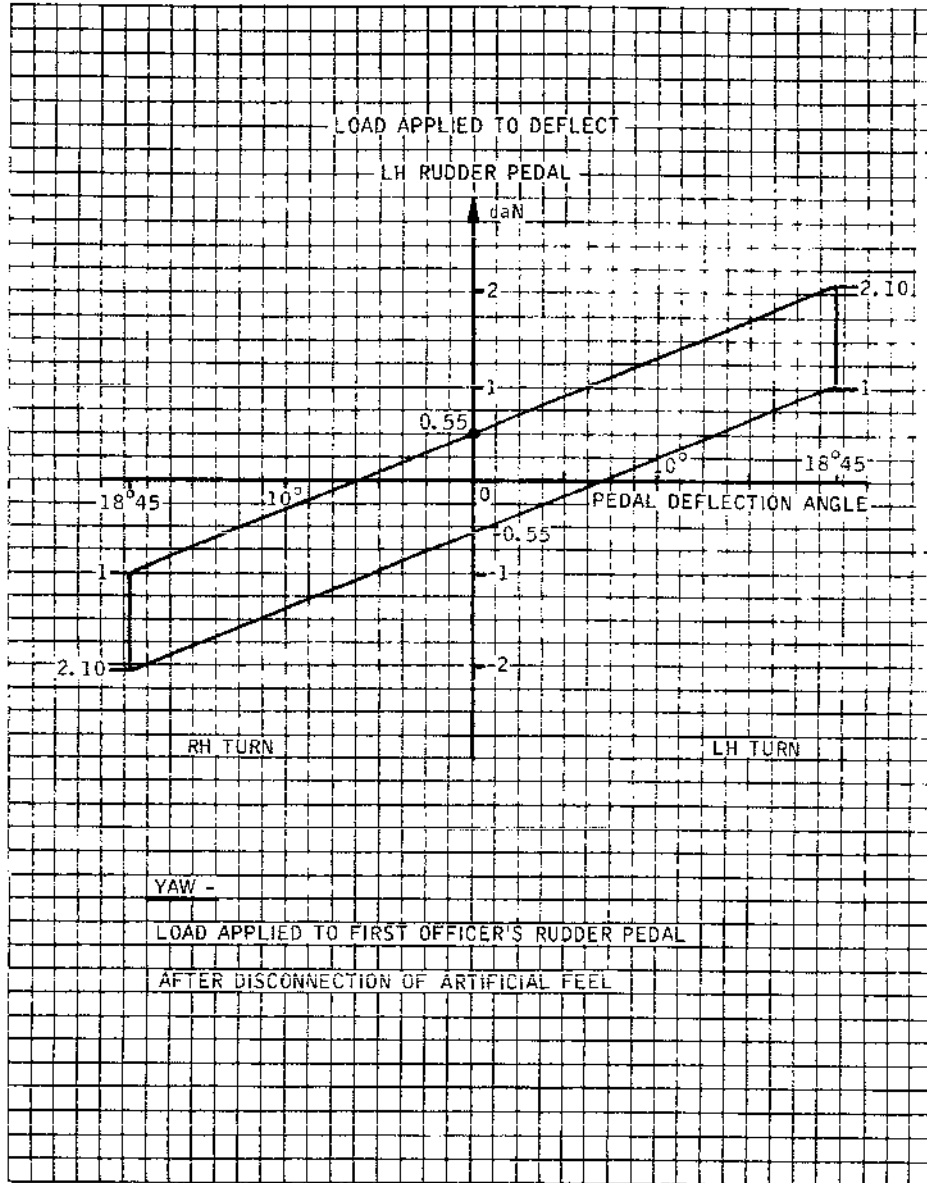
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## MAINTENANCE MANUAL



Graph No.2  
Figure 102

CMA 27 21 00 1 ACMO

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## MAINTENANCE MANUAL

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[1] Artificial feel spring rod	213AF 211HF	121		Under floor	27-22-12 R/I	
[2] AP force limiter	121FB	121			27-21-16 R/I	
[3] Relay jack	121FB	121			27-24-12 R/I	
[4] Integral Trim assembly	121DB	121			27-23-12 R/I	
[5] Green artificial feel jack	121DB	121			27-24-11 R/I	
[6] Blue artificial feel jack	213AF	121			27-24-13 R/I	
[8] Flight data recorder potentiometer	113DB 121AB	121			31-31-17	
[9] Yaw Deflection sensor	113DB 121AB	121			27-22-11 R/I	
[10] Synchro pack	121FB	121			27-26-11 R/I	
[11] Artificial feel rocker arm	121DB	121			27-22-13 R/I	
[12] Load limiting mechanism	121GB	121			27-21-13 R/I	
[13] Upper bellcrank at Rib 15	323ML	323			27-21-43	
[14] Lower bellcrank at Rib 8	323LR	323			27-21-46 R/I	

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# Concorde

## MAINTENANCE MANUAL

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[15] Cable tension regulator	215AF 121GB	121			27-21-14 R/I	
[16] Power flight control unit	351CL or 352CR	351 or 352			27-24-31 R/I	

Component Identification  
Table 101

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# Concorde

## MAINTENANCE MANUAL

### MECHANICAL CONTROL - REMOVAL/INSTALLATION

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

This topic deals with the removal/installation of the mechanical control components in fuselage section between Frame 8 and spar 7 in fin.

#### 2. Guide Pulleys and Control Cables (Ref. Fig. 401 )

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Zero Rigging Device - Relay Chassis	E925019000
Rigging Pins - Synchro Pack	D925252000
Rigging Pin - Quadrant	D925422000
Locking Equipment - Cable Tension Regulator	D921606000
Cable Grip	D921620000
Circuit Breaker Safety Clips	

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# Concorde

## MAINTENANCE MANUAL

---

### DESCRIPTION

### PART NO.

---

Access Platform 3.672 m (12 ft.)  
11.250 m (36 ft. 11 in.)

Tensiometer

Lockwire Dia. 0.028 in (0.7 mm)  
Corrosion Resistant Steel

### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Check that pitch, roll and yaw trim controls are set to zero.
- (3) Open door 121FB, immobilize yaw resolvers with pin D925252002.
- (4) Install equipment E925019010 and E925019014.
- (5) Open door 151DB, depressurize Blue, Green and Yellow hydraulic systems. (Ref. 29-11-00, 29-12-00 and 29-21-00, Servicing).
- (6) Open door 323MR and immobilize cable quadrant in fin with pin D925422000.
- (7) Trip, safety and tag the following circuit breaker

---

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

---

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3, PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS, BY HYDRAULIC GROUND POWER UNIT.

DISPLAY ALSO A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZATION SYSTEM ELECTRIC PUMPS.

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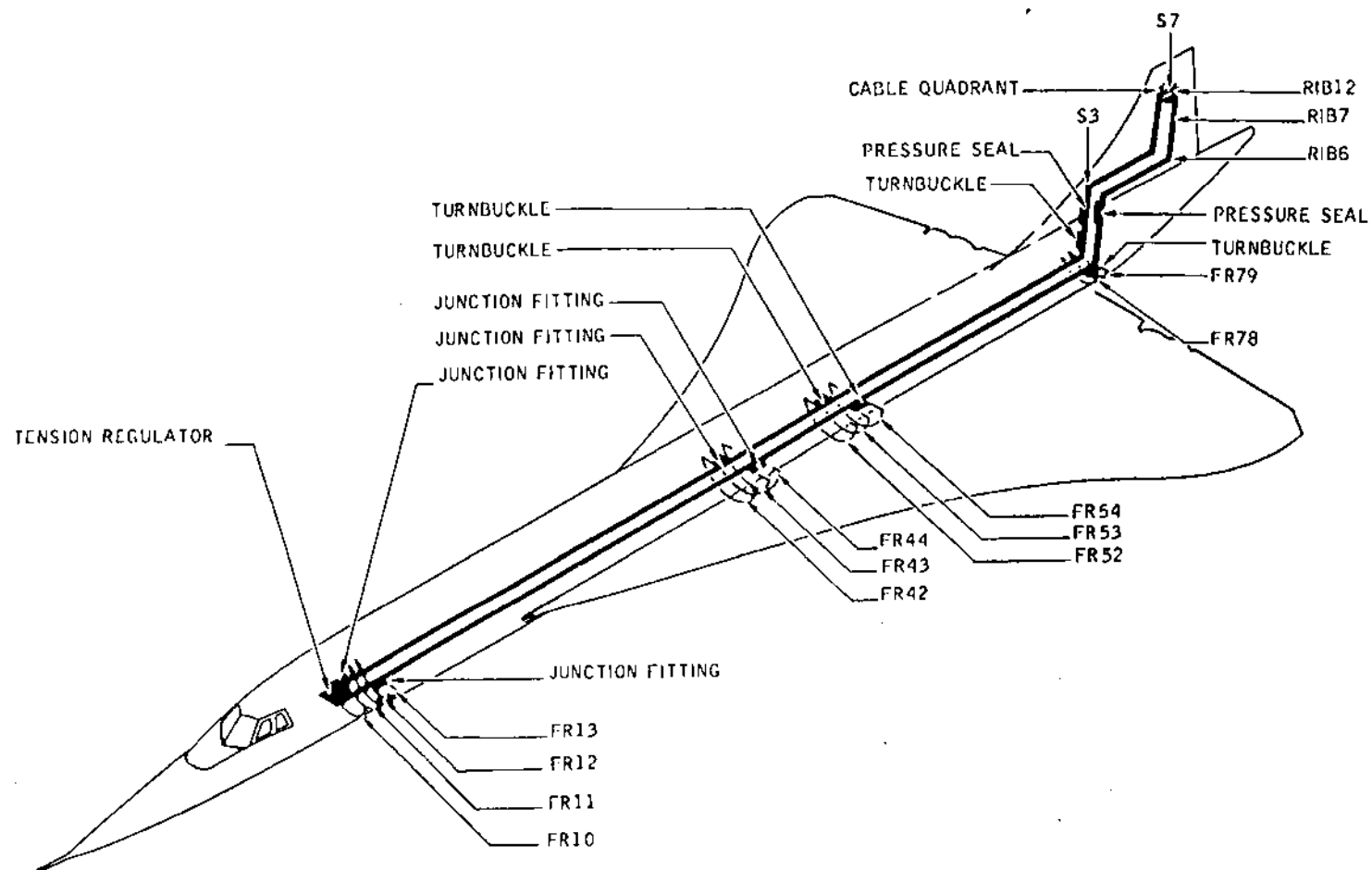
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## MAINTENANCE MANUAL

CMA 27 21 00 4 AAMO



Control Cables  
Figure 401

R

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## MAINTENANCE MANUAL

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT, PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (8) Open door 121GB and floor panel 215AF giving access to cable tension regulators.
- (9) Open floor panel 231JF giving access to cable turnbuckles.
- (10) Open floor panels or access doors corresponding to cable lengths or pulleys to be removed.
  - (a) Guide pulleys.
    - (a1) Pulleys located between frames 9 and 10 : panels 215AF.
    - (a2) Pulleys located between frames 80 and 81 : panels 243KF.
    - (a3) Pulleys located between ribs 6 and 7 in fin : at spar 3 : door 323JL.
    - (a4) Pulleys located between ribs 6 and 7 in fin : at spar 7 : doors 323MR.
  - (b) Cables
    - (b1) RH cable

Cable length from tension regulator to junction fitting located between frames 9 and 10 : panels 215AF and 215BF.  
Cable length from junction fitting (between frames 9 and 10) to junction fitting located between frames 42 and 43 : panels 215BF, 215CF, 221AF, 221DF, 221HF, 221LF, 221QF, 221UF, 221XF, 223AF, 223DF, 223LF, 223SF, 231AF.

Cable length from junction fitting (between frames 42 and 43) to turnbuckle located between frames 52 and 53 : panels 231AF, 231DF, 231GF, 231HF, 231JF.

Cable length from turnbuckle (located between frames 52 and 53) to turnbuckle located at spar 3 : panels 231JF, 233AF, 233BF, 233CF, 233FF, 233JF, 241AF, 241BF, 241EF, 241HF, 241JF, 243AF, 243DF, 243EF, 243HF, 243KF.

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## MAINTENANCE MANUAL

Cable length from turnbuckle (spar 3) to cable quadrant in fin, located at spar 7, level with rib12 : panels 323JL, 323MR.

### (b2) LH cable

Cable length from tension regulator to junction fitting located between frames 12 and 13, panels 215AF, 215BF, 215CF, 221AF. Cable length from junction fitting (between frames 12 and 13) to junction fitting located between frames 43 and 44 : panels 221AF, 221DF, 221HF, 221LF, 221QF, 221UF, 221XF, 223AF, 223DF, 223LF, 223SF, 231AF. Cable length from junction fitting (between frames 43 and 44) to turnbuckle located between frames 53 and 54 : panels 231AF, 231DF, 231GF, 231HF, 231JF. Cable length from turnbuckle (between frames 53 and 54) to turnbuckle located between frames 78 and 79 : panels 231JF, 233AF, 233BF, 233CF, 233FF, 233JF, 241AF, 241BF, 241EF, 241HF, 241JF, 243AF, 243DF, 243EF, 243HF. Cable length from turnbuckle (between frames 78 and 79) to cable quadrant located at spar 7 level with rib12 : panel 323JL, 323MR.

### C. Remove Guide Pulleys (Ref. Fig.402 and 403)

- (1) Remove locking clips (3) from the cable turnbuckles associated with the pulleys to be removed. Slacken the turnbuckles symmetrically until the cable tension is sufficiently reduced so as to enable installation of the cable tension regulator locking equipment D921606000.
- (2) Install the cable tension regulator locking equipment.
- (3) Slacken the cables until the pulley can be removed.
- (4) If necessary, remove the cable guard from the support of the pulley to be removed. (Cotter, nut, washer and bolt).
- (5) Remove cotter and nut, remove washer and pulley bolt.

### D. Preparation of Replacement Component

### E. Install Guide Pulleys

EFFECTIVITY: ALL

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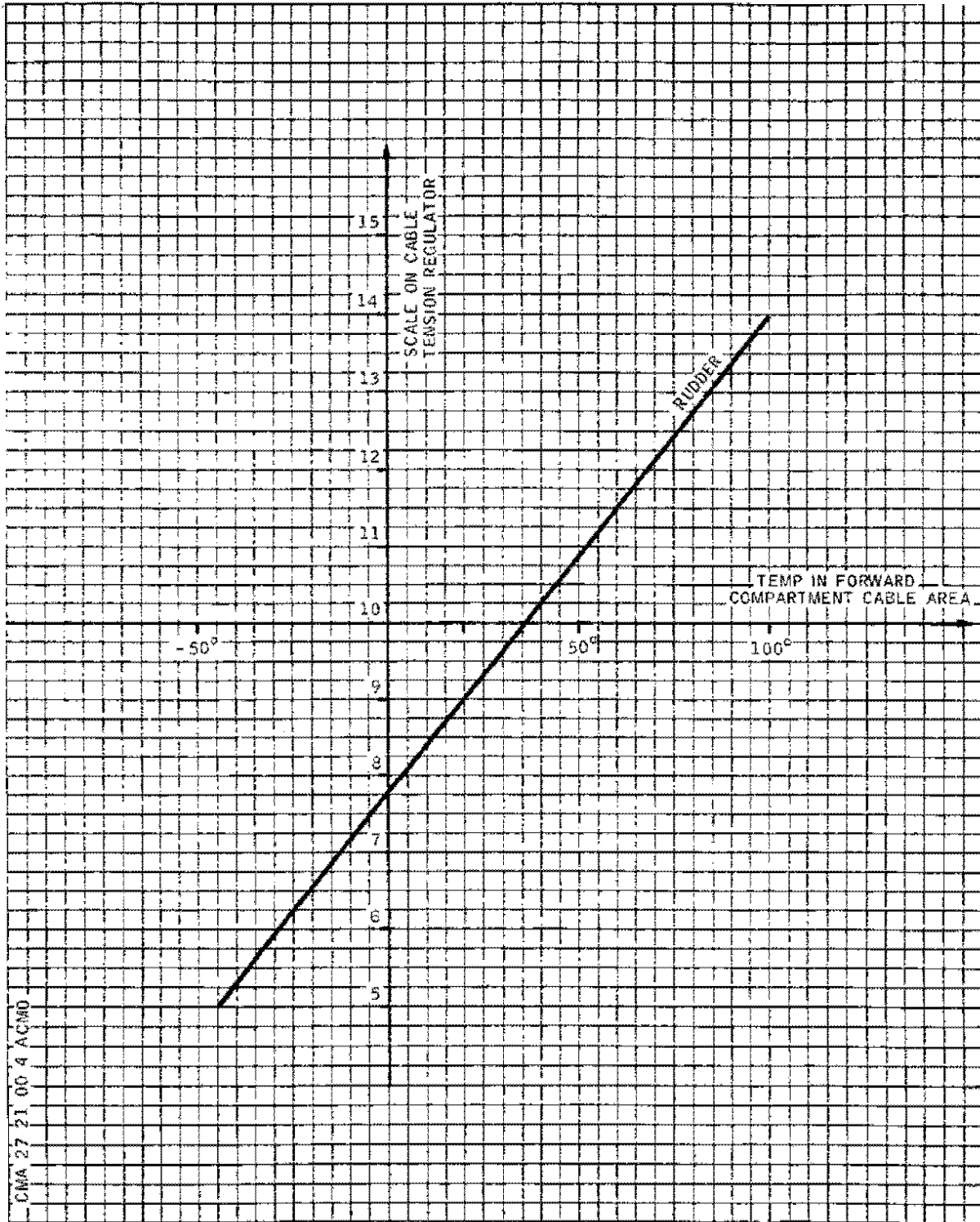
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# Concorde

## MAINTENANCE MANUAL



Cable Tension Adjustment Graph,  
According To Temperature  
Figure 402

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- (1) Position cable in throat of pulley :  
Position pulley on its support : install bolt, washer and nut. Tighten nut and safety with cotter.  
Torque to between 0.46 and 0.58 m.daN (40 and 50 lbf.in.).

NOTE : There must be a clearance of 1 mm minimum (0.039 in.) between pulley side plates and support and 0.022 to 0.060 in. (0.6 to 1.5 mm) between pulleys and cable guards.  
For pulleys located at spar 3 and rib6, minimum clearance between pulley side plates and supports must be 0.040 in. (1.016 mm) and clearance between pulleys and cable guards must be between 0.017 and 0.060 in. (0.431 and 1.524 mm)

- (2) Tighten cables symmetrically until tension reaches the normal value.

- (3) Install cable guard on pulley support.

NOTE : The compensation locking equipment D921606000 maintains the two side plates at adjustment point 10.

- (4) Tighten the turnbuckles symmetrically until a sufficient and equal tension of both cables, enabling easy removal of the regulator locking equipment, is obtained.
- (5) Remove the cable tension regulator locking equipment D921606000.
- (6) Note temperature in the adjacent cable area and adjust tension according to the cable tension adjustment graph.
- (7) Cable tension adjustment must always be symmetrical. The index on the centre drum must coincide with the point chosen on the graph.  
Tension : 25 daN (56.2 lbf.).
- (8) Check that tension is equally distributed between both cables, by removing rigging pins E925019105 from equipment E925019014 and rigging pin D925422000 from cable quadrant (easy removal of rigging pins).
- (9) Safety turnbuckles with locking clips.
- (10) Remove equipment E925019014, E905019010 and pin D925422000 from cable quadrant.

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(11) Remove rigging pin D925252002 from yaw resolvers.

### F. Remove Control Cables (Ref. Fig. 403, 404 and 405)

- (1) Remove locking clips (3) from turnbuckles to be removed.  
Turn turnbuckles symmetrically until a cable tension, which enables the installation of locking equipment D921606000 on tension regulator, is obtained.  
Install locking equipment D921606000 on regulator.
- (2) On cable length to be removed, proceed as follows :
  - (a) Turnbuckle (Ref. Fig. 403 )
    - (a1) Remove locking clips (3) and slacken cables symmetrically until they can be removed.
    - (a2) Slide sleeve assembly (2), separate cable ends (1) and (4).
  - (b) Cable junction fitting (Ref. Fig. 403 )  
Remove locking clips (1), slide outer sleeve (2), separate cable ends (3) and (4).  
  
Install equipment D92162000 (cable grip). This equipment maintains tension of cables remaining on the aircraft.
- (3) If the cable length passes through a fairlead, separate the two parts of the fairlead in order to remove the cable. (Lockwire, bolt and washers to be removed).
- (4) If the cable length passes over a guide pulley, remove the cable guard mounted on the pulley support in order to disengage the cable. (Cotter, nut, washer, bolt and spacer to be removed).
- (5) Cable lengths connected to a cable tension regulator (Ref. Fig. 405 )
  - (a) Remove lower cable guard casing (Ref. 27-21-14, Removal/Installation).
  - (b) Remove cotter pin (21), nut (22), washer (23), bolt (24).  
Disconnect rod (25) from control lever (20).
  - (c) Remove cotter pin (26), nut (27), washer (28)

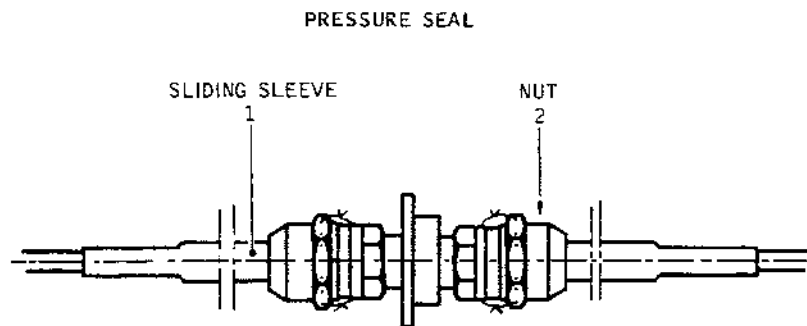
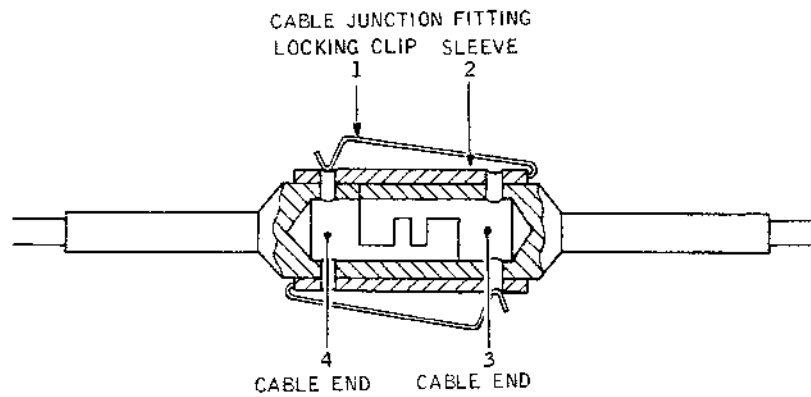
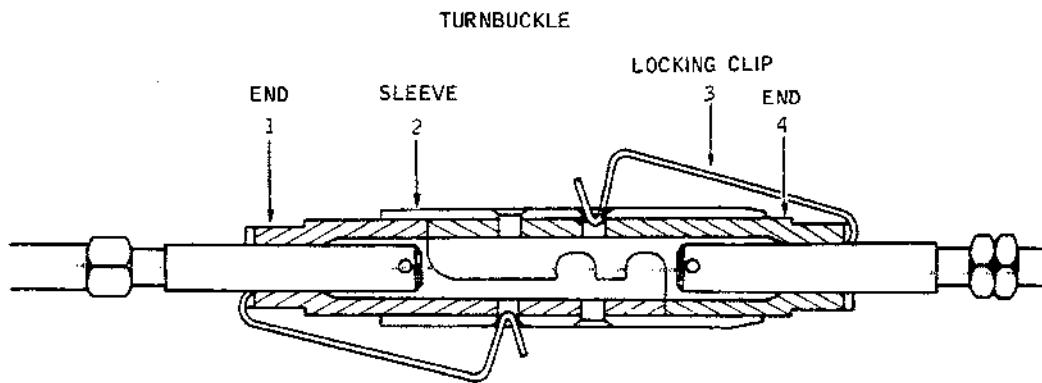
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Cable Junctions  
Figure 403

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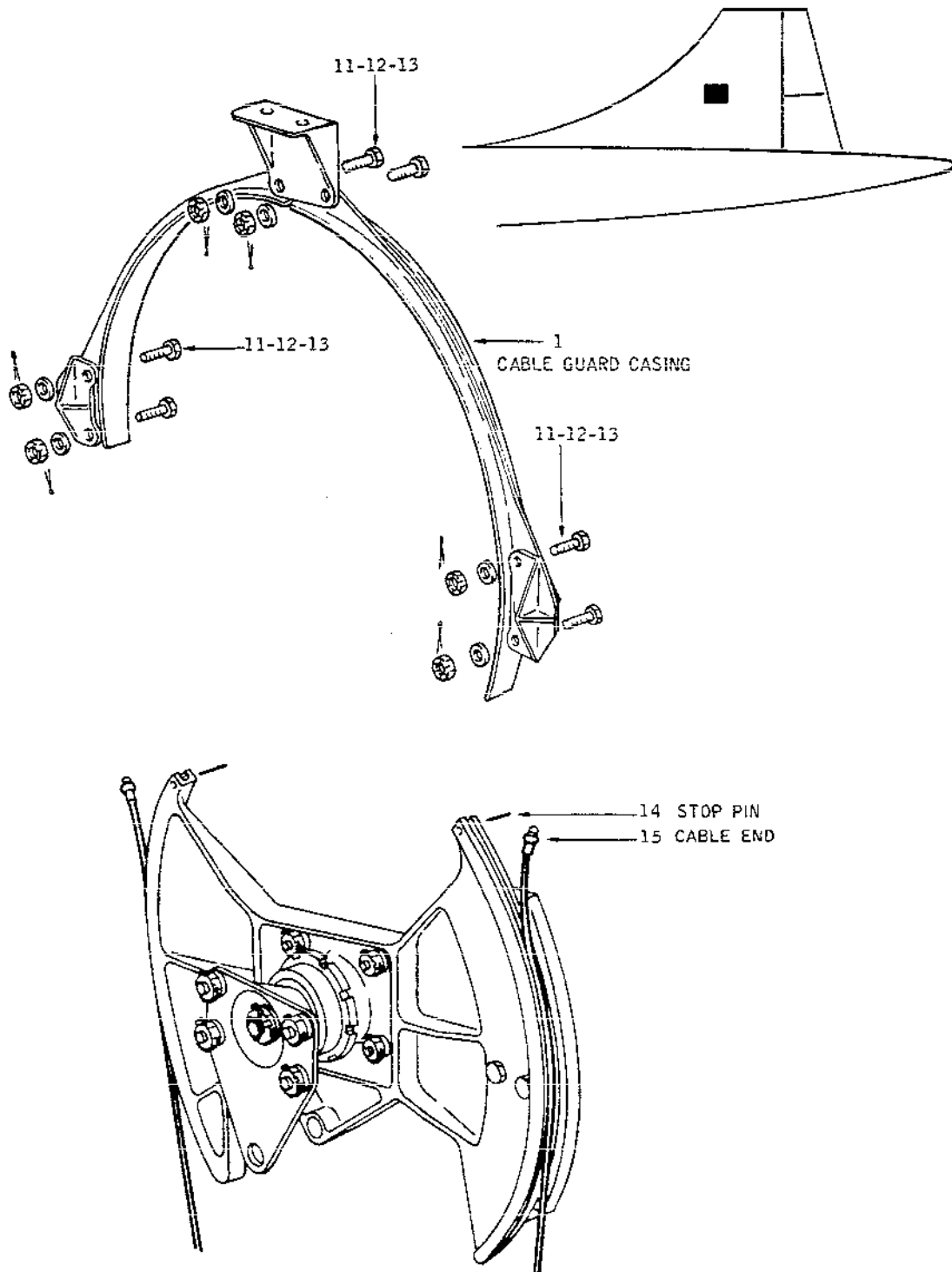
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Cable on Cable Quadrant in Fin  
Figure 404

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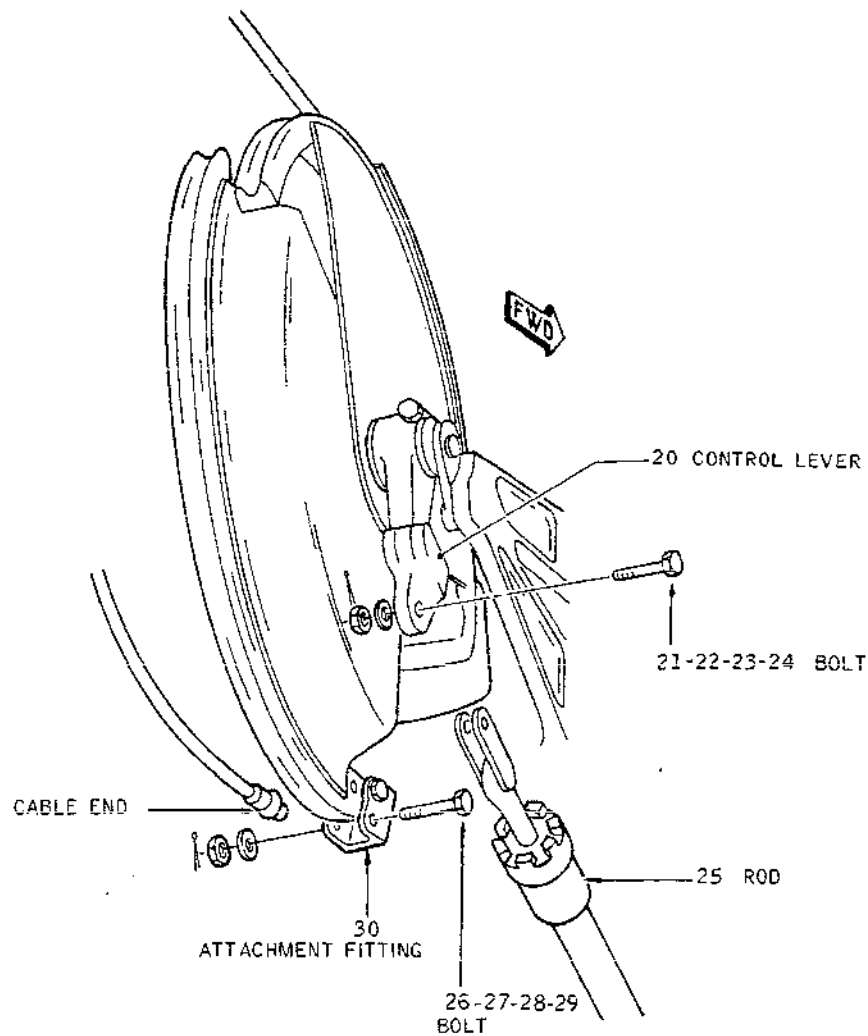
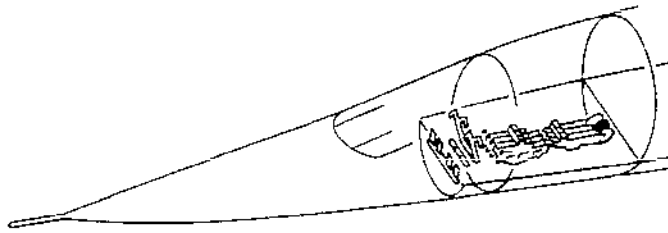
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Cable on Cable Tension Regulator  
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and bolt (29).

Tilt attachment fitting (30) on fixed pin and disengage lower cable.

- (d) Rotate tension regulator so as to gain access to upper cable end attachment fitting.  
Disengage upper cable (same procedure as for lower cable).

NOTE : For removing or installing bolts (24), (29), it is necessary to press plunger on head of bolt, to free retaining balls.

- (6) Cable lengths connected to cable quadrant :  
(Ref. Fig. 404 )

- (a) Remove cable guard casing (10), remove washers (12), nuts (13) and bolts (11).

- (b) Remove stop pins (14), cable ends (15) from their recesses on cable quadrant.

- (7) Cable lengths passing through a pressure seal :  
(Ref. Fig. 403 )

Unsafety and loosen nuts (2), slide them along sliding sleeve (1) in order to allow displacement of the latter.

### G. Preparation of Replacement Component

### H. Install Control Cables

- (1) On cable tension regulator (Ref. Fig. 405 )

- (a) Engage upper cable end in recess on cable tension regulator. Tilt cable attachment fitting on fixed pin, insert bolt, install washer, nut and safety with cotter pin.

- (b) Rotate tension regulator and engage lower cable end in recess on regulator. Tilt cable attachment fitting (30) on fixed pin, insert bolt (29), install washer (28), nut (27). Safety with cotter pin (26).

- (c) Connect rod (25) to control lever (20); insert bolt (24), install washer (23), nut (22). Torque to between 27 and 32 lbf.in. (0.30 and 0.36 m.daN). Safety with cotter pin (21).

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(d) Install lower cable guard casing (Ref. 27-21-14, Removal/Installation).

- (2) At fairlead, engage cable in grooves on lower part of fairlead, position upper part and attach with screws. Torque to between 27 and 32 lbf.in. (0.30 and 0.36 m.daN). Safety with lockwire as per 20-21-13.
- (3) Install cable in throat of guide pulley ; install spacer. Install cable guard using bolt, washer, and nut. Safety with cotter.

NOTE : Minimum clearance between cable guards and pulleys must be between 0.022 and 0.060 in. (0.6 and 1.5 mm)  
For pulleys located at spar 3 and rib 6, minimum clearance between pulley side plates and supports must be 0.040 in. (1.016 mm) and clearance between pulleys and cable guards must be between 0.017 and 0.060 in. (0.431 and 1.524 mm)

- (4) On turnbuckles and cable junction fittings, engage cable ends and maintain them using sleeves.
- (5) Cable lengths passing through a pressure seal :  
(Ref. Fig. 403 )  
Position sliding sleeve in pressure seal, engage nuts (2) tighten and safety with lockwire as per 20-21-13.
- (6) Cable lengths connected to cable quadrant :  
(Ref. Fig. 404 )
- (a) Engage cable ends (15) in their recesses on cable quadrant.
- (b) Engage and install stop pins (14).
- (c) Install the cable guard casing (10) by means of bolts (11), washers (12) and nuts (13). Safety with cotter pins.

Remove equipment D921620000.

- (7) Tighten turnbuckles symmetrically until a sufficient and equal tension of both cables, enabling easy removal of the regulator locking equipment, is obtained.
- (8) Remove locking equipment D921606000.

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- (9) Note temperature in adjacent cable area and adjust cable tension according to adjustment graph.
- (10) Tension adjustment is always symmetrical. Position of pointer on centre indicating drum shall coincide with the selected position on graph.  
Tension : 25 daN (56.2 lbf.).
- (11) Check that tension is equally distributed between both cables, by removing rigging pins E925019105 from equipment E925019014 and rigging pin D925422000 from cable quadrant in fin (easy removal of rigging pins).
- (12) Safety turnbuckles and cable junction fittings with locking clips.
- (13) Remove equipment E925019014, E925019010, D925422000, and rigging pin D925252002.
- (14) Make certain that minimum clearance values are observed at the following points.  
(Ref. Fig. 406 )

(a) Clearance A

Between cables and edges of passages in floor support beams.

Flight control cables and frame beams without fairleads from Frame 11 to Frame 38.

Nominal clearance                      10 mm (0.393 in.)

Minimum clearance                      8 mm (0.315 in.)

(b) Clearance B

Between cables and edges of passages in floor support beams.

Flight control cables and frame beams with fairleads from frame 9 to frame 37.

Nominal clearance                      10 mm (0.393 in.)

Minimum clearance                      4 mm (0.157 in.)

(c) Clearance C

Between cables and edges of passages in floor support beams at frame 8.

Nominal clearance                      10 mm (0.393 in.)

Minimum clearance                      5 mm (0.196 in.)

(d) Clearance D

Between cable quadrant edge and cable guard

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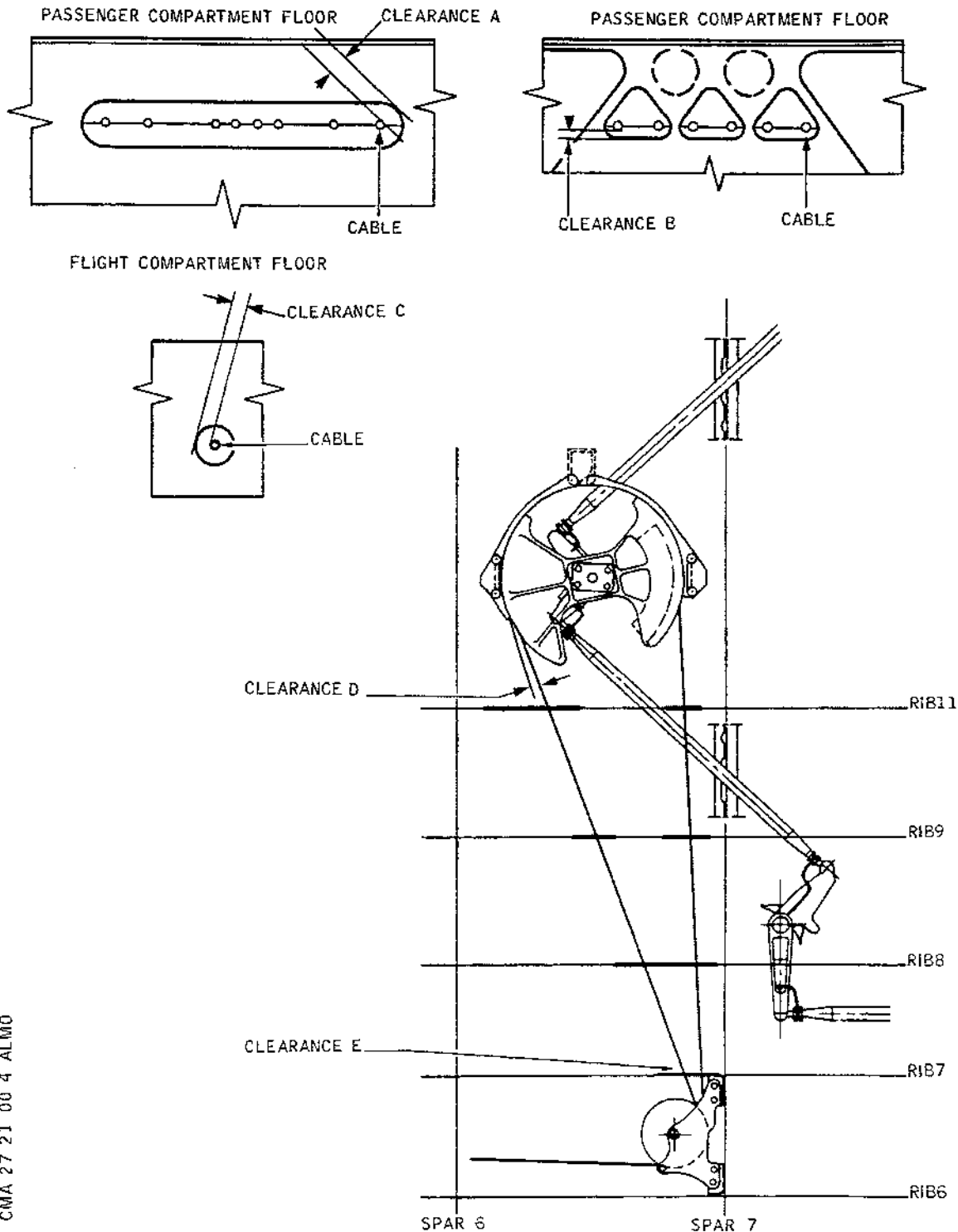
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Clearances between Cables and Structure  
Figure 406

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casing.

Maximum clearance	0.08 in. (2 mm)
Minimum clearance	0.02 in. (0.5 mm)

### (e) Clearance E

Between cables and edges of passages from ribs 7 to 11 inclusive.

Nominal clearance	10 mm (0.393 in.)
Minimum clearance	8 mm (0.315 in.)

\*\*ON A/C 001-004,

### (f) Clearance F (Ref. Fig. 407 )

Between cable and guide plate on structure at RIB3

Nominal clearance	10 mm (0.393 in.)
Minimum clearance	5 mm (0.196 in.)

\*\*ON A/C 005-007,

### (f) Not applicable

## I. Test

- (1) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (2) Carry out an operational test (Ref. 27-21-00, Adjustment/Test).
- (3) Insert rigging pin D925252002 in yaw resolvers. Install equipment E925019010 and E925019014. Make certain that rigging pin D925422000 can be easily inserted and removed.  
Remove : - rigging pin D925422000  
          - Equipment E925019014 and E925019010  
          - rigging pin D925252002.
- (4) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
- (5) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

## J. Close-Up

- (1) Make certain that working area is clean and clear of

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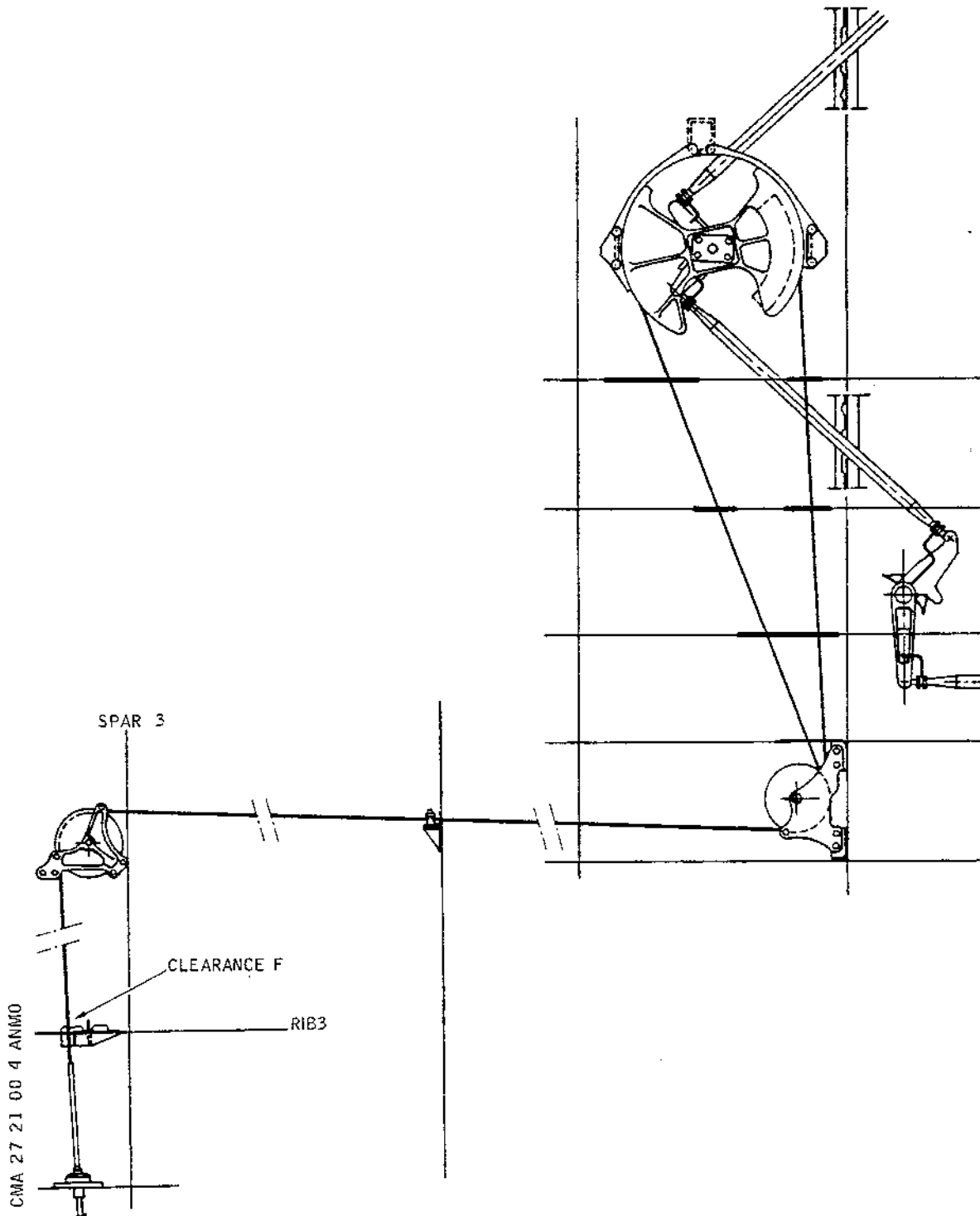
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Clearance between Cable and Structure at RIB3  
Figure 407

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tools and miscellaneous items of equipment.

- (2) Remove safety clip and tag and set circuit breaker M 626, panel 15-216, Map Ref. F22.
- (3) Remove warning notices.
- (4) Close access doors and panels.
- (5) Close floor panels.
- (6) Remove access platforms.

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### MECHANICAL CONTROL - ADJUSTMENT/TEST

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. Linkage Adjustment

##### A. General

For any important check after total removal of yaw linkage, the adjustment procedure described below must be complied with.

WARNING : PITCH AND ROLL MECHANICAL CONTROLS MUST BE CONNECTED TO SERVO CONTROLS AND IN OPERATIONAL CONDITION.

##### B. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins - Synchro Pack	D925252000
Zero Rigging Device - Relay Chassis	E925019000
Rigging Device - Upper bellcrank	D925420000
Rigging Device - Lower Bellcrank	D925421000
Rigging Pin - Quadrant	D925422000

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DESCRIPTION	PART NO.
Rigging Pin - Yaw Shaft	D925357000
Protractor - Elevon and Rudder	TE2012000
Test Set - Zero Setting - Resolvers	TE3016000
Rigging Pins - Set - Integral Trim Pitch/Roll/Yaw	D921277000
Rigging Template - Integral Trim	D921250000
Jig - Neutral Setting - Rudder	E920112000
Locking Equipment - Cable Tension Regulator	D921606000
Ground Power Unit - Hydraulic - Power and Preliminary Testing	EMH398E
Electrical Ground Power Unit	
Access Platforms	
- 11.250 m (36 ft. 11 in.)	
- 3.20 m (10 ft. 7 in.)	
Lockwire Dia. 0.041 in. (1 mm)	
Corrosion Resistant Steel	

### C. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) On overhead panel, on Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position.
- (3) Depressurize Green, Blue and Yellow hydraulic systems (Ref. 29-11-00, Servicing ; 29-12-00, Servicing ; and 29-21-00, Servicing).

**WARNING :** DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

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DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (4) Open the following access doors and panels. They correspond to the Flight Control mechanical linkage components.  
(Ref. Fig.501 and 502)

ITEM	DESIGNATION	ACCESS
1	Torque tube	113DB
2	Torque tube	121AB
3	Integral trim assembly	121DB
4	AP force limiter	121EB
5	Synchro pack	121FB
6	Load limiting mechanism	121GB
7	Upper bellcrank at RIB5	323ML
8	Lower PFCU	351DL
9	Lower PFCU	351CL
10	Lower angle lever	351BL
11	Upper angle lever	352BR
12	Upper PFCU	352CR
13	Upper PFCU	352DR
14	Cable quadrant	323MR
15	Lower bellcrank at RIB8	323LR

### D. Adjustment in Fuselage Front Section

WARNING : UNLESS OTHERWISE SPECIFIED IN THE TEXT ALL ADJUSTMENT OPERATIONS SHALL BE CARRIED OUT WITHOUT HYDRAULIC AND ELECTRICAL POWER.

NOTE : Scrupulously follow order of operations described below. All adjustable rods are removed.

- (1) Immobilize yaw torque tube with rigging pin D925357000.
- (2) Immobilize integral trim assembly. To do this, rotate control knob on centre console until rigging pin D921277000 can be easily inserted on input lever.
- (3) Install equipment D921250000. Check that spring rod is

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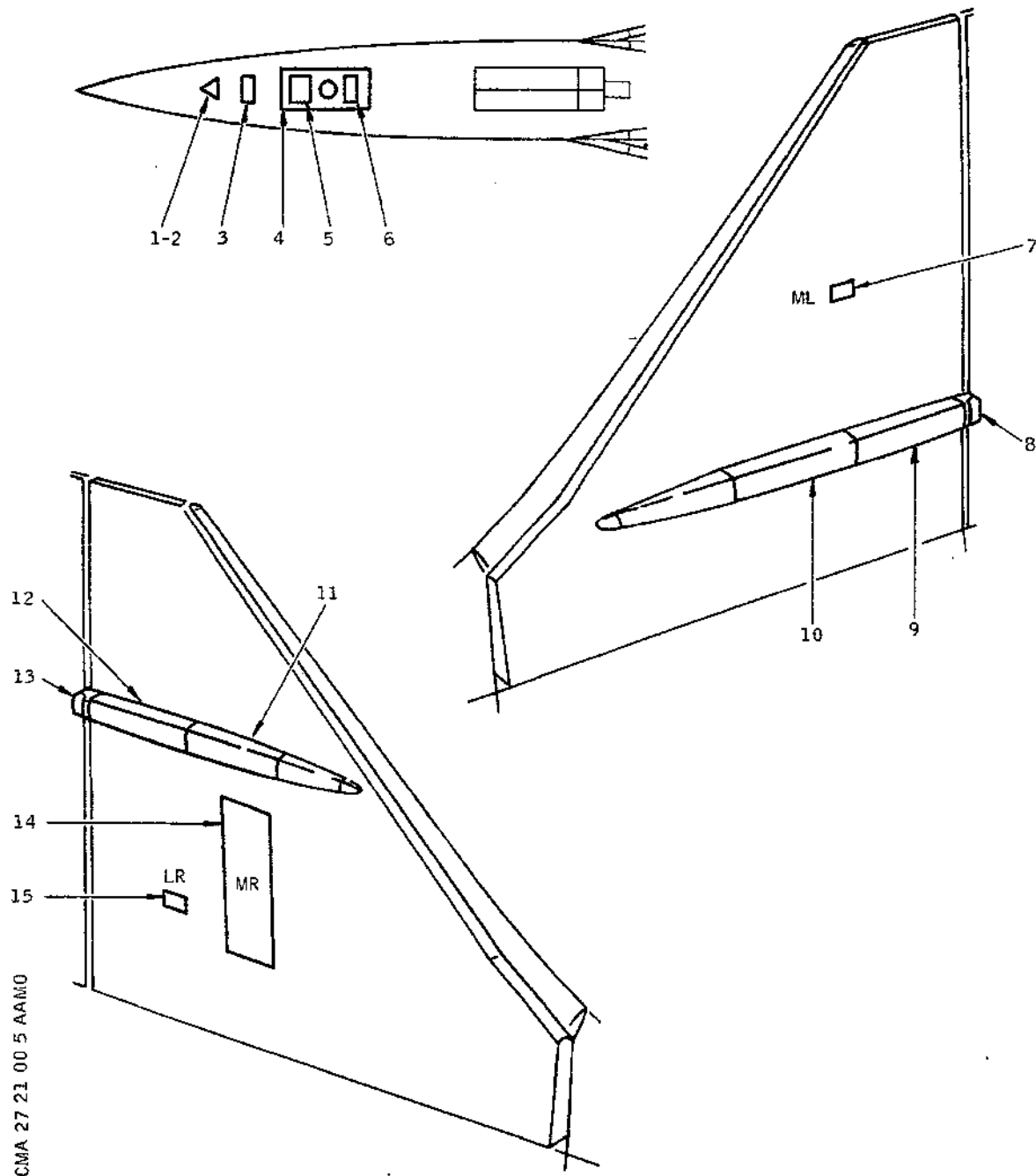
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Access to Flight Controls  
Figure 501

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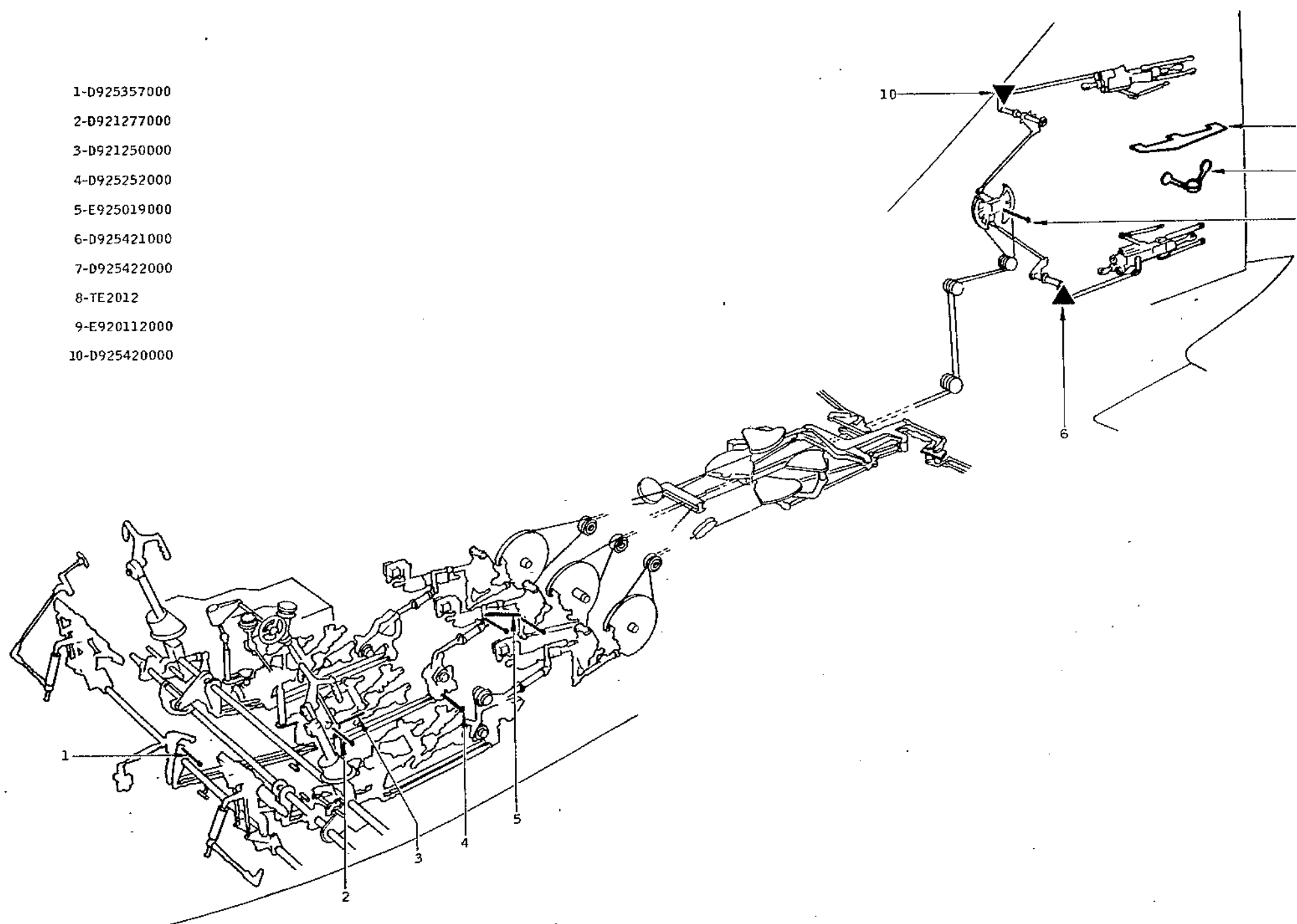
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- 1-D925357000
- 2-D921277000
- 3-D921250000
- 4-D925252000
- 5-E925019000
- 6-D925421000
- 7-D925422000
- 8-TE2012
- 9-E920112000
- 10-D925420000



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Rigging Pins and Equipment for Mechanical  
Adjustment of Flight Controls  
Figure 502

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not compressed. Pin must be inserted without rod piston displacement.

- (4) Remove link rod, between torque tube and integral trim, assigned to Captain's side and install it on First Officer's side. Adjust its length and tighten its adjustable ends. Safety with lockwire (Ref. 20-21-13).

NOTE : For installing or removing link rod attachment bolts, it is necessary to press the plunger located on head of bolt in order to free the retaining balls.

- (5) Remove this rod and install it on Captain's side. Install bolts on its ends.  
Torque tube side, torque to between 27 and 32 lbf.in. (0.30 and 0.36 m.daN).  
Integral trim side, torque to between 45 and 50 lbf.in. (0.52 and 0.60 m.daN).  
Safety with cotter pin.
- (6) Install rod assigned to First Officer's side. If necessary adjust rod length and wirelock its adjustable ends (Ref. 20-21-13).  
Install bolt on its attachment ends and torque to the same values as for Captain's side rod. Safety with cotter pin.  
Install safety attachments and coupling clamps.  
Torque coupling clamp attaching nuts to between 12 and 15 lbf.in. (0.15 and 0.18 m.daN).
- (7) Immobilize synchro pack with rigging pin D925252002.
- (8) Install link rods, between integral trim and synchro pack input levers.  
Adjust rod length until attachment bolts can be installed easily ; tighten the adjustable ends.  
Safety with lockwire (Ref. 20-21-13).  
Install bolts on their attachment ends and torque to between 27 and 32 lbf.in. (0.30 and 0.35 m.daN). Safety with cotter pin.  
Install safety attachments and coupling clamps.  
Torque coupling clamp attaching nuts to between 12 and 15 lbf.in. (0.15 and 0.18 m.daN).  
Safety with cotter pin.
- (9) Remove equipment D921250000.  
Remove rigging pin D921277000 from input lever on integral trim assembly and rigging pin D925357000 from yaw torque tube.

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- (10) Install equipment E925019010 under relay chassis and equipment rod E925019014 connecting equipment support to load limiting mechanism lower lever.
- (11) Install AP force limiter. Tighten attachment bolt nuts : torque to between 27 and 32 lbf.in. (0.30 and 0.36 m.daN).
- (12) Remove rigging pin E925019105 from load limiting mechanism lower lever.
- (13) Connect hydraulic ground power unit EMH398E to relay jack and pressurize the latter.
- (14) Make certain that rigging pin E925019105 on load limiting mechanism can be easily inserted and removed. If not, adjust length of AP force limiter as follows :
  - (a) Cut and remove lockwire and unscrew lock nut on adjustable end, disengage lock washers.
  - (b) Maintain special washer inserted in groove provided on outer sleeve and rod stem.
  - (c) Manually rotate sleeve and rod stem, in order to lengthen or shorten AP force limiter until rigging pin E925019105 can be easily inserted and removed.
  - (d) Make certain that special washer is inserted in groove provided on outer sleeve and rod stem.
  - (e) Engage lock washer with tab in slot provided on front face of special washer.
  - (f) Engage second lock washer.
  - (g) Tighten lock nut of adjustable end. Torque to between 115 and 125 lbf.in. (1.3 and 1.42 m.daN).
- (15) Check adjustment of Relay Jack Sensor (Ref. 22-12-61, Adjustment/Test).
- (16) Depressurize Relay Jack, and disconnect hydraulic ground power unit.
- (17) Connect the aircraft hydraulic lines to the Relay Jack as follows :
  - (a) Maintain adapters screwed in Relay Jack using

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appropriate wrench.

- (b) Torque hydraulic line union nuts to between the following values :

Blue pressure - 1.51 and 1.63 m.daN (11.1372 and 12.0223 lbf.ft)  
Blue return - 1.92 and 2.15 m.daN (14.1612 and 15.8576 lbf.ft)  
Green pressure - 1.51 and 1.63 m.daN (11.1372 and 12.0223 lbf.ft)  
Green return - 1.92 and 2.15 m.daN (14.1612 and 15.8576 lbf.ft)  
Yell/Green Pressure - 2.43 and 2.75 m.daN (17.9228 and 20.3567 lbf.ft)  
Yellow return - 2.43 and 2.75 m.daN (17.9228 and 20.3567 lbf.ft)  
Yell/Blue Pressure - 2.43 and 2.75 m.daN (17.9228 and 20.3567 lbf.ft)

- (18) Remove equipment E925019014, E925019010 and rigging pin D925252002.

E. Adjustment in Fuselage

(Ref. 27-21-00, Removal/Installation).

F. Adjustment in Fin

- (1) Immobilize cable quadrant in fin with rigging pin D925422000. In zone 121, immobilize synchro pack with rigging pin D925252002.
- (2) Adjust the two output levers on cable quadrant bellcrank to their theoretical length (118.36 mm - 4.65 in.). Tighten clamps.
- (3) Install equipment D925420000 and D925421000 on upper and lower bellcranks.
- (4) Install link rods between cable quadrant and bellcranks. Adjust their lengths so that markers of equipment D925420000 and D925421000 are in line with the marks located on structure. Wirelock rods to that length (Ref. 20-21-13). Install bolts and nuts and safety with cotter pin.
- (5) Install rudder neutral setting jig E920112000.
- (6) Install protractors TE2012000 on each rudder and set them to neutral.

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- (7) Remove rudder neutral setting jig E920112000.
  - (8) Manually, deflect the two rudders in both directions and up to stops on structure. Do not apply excessive loads. Check on protractor that deflection angles are not less than 35°.
  - (9) Set eccentric bush, PFCUs lower side, to zero. Marks engraved on bush and on body. Install lower rods linking PFCUs to rudder.  
Tighten attachment points.  
Torque rudder attachment bolt nuts to between 137.5 and 149 lbf.ft. (18.5 and 20.1 m.daN). PFCU side : 25 to 33.33 lbf.ft. (3.6 and 4.8 m.daN).
  - (10) Install upper rods; if necessary, adjust eccentric bush of PFCU so that rods can be installed freely. In the event that eccentricity of upper bush is insufficient, adjust lower bush so as to obtain required rod end fitting centre-to-centre distance. Tighten attachment nuts and safety with cotter pin.  
Torque rudder attachment bolt nuts to between 137.5 and 149 lbf.ft (18.5 and 20.1 m.daN)  
PFCU side : 25 to 33.33 lbf.ft. (3.6 and 4.8 m.daN).
- NOTE : On rudder side, upper hinge bolts are mounted upside down.
- (11) Manually deflect the two rudders from one PFCU stop to the other.  
During the operation, check :
    - (a) clearance between moving and fixed parts.
    - (b) deflection angles : 32° plus or minus 30 minutes.
  - (12) Set PFCU input lever actuating rods to their theoretical length :  
Upper rod 42.015 in. (1067 mm)  
Lower rod 42.250 in. (1073 mm)
  - (13) Install these rods without safetying them.
  - (14) Remove rigging pin D925422000 from cable quadrant, remove equipment D925420000 and D925421000 from upper and lower bellcrank.
  - (15) Make certain that control surface travel range is clear.
  - (16) Set Flight Controls in mechanical mode (Ref. 27-00-00,

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Servicing).

- (17) If necessary, adjust length of PFCU lever actuating rods in order to set protractor to zero plus or minus 2 minutes.
  - (18) Check that rigging pin D925422000 on cable quadrant can be removed and inserted easily. Remove rigging pin.
  - (19) Tighten nuts and safety with lockwire (Ref. 20-21-13) these rods to the length thus obtained. Safety attachment points with cotter pins.
  - (20) Remove rigging pin D925252002 from synchro pack.
  - (21) Carry out three full deflection operations to stabilize cable linkages - slowly return to neutral.
  - (22) Fully deflect rudder pedals in both directions and check rudder deflection angle : 30° plus or minus 30 minutes in both directions. If necessary, adjust length of cable quadrant output levers to obtain correct deflection angles.
  - (23) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
  - (24) Drill and ream cable quadrant output levers to final lever length obtained after adjustment. Install bolts and nuts and safety with cotter pin.
  - (25) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
  - (26) Check on protractor that position zero of rudder is identical to previous measurements. If not, re-adjust length of PFCU lever actuating rods.
  - (27) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
  - (28) Do not remove protractors TE2012000, and carry out PFCU resolver electrical zero adjustment.
- G. Adjustment of PFCU Resolver Electrical Zero (Ref. Fig. 503 )
- (1) Immobilize synchro pack with rigging pin D925252002.
  - (2) Disconnect electrical connectors from PFCU's, connect

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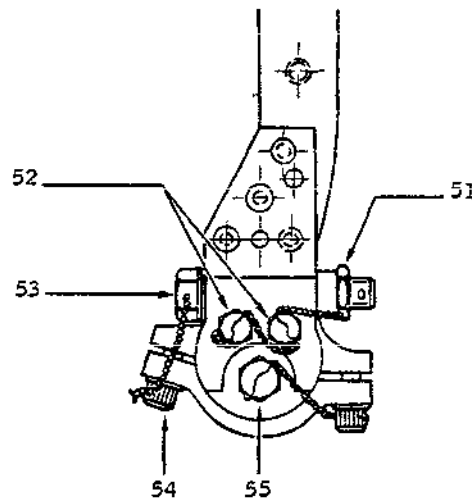
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Resolver Electrical Zero Adjustment  
Figure 503

electrical connectors of test set TE3016000 to PFCU.

- (3) Position rudders to neutral, and maintain them in this position.

In the event that protractors have been removed or are out of adjustment, proceed as follows :

- (a) Install neutral setting jig (E920112000) and align the two rudders with jig pick ups.
- (b) Install protractors TE2012000 on each rudder and set them to zero.
- (c) Remove neutral setting jig (E920112000).
- (4) Attach PFCU resolver feedback link bolt attachment plates to structure.
- (5) Proceed with resolver zero electrical adjustment as follows :

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- (a) Unsafety nuts and bolts (51), (52), (54) and (55).
  - (b) Slightly loosen bolts (52) (54) and (55).
  - (c) Loosen nut (51) in order to be able to turn bolt (53) with slight resistance.
  - (d) Turn bolt (53) in appropriate direction until test set TE3016000 indicator pointer indicates 0° plus or minus 2 minutes. At the same time, gradually increase test set sensitivity to maximum.
  - (e) Tighten nut (51).  
Torque to between 13 and 15 lbf.in. (0.15 and 0.17 m.daN).
  - (f) Make certain that electrical zero has not varied.
  - (g) Tighten bolts (52) and (54).  
Torque to between 6 and 8 lbf.in. (0.07 and 0.09 m.daN).
  - (h) Tighten bolt (55).  
Torque to between 23 and 25 lbf. in. (0.259 and 0.282 m.daN).
  - (i) Wirelock bolts (52) (54) and (55) and nut (51) (Ref. 20-21-13).
- (6) Disconnect resolver feedback link bolt attachment plates from structure.
  - (7) Disconnect test set from PFCU.
  - (8) Connect aircraft electrical connectors to PFCU.
  - (9) Fully deflect rudder and check that in both PFCU stop positions, feedback link can be connected easily to structure.
- WARNING** : IN PFCU STOP POSITIONS, MAKE CERTAIN BEFORE CONNECTING FEEDBACK LINK TO STRUCTURE THAT A CLEARANCE OF AT LEAST 1 mm (0.039 in.) IS OBTAINED BEFORE RESOLVERS REACH THEIR INTERNAL STOPS.
- (10) Attach link bolt attachment plates to structure. Wirelock (Ref. 20-21-13).

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- (11) Check that rudder travel range is clear.
- (12) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in electrical mode).
- (13) Remove rigging pin D925252002 from synchro pack.
- (14) Deflect rudder pedals, at least three times, in both directions, up to stops. Slowly release rudder pedals to neutral. Insert rigging pin D925252002 in synchro packs.  
On protractors TE2012000, check rudder position : 0° plus or minus 2 minutes.  
If this value is outside tolerance, re-adjust PFCU resolver electrical zero.
- (15) Remove rigging pin D925252002 from synchro pack.  
Remove protractors TE2012000).
- (16) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in electrical mode).

### H. Close-Up

- (1) Clean relay jack, PFCUs and adjacent areas. Make certain that no trace of hydraulic fluid remains.
- (2) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (3) Close access doors and panels corresponding to the linkage components. Ref. list C. (4).
- (4) Remove access platforms.

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### 2. Operational Test

#### A. General

The purpose of the test is to make certain that the mechanical linkage from flight controls to control surfaces operates correctly.

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph (page 501).
- (2) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (3) Check that yaw trim control is in zero position.

#### C. Test

- (1) Fully deflect rudder pedals in left turn configuration.
  - Check on ICOVOL indicator, (Flight Control Surface Position Indicator), that rudders deflect in the same direction and up to stops.  
Maximum travel : 30° plus or minus 30 minutes.
- (2) Fully deflect rudder pedals in right turn configuration.
  - Check on ICOVOL indicator rudder position.  
Maximum travel : 30° plus or minus 30 minutes.
- (3) Release pedals to neutral position.
  - Check on ICOVOL indicator that rudders are in neutral position.

#### D. Close-Up

- (1) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).

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### 3. System Test

#### A. General

The purpose of the test is :

- (1) to check that control surface deflection values correspond to Flight control displacement value.
- (2) to check that the load applied to components does not exceed the authorized values.

#### B. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins - Synchro Pack	D925252000
Protractor - Elevon and Rudder	TE2012000
Hand Equipment - Effort Measuring - Flight Control Linkages	TE3019000
Access Platforms	
- 11.250 m (36 ft. 11 in.)	
- 3.220 m (10 ft. 7 in.)	

#### C. Prepare

- (1) Take the precautions described in the previous WARNING paragraph (page 501).
- (2) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (3) Check that yaw trim control is set to zero.
- (4) Open panel 121FB and immobilize yaw control synchro pack with rigging pin D925252002.
- (5) Install the following equipment :  
TE 2012000 on rudder  
TE 3019103 at Captain's station  
TE 3019212, TE 3019210 and TE 3019220 at first Officer's station

NOTE : Equip spring scale with a 100 daN blade.

- (6) Set measuring equipment to zero.

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(7) Remove rigging pin D925252002 from synchro pack.

### D. Mechanical Mode Test.

- (1) Using equipment installed on RH rudder pedal, deflect rudders in LH turn configuration up to stop.
- (2) Load applied to spring scale must be progressive and at a tangent to circumference described. Load must not exceed 50 daN
- (3) Note :
  - (a) LH rudder pedal travel : 30° plus or minus 1°.
  - (b) Rudder deflection : 30° plus or minus 30 minutes
- (4) Gradually release pedal to neutral position.
- (5) Using equipment installed on LH rudder pedal, deflect rudders in RH turn configuration up to stop.  
Carry out the same measurements as for LH rudder pedal.

### E. BLUE Electrical Mode Test

- (1) Set Flight Controls in Blue electrical mode (Ref. 27-00-00, Servicing).
- (2) Repeat procedure described in paragraph "Mechanical Mode Test".

### F. GREEN Electrical Mode Test

- (1) Set Flight Controls in Green electrical mode (Ref. 27-00-00, Servicing).
- (2) Repeat procedure described in paragraph "Mechanical Mode Test".

### G. Close-Up

- (1) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in electrical mode).
- (2) Remove equipment TE3019000 and TE2012000.
- (3) Close access panel 121FB.
- (4) Remove access platforms.

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### 4. Neutral Tolerance (Dead Play) Test

#### A. General

The purpose of this test is to check the neutral tolerance ranges of the rudders.

Before carrying out measurements, it is advised to operate yaw control several times.

#### B. Equipment and Materials

DESCRIPTION	PART NO.
Protractor - Elevon and Rudder	TE2012000
Rigging Pins - Synchro Pack	D925252000
Access Platform 36 ft. 11 in. (11.250 m) 14 ft. 7 in. ( 4.33 m)	
Circuit Breaker	
Safety Clips	

#### C. Prepare

- (1) Take the precautions described in the previous WARNING paragraph (p 501).
- (2) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (3) Check that yaw trim control is at zero.
- (4) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
STICK SHAKER SUP	1-213	W 513	P15

- (5) Check that the following circuit breakers are set :

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW A SYS SUP	1-213	G 292	M17
ADC1 28 V SUP		1F 74	P12
ADC1 26 V SUP	2-213	1F 78	A 2
1ST PLT ADC INST SUP	2-213	1F 75	B 3

\*\*ON A/C ALL

YAW ART FEEL COMP 1 SUP	2-213	1C 242	E 2
ADC1 115V SUP		1F 73	F 3

RH UC WEIGHT SW	3-213	G 294	B 9
-----------------	-------	-------	-----

- (6) On ADC control panel (centre console)
  - (a) Place ADC1 switch in ON position.
  - (b) Place ADC1 TEST selector switches in position 1.
    - (b1) ADC1 amber warning light must illuminate.
    - (b2) After 30 seconds approximately, Blue TEST indicator light must illuminate.
    - (b3) Press then release ADC1 amber warning light ; it must go off.
- (7) On overhead panel, on ARTIFICIAL FEEL No.1 engage switch unit, engage YAW switch ; it must remain engaged
- (8) Open panel 121FB, immobilize yaw resolvers with rigging pin D925252002.
- (9) Install protractors TE2012000, set them to zero.
- (10) Remove rigging pin D925252002 from yaw resolvers.

### D. Mechanical Mode Test

- (1) Deflect RH rudder pedal in right turn configuration to obtain approximately a 10° deflection of the rudder.
- (2) Slowly release rudder pedal to neutral.  
Note position of rudder on protractor.

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- (3) Deflect LH rudder pedal in left turn configuration to obtain approximately a 10° deflection of rudder.
- (4) Slowly release rudder pedal to neutral.  
Note position of rudder on protractor.
- (5) Carry out operations (1) to (4) at least three times.  
Average the readings of stop positions taken on protractor for each direction of operation.  
Check that the average stop values of rudder are in a range of plus or minus 30 minutes maximum.
- (6) In the event that the neutral tolerance ranges are greater than the value indicated above (plus or minus 30 minutes) inspect for chafing along linkage.

### E. BLUE Electrical Mode Test

- (1) Set Flight Controls in BLUE electrical mode (Ref. 27-00-00, Servicing).
- (2) Repeat procedure described in paragraph :  
Mechanical Mode Test  
Neutral tolerance range value : plus or minus 20 minutes maximum.

### F. GREEN Electrical Mode Test

- (1) Set Flight Controls in GREEN electrical mode (Ref. 27-00-00, Servicing).
- (2) Repeat procedure described in paragraph :  
Mechanical Mode Test  
Neutral tolerance range value : plus or minus 20 minutes maximum.

### G. BLUE Electrical Mode Test with Trim Operation

- (1) Set Flight Controls in BLUE electrical mode (Ref. 27-00-00, Servicing).
- (2) Place ADC1 switch in OFF position.
- (3) Operate yaw trim control in full right turn configuration.
- (4) Deflect rudder pedal in right turn configuration.
- (5) Slowly release rudder pedal to neutral.  
Note position of rudder on protractor.

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- (6) Deflect LH rudder pedal in left turn configuration.
- (7) Slowly release rudder pedal to neutral.  
Note position of rudder on protractor.
- (8) Carry out operations (5) to (7) at least three times.  
Average the readings of stop positions taken on protractor for each direction of operation.  
Check that the average stop values of rudders are in a range of plus or minus 20 minutes maximum.
- (9) Repeat these operations with a trim control operation in left turn configuration.

### H. GREEN Electrical Mode Test with Trim Operation

- (1) Set Flight Controls in GREEN electrical mode  
(Ref. 27-00-00, Servicing).
- (2) Repeat procedure of previous paragraph (BLUE electrical mode test with trim operation).

### I. Close-Up

- (1) Shut down pressurization of hydraulic systems  
(Ref. 27-00-00, Servicing, Procedure to set Flight Controls in electrical mode).
- (2) Remove equipment TE2012000.
- (3) Remove safety clips and tags and reset circuit breakers
- (4) Remove access platform.

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### MECHANICAL CONTROL - INSPECTION/CHECK

WARNING: BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

General check of yaw mechanical control cables, pulleys, upper and lower bellcrank assemblies and control rods.

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Zero Rigging Device - Relay Chassis	E925019000
Rigging Pins - Synchro Pack	D925252000
Rigging Pin - Quadrant	D925422000
Access Platform 12 ft (3.672 m)	-
Special Material (Ref. 20-30-00, No.124)	-
Cleaning (Ref. 20-30-00, No.469)	-
Circuit breaker safety clip	-

##### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Remove access panels 121GB and 121FB, to gain access to cable tension regulators and to resolvers.

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(3) Trip, safety and tag the following circuit breaker:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

WARNING: DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (4) Open door 151DB, Depressurize Blue, Green and Yellow hydraulic systems.
- (5) Open floor panels 215AF, 215BF, 221AF, 21DF, 221HF, 221LF, 221QF, 221UF, 221XF, 223AF, 223DF, 223LF, 223SF, 231AF, 231DF, 231GF, 231HF, 231JF, 233AF, 233BF, 233CF, 233FF, 233JF, 241AF, 241BF, 241EF, 241HF, 241JF, 243AF, 243DF, 243EF, 243HF, 243KF.
- (6) Remove access panels 323AL, 323JL, 323MR.

### C. Check

- (1) Two cables assembly.

(Ref. Fig. 601 and 602)

- (a) Cable wear.

On cable lengths moving over pulleys and through fairleads.

- a1) Check cables for traces of wear. Wear must not exceed 50% of the cross section of the wires in an outer strand.
- a2) Cables must not show excess of protective material. Abrasive particles could adhere to this surplus lubricant and cause damage to the cables.

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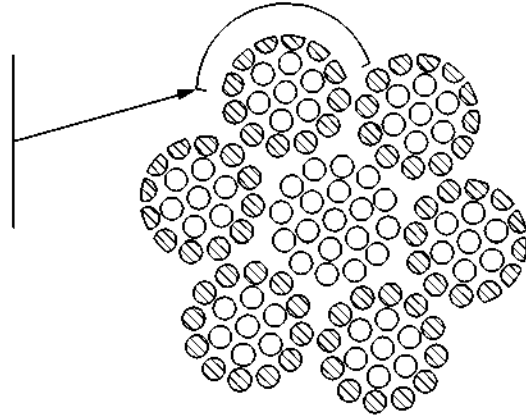
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TYPICAL OUTER WIRE WEAR AREA  
ON CABLE STRAND, HAIRLINE  
CRACKS BETWEEN WIRES OR  
FULLY BLENDED SURFACE APPEARANCE  
OF APPROXIMATELY SIX WIRES PER  
OUTER CABLE STRAND INDICATES  
50 PERCENT WIRE WEAR.



Cable Wear  
Figure 601

(b) Broken wires.

Cables must not show any broken wire.

(c) Corrosion.

The cable lengths showing internal corrosion traces must be replaced (Ref. Removal/Installation).

In case of external corrosion traces, proceed as follows:

- Clean the cable with product No.469
- Coat the cable with a protective film of product No.124.

(2) RH cable.

- (a) Check the cable attachment to the tension regulator drum.

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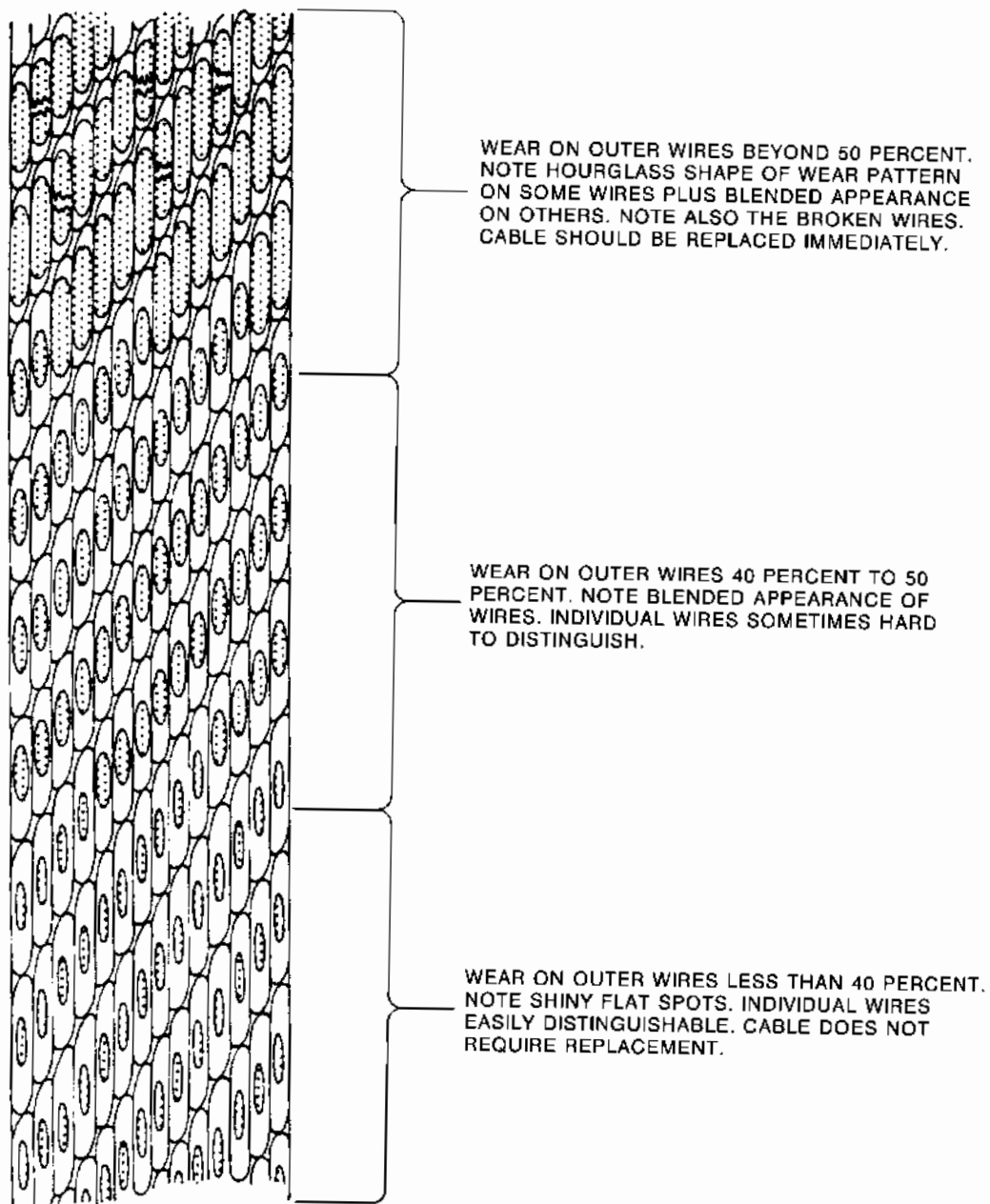
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Cable Check  
Figure 602

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- (b) On the sleeves, make certain there is no sign of pulling out of cable by reference to painted mark.
    - Sleeve located between frames 15 and 16
    - Sleeve located between frames 20 and 21
    - Sleeve located between frames 50 and 51
    - Sleeve located between frames 54 and 55
    - Sleeve located between frames 76 and 77
  - (c) On the cable junction fittings, make certain there is no sign of pulling out of cable by reference to painted mark and check the correct position of the lock pins.
    - Cable junction fitting located between frames 9 and 10
    - Cable junction fitting located between frames 10 and 43
  - (d) On the turnbuckles, make certain there is no sign of pulling out of cable by reference to painted mark and check the correct position of the lock pins.
    - Turnbuckle located between frames 52 and 53
    - Turnbuckle located between frames 80 and 81, between the guide pulley and the pressure seal.
  - (e) At pressure seal, under access door 323AL, make certain that there is no sign of pulling out of cable by reference to painted mark and no wear traces on the sliding cable length.
  - (f) Check the cable attachment to the cable quadrant in fin.
- (3) LH cable.
- (a) Carry out the same operations, only the locations are different.
    - Sleeve between frames 11 and 12  
between frames 21 and 22  
between frames 51 and 52  
between frames 56 and 57
    - Cable junction fittings  
between frames 12 and 13  
between frames 43 and 44
    - Turnbuckles  
between frames 53 and 54  
between frames 78 and 79

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- (4) Guide pulleys.  
    between frames 9 and 10  
    between frames 80 and 81  
    under access door 323JL (spar 3)  
    under access door 323MR (spar 7)

NOTE: All new installations must be checked for wear  
and the measured dimensions recorded.

- (a) Check that there are no wear traces on the pulley.
- (b) Check the attachment and the correct position of the pulley cable guard. Clearance between pulley and cable guard must be between 0.022 and 0.060 in (0.55 and 1.5 mm).
- (c) Check that the clearance between pulley and support flanges is 0.04 in (1 mm) minimum.
- (d) Check the movement of any point on the outer circumference of the pulley sheave in a direction parallel to the pulley mounting bolt axis, does not exceed 0.025 in (0.635 mm) total amplitude. If the value exceeds the above limit replace pulley (Ref. Removal/Installation). If the value is less than the above limit, check pulley for smooth running.
- (e) Using suitable optical methods (mirror or boroscope) inspect pulley groove revealed by cable movement and pulley rotation for wear.  
If wear is excessive pulley dimensional checks will be required as follows:
- e1) Check that the diameter of the bottom of the wire groove exceeds the minimum worn diameter specified in Table 601. Replace the pulley if the diameter is smaller than that specified (Ref. Removal/Installation).

MIN. DIAMETER NEW	MIN. DIAMETER WORN
4.724 in (119.99 mm)	4.660 in (118.36 mm)

Pulley Groove Wear  
Table 601

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- (5) Upper and lower bellcrank assemblies (Zone 323).
  - (a) Check the shaft end float. If the value exceeds 0.007 in (0.18 mm) the bearings on the bellcrank assembly must be renewed (Ref. 20-26-34).
- (6) Control rods (Zone 323)
  - (a) The bearings at either end of the control rods must be replaced (Ref. 20-26-34) if one or both bearings, when checked, has a total internal radial clearance exceeding 0.0025 in (0.0635 mm).
- (7) Place a thermometer in the regulator adjacent area and note temperature.  
Indication read on regulator scale must be the same as that of graph in relation with temperature noted. If not, adjust cable tension (Ref. 27-11-00, Removal/Installation).
- (8) Remove safety clip and tag and set circuit breaker M626 on panel 15-216, Map Ref. F22.
- (9) Remove warning notices and set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (10) Immobilize yaw resolvers with rigging pin D925252002.
- (11) Install items of equipment E925019010 and E925019014 and immobilize yaw control.
- (12) Make certain that rigging pin of equipment D925422000 can be easily inserted in cable quadrant. If not, adjust cable tension (Ref. 27-11-00, Removal/Installation). Remove rigging pin D925422000.
- (13) Remove items of equipment E925019014 and E925019010.
- (14) Remove rigging pin D925252002.
- (15) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).  
(Ref. Fig. 603 and 603).

### D. Close-up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

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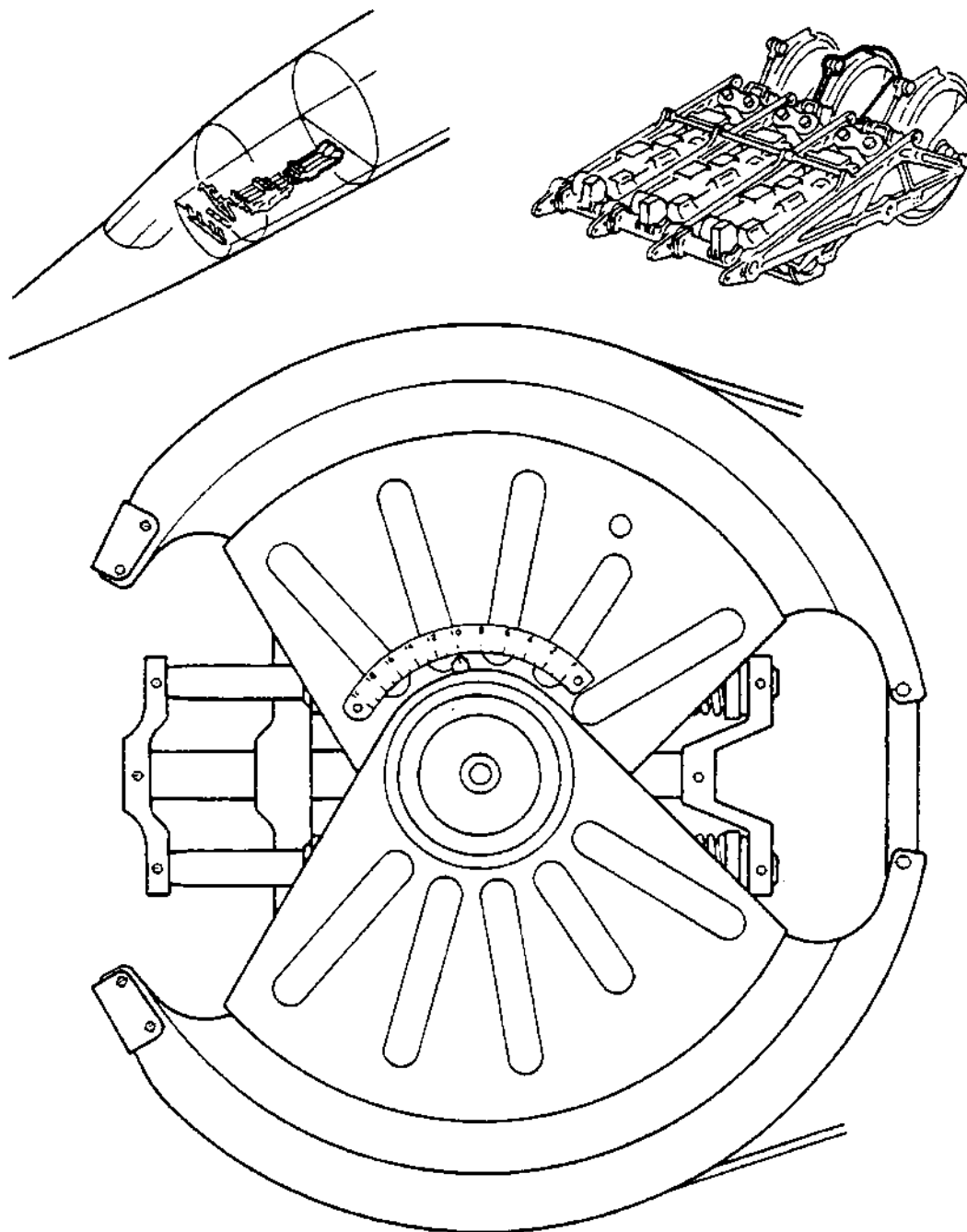
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Cable Tension Regulator  
Figure 603

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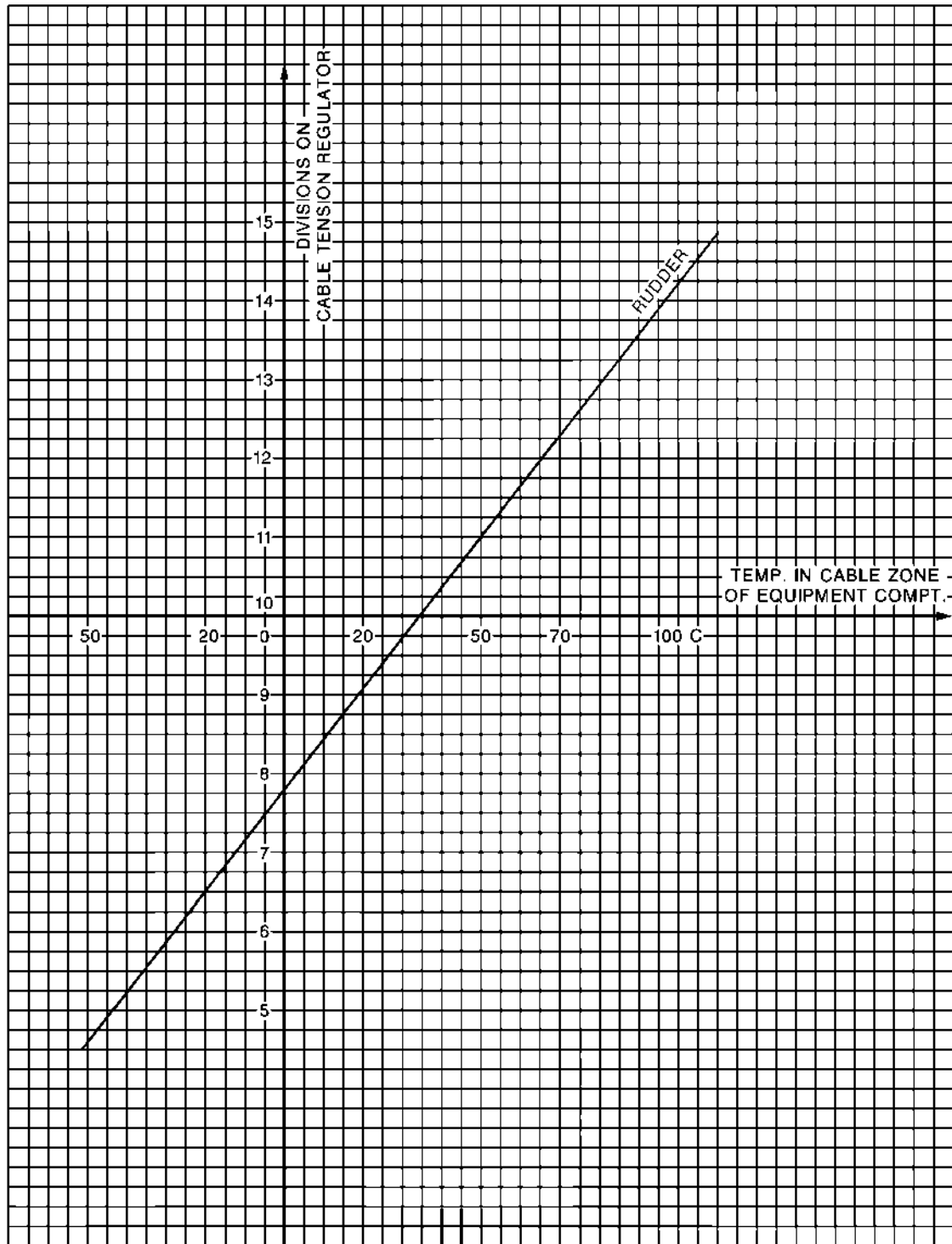
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Cable Tension Graph  
Figure 604

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## MAINTENANCE MANUAL

### RUDDER PEDAL ASSEMBLY - REMOVAL/INSTALLATION

WARNING : MAKE CERTAIN THAT DOORS ARE CLOSED IF KEY 734116 IS WITHDRAWN FROM MICROSWITCH BOX LOCATED ON LH MAIN GEAR LEG, OR OPEN IF KEY IS INSERTED IN MICROSWITCH BOX.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The rudder pedal assemblies of both captain and First Officer are identical : therefore only the Captain's pedal assembly will be dealt with.

#### 2. Rudder Bar

##### A. Equipment and Materials

---

DESCRIPTION	PART NO.
Rigging Pin - Set - Integral Trim - Pitch/Roll/Yaw	D921277000
Access Platform 3.672 m (12 ft.)	
Circuit Breaker Safety Clips	
Lockwire Dia. 1 m/m (0.041 in.)	
Corrosion Resistant Steel	

---

##### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.

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## MAINTENANCE MANUAL

- (2) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

- (3) Open door 151DB, depressurize Blue, Green and Yellow hydraulic systems.

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT, PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS

- (4) Make certain that yaw trim control is in zero position.
- (5) Open access door 121DB and install rigging pin in yaw integral trim.
- (6) Disconnect rods linking torque tubes and artificial feel levers.
- (7) In fuselage nose open access doors 113DB and 121AB allowing access to the rudder pedal assembly.
- (8) On centre console,  
- Make certain that the brake selector is in NORM position.
- (9) In Flight compartment, remove the following components around Captain's or First Officer's control column :
- (a) Captain's control column
- (a1) Remove panel 211CS
- (a2) Remove pedal-base foot rests ; 211DF, 211

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FF, 211EF.

- (a3) Remove pedal gaiter.
- (a4) Remove attach plate securing gaiter 211DS on control column three-piece base housing, lift gaiter 211DS on column and retain gaskets.
- (a5) Remove three-piece base housing ; 211RF, 211PF and 211QF.
- (a6) Remove floor panels 211CF and 211BF.
- (b) First Officer's control column.
  - (b1) Remove panel 212CS.
  - (b2) Remove pedal-base foot rests 212DF, 212FF, 212EF.
  - (b3) Remove pedal gaiter.
  - (b4) Remove attach plate securing gaiter 212DS on control column three-piece base housing, lift gaiter 212DS on column and retain gaskets.
  - (b5) Remove three-piece base housing 212RF, 212PF, 212QF.
  - (b6) Remove floor panels 212CF, 212NF, 212HF (Ref. Fig. 401 )
- (10) Remove Captain's or First Officer's rudder bar protective casings.
  - (a) Remove clamp (3) securing gaiter (6) on casings and pull down gaiter.
  - (b) Remove screws (2) securing casings (1) and (7)
    - 211BX and 211DX Captain's Side
    - 212BX and 212DX First Officer's Side
  - (c) Remove casings.
  - (d) Remove screws securing gaiter (6), 211AX on Captain's side, 212AX on First Officer's side. Remove joint plate (5), lift gaiter (6) on rudder pedal to disengage bearings and retain gasket (4).

EFFECTIVITY: ALL

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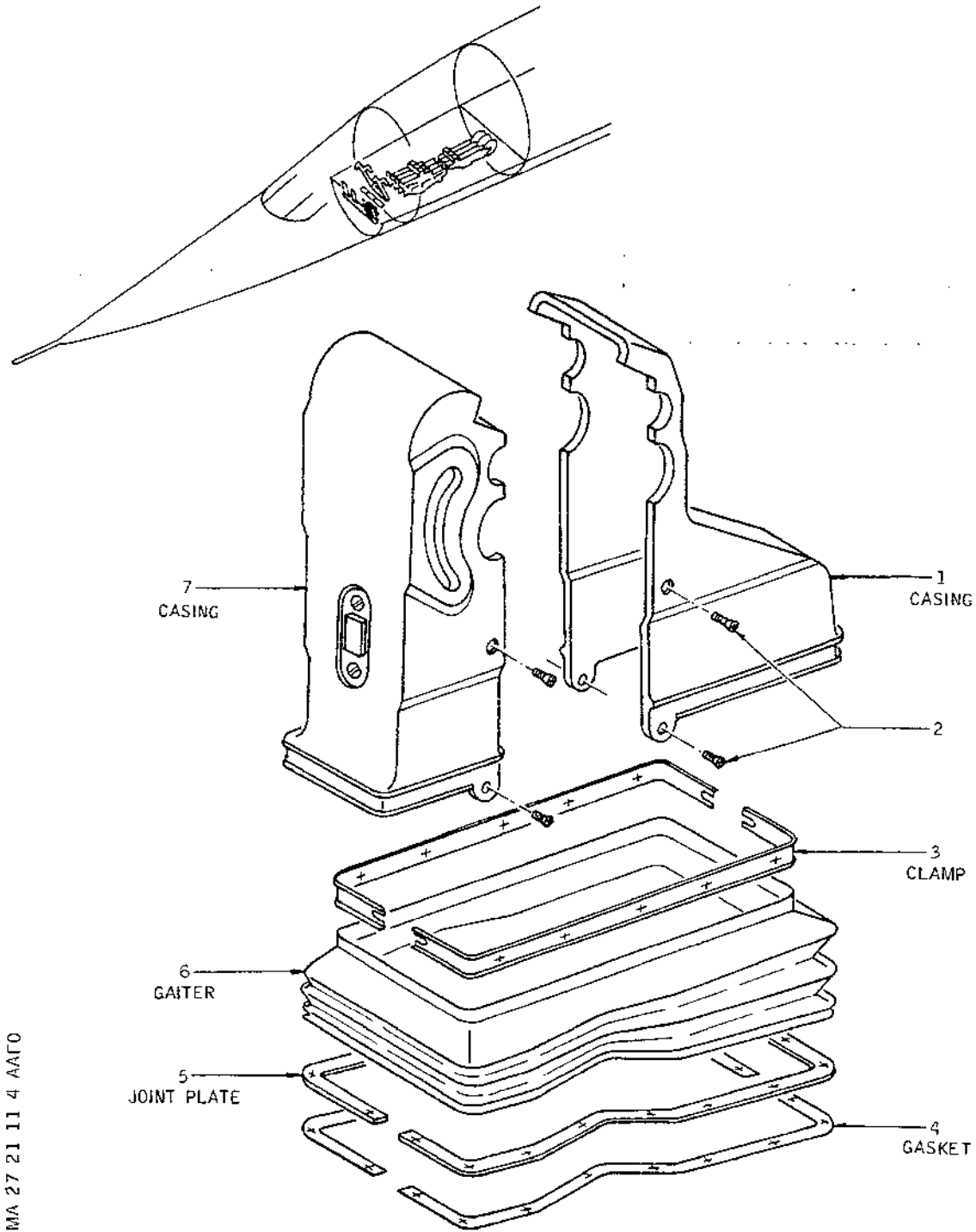
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Rudder pedal casings  
Figure 401

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### C. Remove (Ref. Fig. 402 )

- (1) Disconnect link rods actuating yaw torque tube.  
For each rod remove cotter and nut (8) : remove washer (9) and bolt (10).
- (2) Disconnect lower bellcranks from brake control rods.  
  
For each rod, remove cotter and nut (15), washer (14) and bolt (12).  
Retain shim washer (13).
- (3) Remove brake master cylinder (Ref. 32-44-31, Removal/Installation).
- (4) Disconnect pedal adjustment jack from pedal support :  
Remove cotter and nut (1), remove washer (2) and bolt (3).
- (5) Support rudder bar and remove bearings from pedal support shaft.

CAUTION : THE UPPER AND LOWER HALF-BEARINGS ARE MATCHED DURING MANUFACTURE, THEREFORE THE UPPER HALF-BEARINGS (7) AND (20) MUST NOT BE INTER-CHANGED.

Cut and remove lockwire (17) ; loosen bolts (18), recover washers (19) and remove upper half-bearing (20).

Cut and remove lockwire (4) ; loosen bolts (5), recover washers (6) and remove upper half-bearing (7).

- (6) Lift up rudder bar and remove it.
- (7) Remove protective gaiter from rudder bar.

### D. Install

- (1) Install protective gaiter on rudder bar.
- (2) Position rudder bar and install pedal support shaft on lower half-bearings (16) and (11).
- (3) Support rudder bar and install bearings.  
Install upper half-bearings (20) and (7) on the corresponding lower half-bearings (16) and (11).  
Screw up bolts (18) and (5) without tightening :  
make certain that washers (19) and (6) are in place.  
Tighten bolts (18) and (5) in the order indicated

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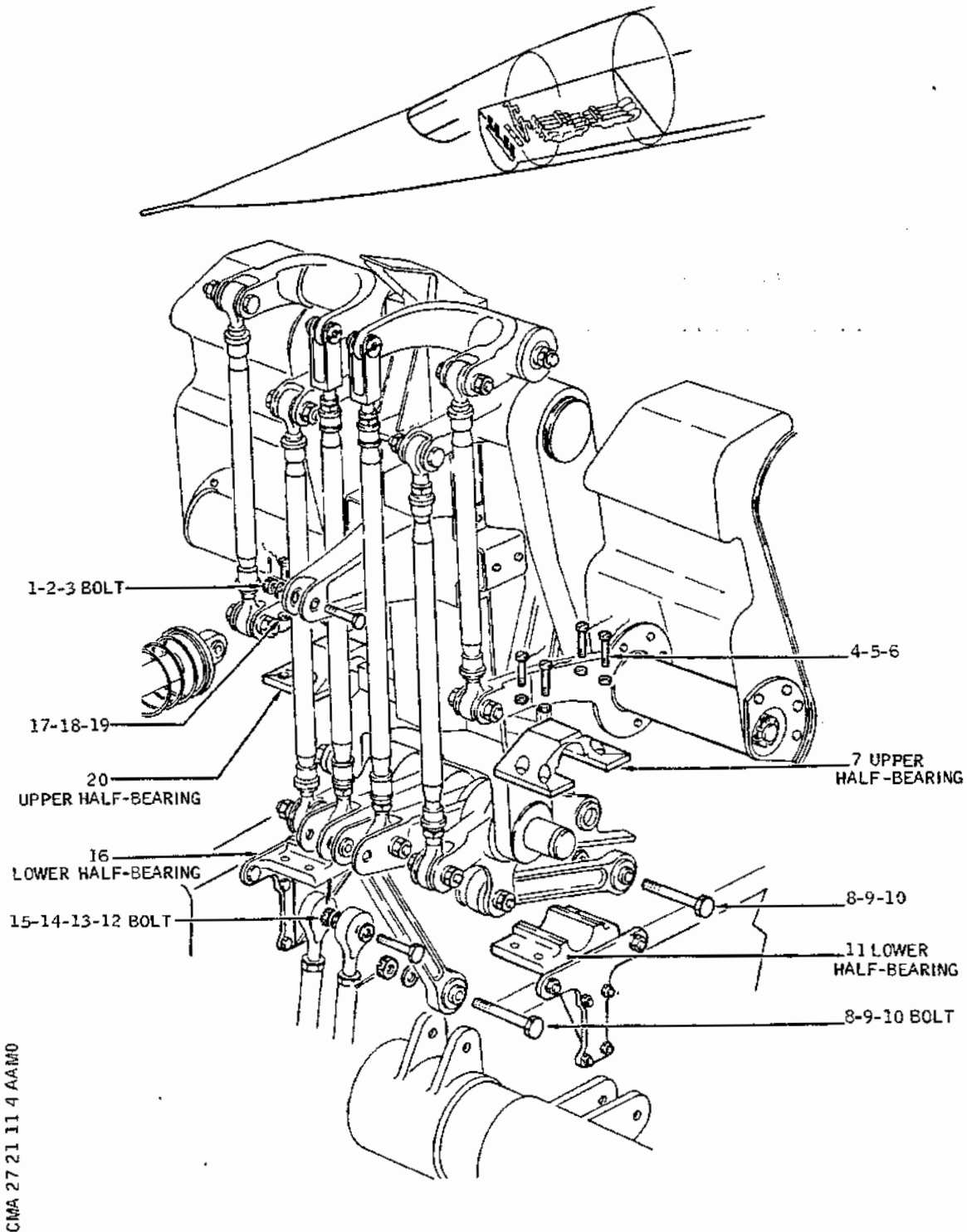
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Rudder Pedal Assembly  
Figure 402

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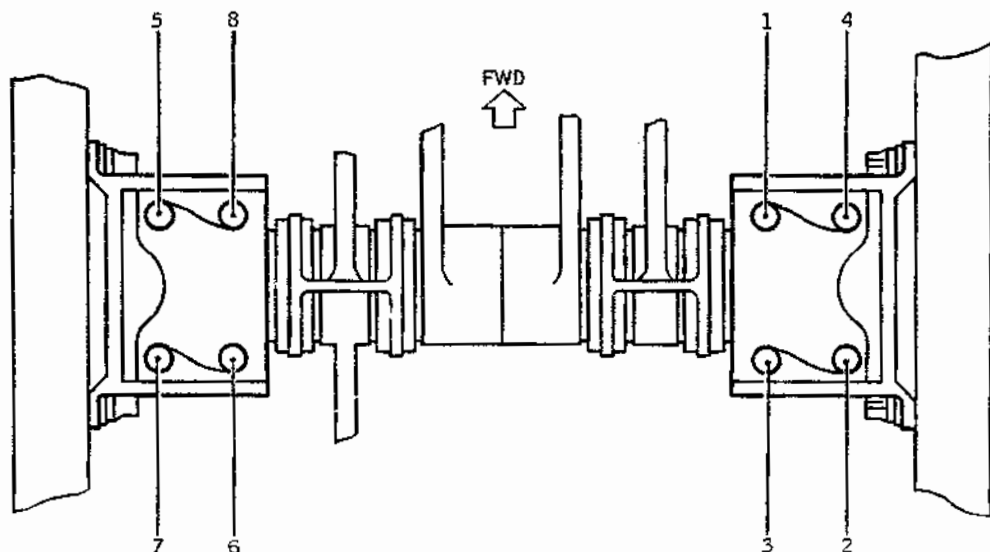
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(Ref. Fig. 403 ).

Torque to between 0.68 and 0.79 m.daN (60 and 70 lbf. in.).



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Tightening Order for Bolts (18) and (5)  
Figure 403

Safety bolts (18) and (5) with lockwire (4).

- (4) Install pedal adjusting jack on pedal support. Position the end of the jack and install bolt (3). Install washer (2) and tighten nut (1). Torque to between 0.30 and 0.36 m.daN (27 and 32 lbf. in.). Safety with cotter.
- (5) Connect brake control rods to lower bellcranks. For each rod, line up the rod and bellcrank bore-holes, position shim washer (13) and insert bolt (12). Install washer (14) and nut (15). Tighten, then safety with cotter.
- (6) Connect link rods to rudder control torque tube. For each rod ; install bolt (10) and washer (9) :

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Tighten nut (8).

Torque to between 0.30 and 0.36 m.daN (27 and 32 lbf. in.).

Safety with cotter.

- (7) Install brake master cylinder (Ref. 32-44-31, Removal/Installation).
- (8) Position FORWARD casing (7) 211BX, Captain's side, or 212BX, First Officer's side, and secure with screws (2).
- (9) Check the following clearances :  
(Ref. Fig. 404 )
  - (a) Clearance between head of rod attachment bolt and casing.  
Clearance "a" : Theoretical 3 mm (0.118 in.)  
Minimum 0.66 mm (0.026 in.)
  - (b) Clearance between rod and casing  
Clearance "b" : Theoretical 3 mm (0.118 in.)  
Minimum 0.94 mm (0.037 in.)
- (10) Position AFT casing (1) 211DX, captain's side, or 212DX, first officer's side, and secure with screws (2).
- (11) Check the following clearances :
  - (a) Clearance between pedal support arm and casing.  
Clearance "c" : Theoretical 3 mm (0.118 in.)  
Minimum 0.63 mm (0.025 in.)
  - (b) Clearance between pedal support arm and casing.  
Clearance "d" : Theoretical 3mm (0.118 in.)  
Minimum 1.40 mm (0.055 in.)
  - (c) Clearance between head of pedal hinge bolt and casing.  
Clearance "e" : Theoretical 3 mm (0.118 in.)  
Minimum 1.55 mm (0.061 in.)
- (12) Position gasket (4), gaiter (6) and secure with joint-plate (5) and attachment screws.
- (13) Position gaiter (6) on casings (1) and (7) and attach with clamp (3).
- (14) Install the following components around Captain's and First Officer's control column :

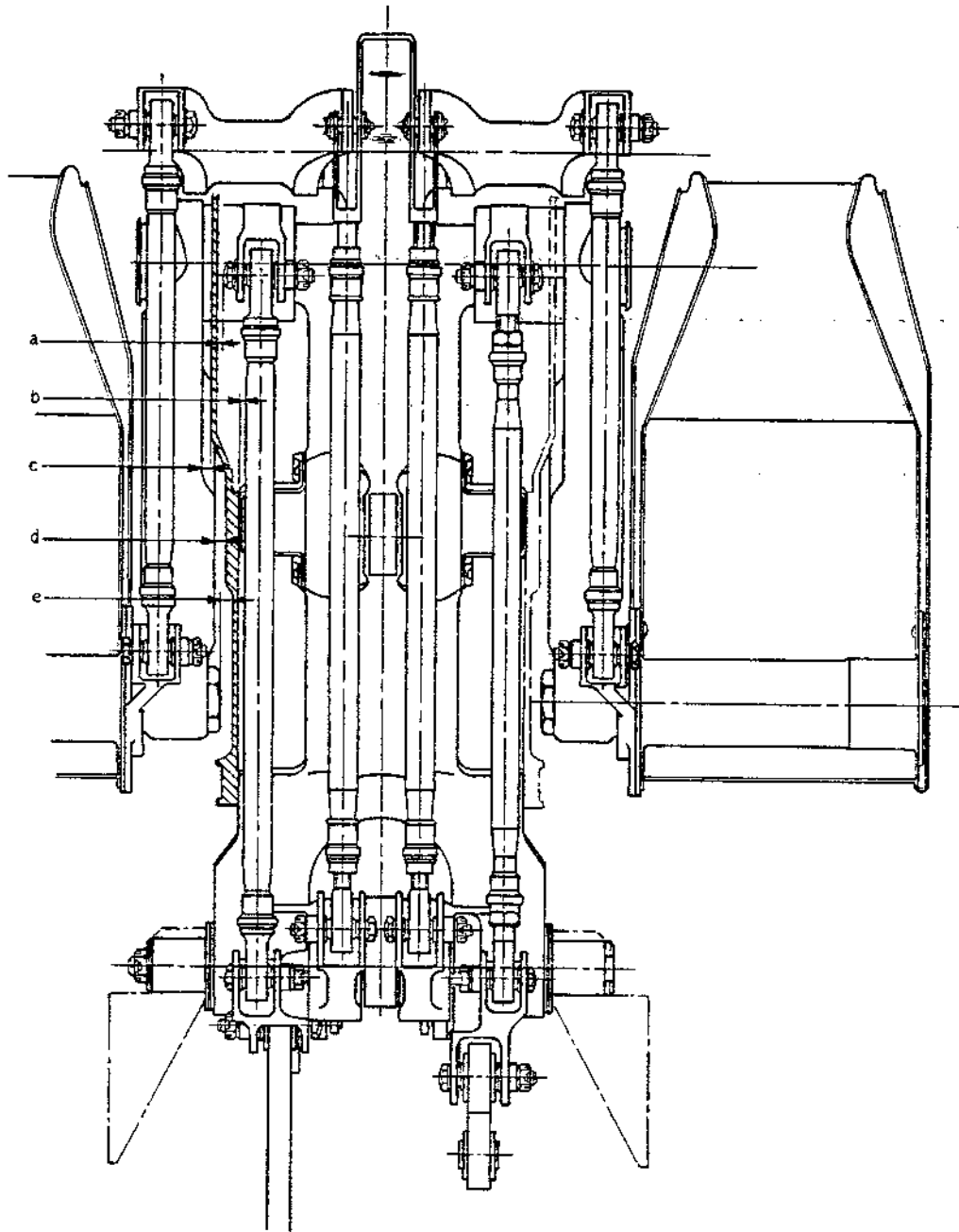
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Clearance on Rudder Pedal Assembly  
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- (a) Captain's side :
  - (a1) Install floor panels 211CF and 211BF.
  - (a2) Install pedal gaiters.
  - (a3) Install three-piece base housing ; 211RF, 211PF and 211QF.
  - (a4) Install pedal-base foot rests 211DF, 211FF, 211EF.
  - (a5) Install panel 211CS.
- (b) First Officer's side :
  - (b1) Install floor panels 212CF, 212NF, 212MF.
  - (b2) Install pedal gaiters.
  - (b3) Install three-piece base housing : 212RF, 212PF, 212QF.
  - (b4) Install pedal-base foot rests 212DF, 212FF, 212EF.
  - (b5) Install panel 212CS.
- (15) Install gaskets and gaiter 211DS or 212DS on three-piece base housing.  
Position and secure attach plate.
- (16) Connect rods connecting the torque tubes to artificial feel lever.  
Torque to between 0.30 and 0.39 m.daN (27 and 32 lbf. in.).  
Safety with cotters.
- (17) Remove rigging pins D921277000.

### E. Test

- (1) Carry out the operational test (Ref. 27-21-00, Adjustment/Test).
- (2) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### F. Close-Up

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- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Remove safety clip and tag and reset circuit breaker M 626.
- (3) Remove warning notices.
- (4) Close access doors 151BB, 121DB, 113DB, 121AB.
- (5) Remove access platform.

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### 3. Pedals

The rudder pedals are identical, therefore only the Captain's pedal will be dealt with.

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	-
Access Platform 3.7 m (12 ft)	-

#### B. Prepare

- (1) Carry out para. 2.B.(1), (2), (3) and (4).

#### C. Remove (Ref. Fig. 405)

- (1) Remove cotter and unscrew nut (7), remove washers (8) and (9), and remove bolt (4).
- (2) Remove cotter, nut (5) and washer (6). Remove pedal assembly from bolt (3).
- (3) Remove bolt (3) from lever (2).

#### D. Install (Ref. Fig. 405)

- (1) Fit bolt (3) in lever (2).
- (2) Install pedal assembly onto bolt (3).
- (3) Fit washer (6) and nut (5). Torque nut (5) to 120 lbf in (1.35 mdaN) (Ref. 20-21-11). Safety nut (5) using a cotter (Ref. 20-21-12).
- (4) Insert pedal assembly eye end into fork end of rod (1). Fit bolt (4), washers (9) and (8), and nut (7). Tighten nut (7) and safety with cotter.

#### E. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

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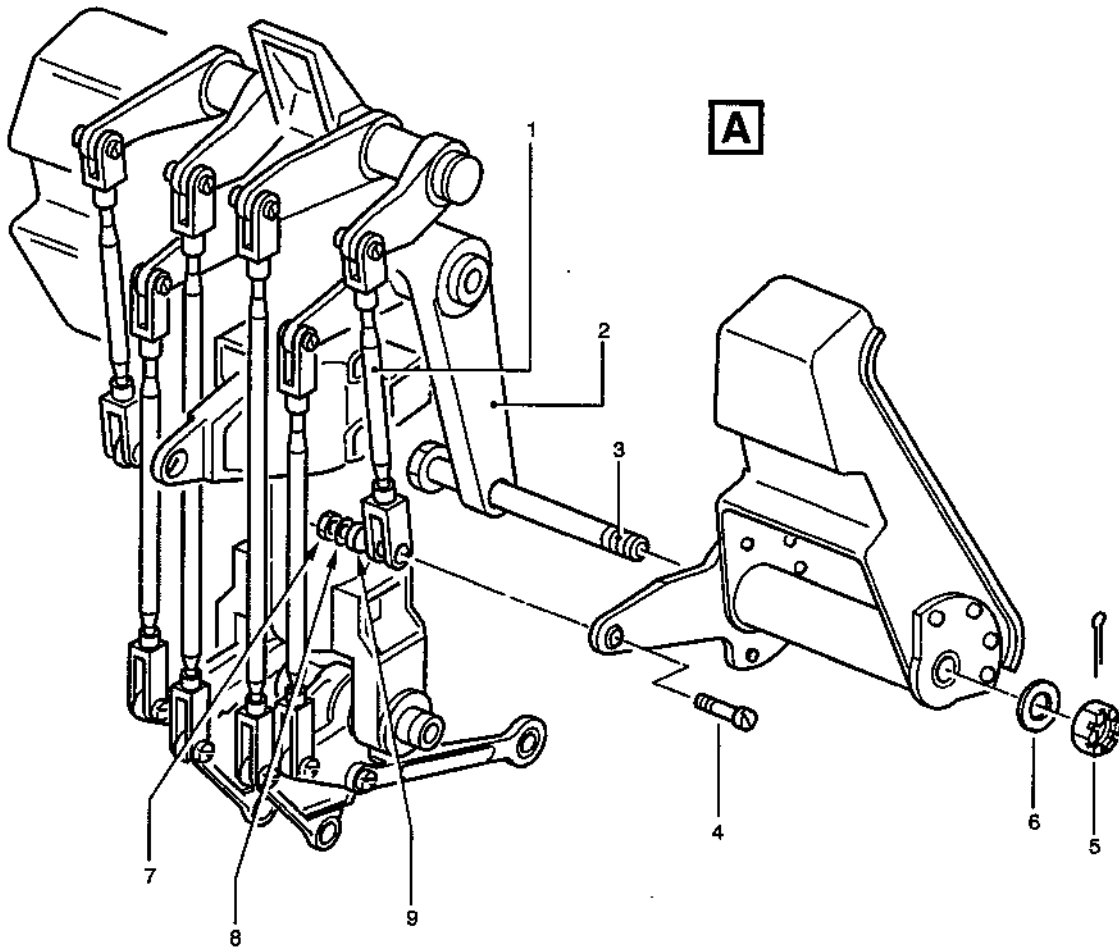
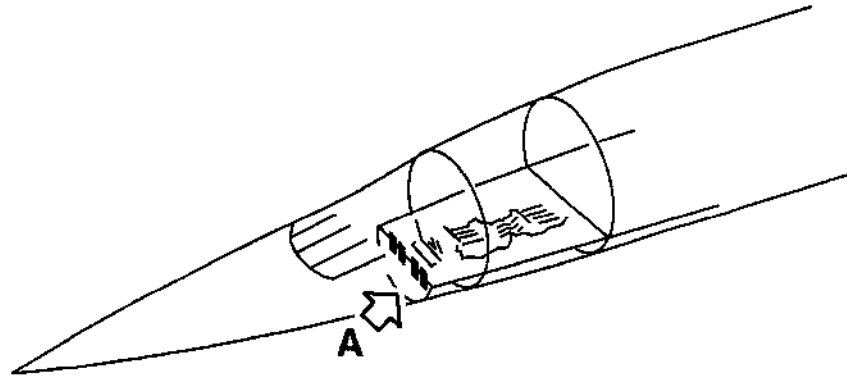
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CMB 27 21 11 4 AJM0 00

Pedals  
Figure 405

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- R
- (2) Remove safety clip and tag and reset circuit breaker M 626.
  - (3) Remove warning notices.
  - (4) Remove access platform.

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## MAINTENANCE MANUAL

### RUDDER PEDAL ASSEMBLY - INSPECTION/CHECK

#### 1. General

The purpose of the following procedure is to check the rudder pedal assembly.

The 1st pilot's and 2nd pilot's rudder pedal assemblies being similar, only the 1st pilot's rudder pedal assembly check is described.

#### 2. Rudder Pedal Assembly

##### A. Equipment and Materials

DESCRIPTION	PART NO.
-------------	----------

Access Platform 3,672 m (12 ft)

##### B. Prepare

- (1) Open doors 113DB and 121AB, giving access to rudder pedals in nose cone.
- (2) On flight compartment floor, remove the protecting sleeve attachments of control column base and rudder pedals.
- (3) Remove floor panels in rudder pedal adjacent area.
- (4) Remove screws and attachment clamp of rudder pedal case.

##### C. Check

- (1) Make certain there is no play between pedals and their shafts. Remove case.
- (2) On pedal position transmitter control rods :
  - Make certain there is no end play between rods and bellcranks.
  - Check lockwiring condition of attach bolt nut.
- (3) On yaw rods :
  - Make certain there is no end play between rods and bellcranks.
  - Check lockwiring condition of attach bolt nut.

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- (4) On rods linking bellcranks to torque tubes :
  - Make certain there is no end play.
  - Check lockwiring condition of attach bolt nut.
- (5) On attachment of rudder pedal adjuster control on rudder pedal assembly :
  - Make certain there is no end play.
  - Check lockwiring condition of attach bolt nut.
- (6) On all adjustable rods, check lockwiring condition of adjustment system.

### D. Tests

### E. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Reposition rudder pedal case. Attach it with screws and clamp.
- (3) Close floor panels in control column adjacent area.
- (4) On flight compartment floor, install protecting sleeve attachments of control column base and rudder pedals.
- (5) Close access panels.
- (6) Remove access platform.

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### TORQUE TUBES (CAPTAIN AND FIRST OFFICER) - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The Captain's and First Officer's torque tubes transmit linkage mechanical movements between rudder pedals and link rods.

#### 2. Torque Tubes

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins - Synchro Pack	D925252000
Rigging Pin - Yaw Tube	D925357000
Rigging Pin - Yaw Potentiometer	E920002000
Extractor - Yaw Tube	D925371001
Access Platforms 3.672 m (12 ft.)	
Rigging Pin - Nose Wheel Steering Mechanism	D925197000
Standard Grease (Ref. 20-30-00, No.51)	

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DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Lockwire (Dia. 1 mm (0.041 in.)) (Corrosion Resistant Steel)	

### B. Prepare

- (1) Take the precautions described in the previous "WARNING" paragraph.
- (2) Check that pitch, roll and yaw trim controls are set to zero.
- (3) Open door 121FB, immobilize yaw channel resolvers with rigging pin D925252002.
- (4) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY ALSO A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZATION SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (5) Open door 151DB and depressurize Blue, Green and Yellow hydraulic systems.
- (6) Remove panels 113DB and 121AB, giving access to torque tubes.

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- (7) Remove the following components around control columns
- (a) Captain's control column
    - (a1) Remove panel 211CS.
    - (a2) Remove pedal base footrests 211DF, 211FF, 211EF.
    - (a3) Remove pedal gaiter 211AX.
    - (a4) Remove attach plate securing gaiter 211DS to three-piece base housing, lift gaiter 211DS on control column and retain gaskets.
    - (a5) Remove three-piece base housing 211RF, 211PF, 211QF.
    - (a6) Remove floor panels 211CF, 211BF.
  - (b) First Officer's control column
    - (b1) Remove panel 212CS.
    - (b2) Remove pedal base footrests 212DF, 212FF and 212EF.
    - (b3) Remove pedal gaiter 212AX.
    - (b4) Remove attach plate securing gaiter 212DS to three-piece base housing, lift gaiter 212DS on control column and retain gaskets.
    - (b5) Remove three-piece base housing 212RF, 212PF, 212QF.
    - (b6) Remove floor panels 212CF, 212NF, 212MF and 212BF.
- (8) Remove Yellow pressure stand-by electro-hydraulic lock selector valve (4102) (Ref. 27-62-21, Removal/Installation).

### C. Remove Captain's Torque Tube (Ref. Fig. 401 )

- (1) Disconnect the nose wheel steering control unit spring rod (14) from the torque tube.  
Remove cotter and unscrew nut (15) : remove washer (16) and bolt (17).
- (2) Disconnect artificial feel input rods (20) and (21).

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Cotter pin, nut (25) washer (24) and (23) bolt (22).

NOTE : For installing or removing attachment bolts it is necessary to press plunger on head of bolt to free the locking system balls.

- (3) Disconnect pedal crank and position potentiometer rods (18) from the torque tube.  
For each rod : remove cotter and unscrew nut (5), remove washer (6) and bolt (7).
- (4) Remove support (2) from the end of torque tube located on floor beam :  
Cut lockwire, unscrew and remove bolts (4) ; retain washers (3).  
Support torque tube.  
Using the yaw tube extractor D925371001, remove support (2).
- (5) Cut and remove lockwire and remove bolts (12) attaching bearing assemblies (26) and (27) to the centre support beam.  
Retain washers (13).
- (6) Disengage the shoulder of bearing (26) from the machining on the beam and remove the torque tube.

### D. Preparation of Replacement Component

### E. Install Captain's Torque Tube

- (1) Offer up the torque tube and engage the shoulder of bearing (26) in the machining of the support beam, making certain that the grease nipple is positioned downwards.  
Hold the torque tube in position.
- (2) Install support (2) on the end of the torque tube located on the floor beam. (Grease nipple (19) positioned upwards).  
Fit support (2) in the ball bearing of the torque tube and in the machining of the beam.  
Install bolts (4) and washers (3). Torque to 60 - 70 lbf.in. (0.68 - 0.79 m.daN). Safety with lockwire.
- (3) Attach bearing (26) to the support beam using bolts (12) equipped with washers (13). Torque to 60 - 70 lbf.in. (0.68 - 0.79 m.daN). Safety the bolts with lockwire.
- (4) Grease the ball bearing of the torque tube through

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grease nipple (19) and the nipple on bearing (26) using Product No.51.

- (5) Install artificial feel input rods (20) and (21).  
For each rod : bolt (22), washers (24), (23) nut (25).  
Torque to 27 - 32 lbf.in. (0.30 - 0.36 m.daN). Safety nut with cotter.
- (6) Connect pedal crank and position potentiometer rods to torque tube.  
Position each rod and install bolt (7). Install washer (6) and tighten nut (5). Torque to 27 - 32 lbf.in. (0.30 - 0.36 m.daN). Safety nut with cotter.
- (7) Connect the nose wheel steering control unit spring rod (14) to the torque tube.  
Install bolt (17) and washer (16) : tighten nut (15) and safety with cotter.
- (8) Make certain that pin D925357000 can be easily inserted or removed. Insert pin.
- (9) On nose wheel steering control unit, make certain that installation of rigging pin D925197000 can be effected freely. If not, adjust rod (Ref. 32-51-00 paragraph 3. Adjustment/Test). Remove pin.
- (10) Remove pin D925357000 from torque tube.
- (11) Set circuit breaker M626, panel 15-216, Map ref F22.
- (12) Remove warning notices.
- (13) Remove pin D925252002 from yaw resolvers.
- (14) Install electro-hydraulic lock selector valve (4102) (Ref. 27-62-21, Removal/Installation).

### F. Remove First Officer's Torque Tube (Ref. Fig. 401 )

- (1) Insert rigging pin E920002000 in the trim deflection sensor.
- (2) Disconnect the torque tube from trim deflection sensor rod (28).  
Remove cotter and unscrew nut (11) ; remove washers (10) and (9), and bolt (8).
- (3) Remove artificial feel actuating rods (20) and (21) : cotter, nut (25), washers (24) and (23), and bolt (22).

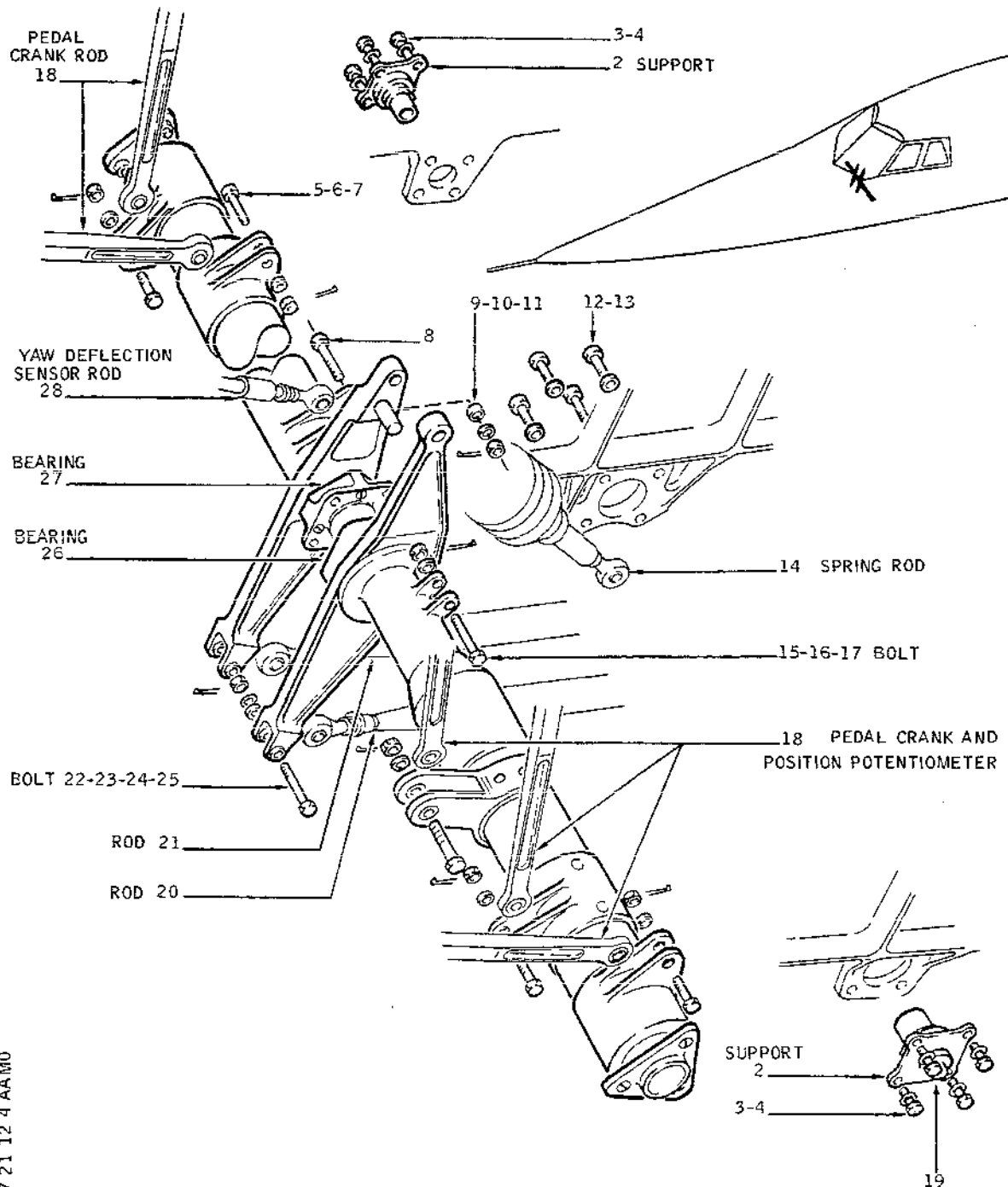
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Captain's and First Officer's Torque Tubes  
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NOTE : When installing or removing attachment bolts, it is necessary to press plunger on head of bolt to free the locking system balls.

- (4) Disconnect pedal crank rods (18) from the torque tube.  
On each rod remove cotter and unscrew nut (5), remove washer (6) and bolt (7).
- (5) Remove support (2) from the end of the torque tube located on the floor beam.  
Cut and remove lockwire, unscrew and remove bolts (4). Recover washers (3).  
Support the torque tube.  
Using the yaw tube extractor D925371001, remove support bearing (2).
- (6) Cut and remove lockwire and remove bolt (12) attaching bearing assemblies (27) and (26) to the centre support beam.  
Recover washers (13).
- (7) Disengage the shoulder of bearing (27) from the machining on the beam and remove the torque tube.

### G. Preparation of Replacement Component

### H. Install First Officer's Torque Tube

- (1) Position the torque tube, the upper crank lever on the inside of the double stop attached to the beam, and engage the shoulder of bearing (27) in the machining on the beam. The grease nipple must be positioned downwards.  
Support the torque tube in position.
- (2) Install torque tube end support (2) on the floor beam. Fit support (2) in the ball bearing of the torque tube and in the machining of the beam, grease nipple (19) upwards.  
Install bolts (4) and washers (3). Torque to between 60 and 70 lbf.in. (0.68 and 0.79 m.daN). Safety with lockwire.
- (3) Attach bearing (27) to the support beam using bolts (12) equipped with washers (13). Torque to between 60 and 70 lbf.in. (0.68 and 0.70 m.daN). Safety the bolts with lockwire.
- (4) Grease the ball bearing of the torque tube through grease nipple (19) and the nipple on bearing (27)

EFFECTIVITY: ALL

R

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## MAINTENANCE MANUAL

using Product No.51.

- (5) Install artificial feel actuating rods (20) and (21), by means of bolt (22), washers (24) (23) and nut (25) on each rod.  
  
Torque to between 27 and 32 lbf.in. (0.30 and 0.36 m.daN). Safety nut with cotter.
- (6) Connect rods (18), between the pedal crank and the torque tube.  
Position each rod and install bolt (7). Install washer (6) and tighten nut (5). Torque to between 27 and 32 lbf.in. (0.30 and 0.36 m.daN). Safety nut with cotter.
- (7) Connect trim deflection sensor rod (28) to the torque tube. If necessary adjust rod length.  
Install bolt (8) and washers (9 and 10) tighten nut (11) and safety with cotter.  
Check that pin E920002000 for adjusting the yaw deflection sensor can be removed easily.  
Remove pin.
- (8) Make certain that pin D925357000 can be inserted and removed easily; Remove pin.
- (9) Set circuit breaker M626, panel 15-216, Map ref F22.
- (10) Remove warning notices.
- (11) Remove pin D925252002 from yaw resolvers.
- (12) Install electro-hydraulic lock selector valve (4102) (Ref. 27-62-21 Removal/Installation).

### I. Tests

- (1) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (2) Carry out an operational test (Ref. 27-21-00, Adjustment/Test).
- (3) Immobilize yaw resolvers with pin D925252002.
- (4) Check that pin D925357000 can be inserted and removed easily. Remove pin.
- (5) Remove pin D925252002 from resolvers.
- (6) Shut down pressurization of hydraulic systems

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

(Ref. 29-12-00, Servicing. Procedure to set Flight Controls in mechanical mode).

- (7) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### J. Close-Up

- (1) Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
- (2) Install the following components around control column
- (a) Captain's control column.
    - (a1) Install floor panels 211CF and 211BF.
    - (a2) Install pedal gaiter 211AX.
    - (a3) Install three-piece base housing 211RF, 211PF, and 211QF.
    - (a4) Install control column gaiter 211DS (gasket, gaiter, attach plate).
    - (a5) Install pedal base foot rests 211DF, 211EF, 211FF.
    - (a6) Install panel 211CS.
  - (b) First Officer's
    - (b1) Install floor panels 212BF, 212MF, 212NF, 212CF.
    - (b2) Install pedal gaiter 212AX.
    - (b3) Install three-piece base housing 212QF, 212PF, 212RF.
    - (b4) Install control column gaiter (gasket, gaiter attach plate).
    - (b5) Install pedal base foot rests 212EF, 212FF, 212DF.
    - (b6) Install panel 212CS.
- (3) Close access doors and panels 121AB, 113DB, 121FB,

EFFECTIVITY: ALL

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151DB.

(4) Remove access platforms.

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### TORQUE TUBES - INSPECTION/CHECK

#### 1. General

The purpose of the following procedure is to check Captain's and First Officer's torque tubes of the yaw linkage.

#### 2. Torque Tubes

##### A. Equipment and Materials

DESCRIPTION	PART NO.
-------------	----------

Access Platform 3,672 m (12 ft)

##### B. Prepare

- (1) Open doors 113DB and 121AB.
- (2) Remove floor panels in control column adjacent area.

##### C. Check

- (1) Check that there is no play between torque tubes and their corresponding bearings (2) (11) (10) (6).
- (2) Check attachment of nose wheel steering control unit spring rod (3).
- (3) Check attachment of artificial feel input rods (9) and (8).
- (4) Check attachment of deflection sensor rod (12).
- (5) Check attachment of pedal bellcrank rods (4) (5) (7) (13) (1) to torque tubes.

##### D. Tests

##### E. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Install floor panels in the control column adjacent area.
- (3) Close access doors

EFFECTIVITY: ALL

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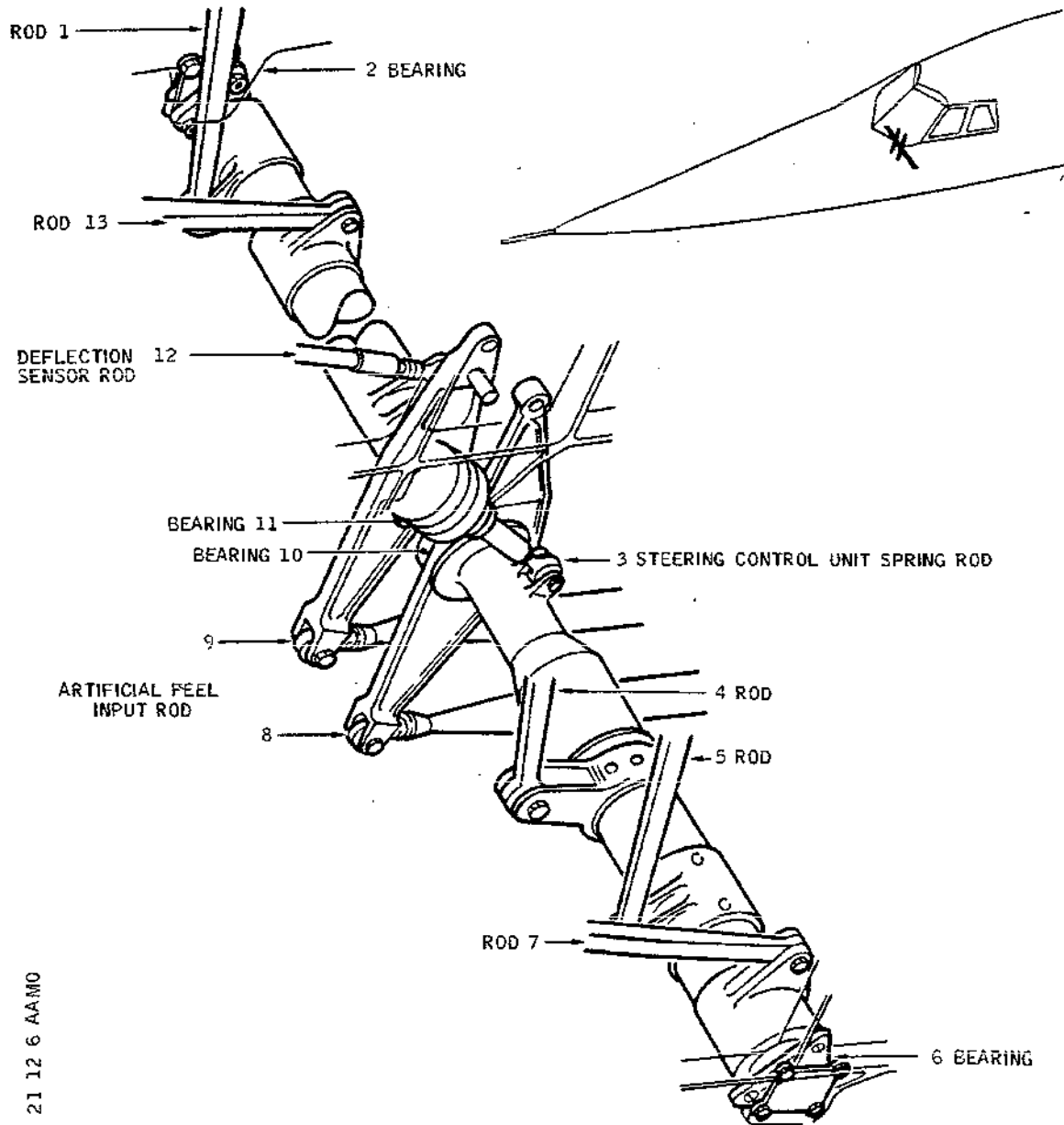
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Captain's and First Officer's Torque Tubes  
Figure 601

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(4) Remove access platform.

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## MAINTENANCE MANUAL

### LOAD LIMITING MECHANISM - REMOVAL/INSTALLATION

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

A. The load limiting mechanism protects the control linkage.

#### 2. Load Limiting Mechanism

A. Equipment and Materials

DESCRIPTION	PART NO.
Zero Rigging Device - Relay Chassis	E925019000
Rigging Pins - Synchro Pack	D925252000
Access Platforms 3.672 m (12 ft.) 11.25 m (36 ft.11 in.)	
Warning Notices	
Circuit Breaker Safety Clips	
Lockwire Dia. 1 mm (0.04 in.) Corrosion Resistant Steel	

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### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Check that pitch, roll and yaw trim controls are in zero position.
- (3) Remove panel 121FB, immobilize yaw resolvers with rigging pin D925252002.
- (4) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

ALSO DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING OPERATION OF HYDRAULIC GROUND PRESSURIZATION SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED DISPLAY A WARNING NOTICE ON THIS UNIT, PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (5) Open door 151DB and depressurize Green, Blue and Yellow hydraulic systems.
- (6) Remove panel 121GB, to gain access to load limiting mechanisms.

### C. Remove

- (1) Remove cotter and unscrew nut (14) ; remove washers (13) and (12) and remove bolt (11). Disconnect rod (10)
- (2) Remove cotter and unscrew nut (4) ; remove washers (5) and (6) and remove bolt (7). Disconnect relay jack (18).

EFFECTIVITY: ALL

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- (3) Remove cotter's and unscrew nuts (1), remove washer (2) and disconnect ground bonding strip (17).
- (4) Support the load limiting mechanism and remove bolts (3). Remove the load limiting mechanism.
- (5) Remove supports (8) and (16) and washers (9) and (15) from the load limiting mechanism pivot.

### D. Preparation of Replacement Component

### E. Install

- (1) Install washers (9) and (15), and supports (8) and (16) on the pivot of the load limiting mechanism.
- (2) Position the load limiting mechanism and install support attachment bolts (3) in chassis beams.
- (3) Connect ground bonding strip (17).
- (4) Install washers (2) and tighten nuts (1). Safety with cotter.
- (5) With the assembly installed, sideways play must be between 0.05 and 0.13 mm (0.002 - 0.005 in.).
  - (a) If play is above limits, replace washer (9).
  - (b) If play is below limits, adjust washer (9).
- (6) Connect rod (10). Install bolt (11), washers (12) and (13) and tighten nut (14). Torque to between 0.30 and 0.36 m.daN (27 and 32 lbf.in.). Safety with cotter.
- (7) Connect relay jack (18) to the body of the load limiting mechanism. Install bolt (7), washers (5) and (6) and tighten nut (4). Safety with cotter pin.
- (8) Remove warning notices.
- (9) Set circuit breaker M626.
- (10) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (11) Install equipment E925019010. Install welded strut E925019014 on tool E925019010 and on load limiting mechanism output lever by means of rigging pin E925019105. It must be easy to pin. If not adjust the

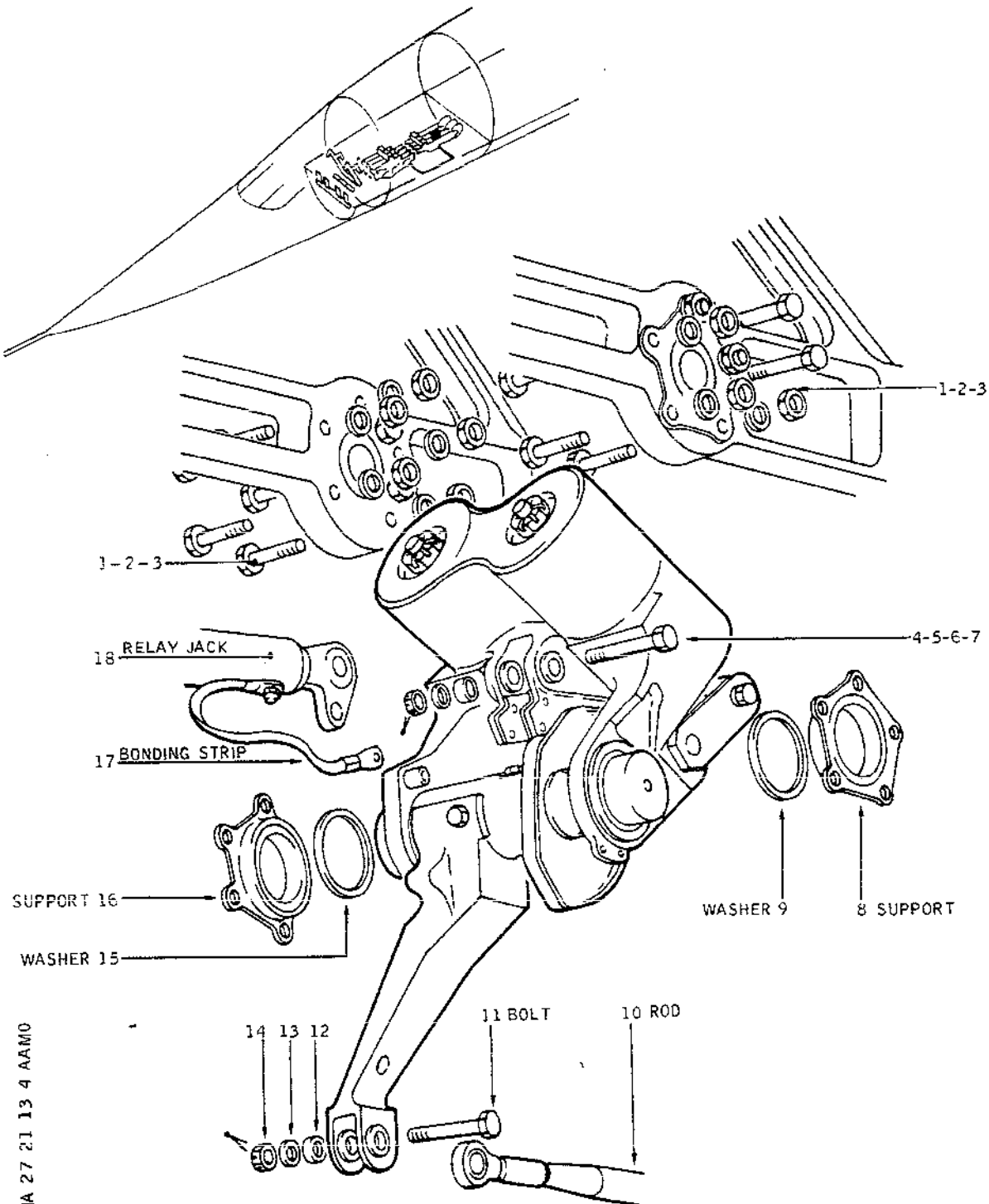
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CMA 27 21 13 4 AAM0

Load Limiting Mechanism  
Figure 401

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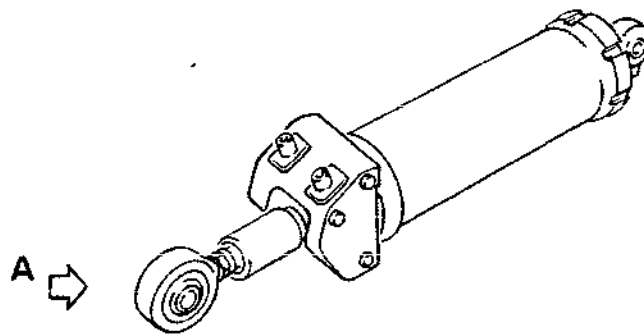
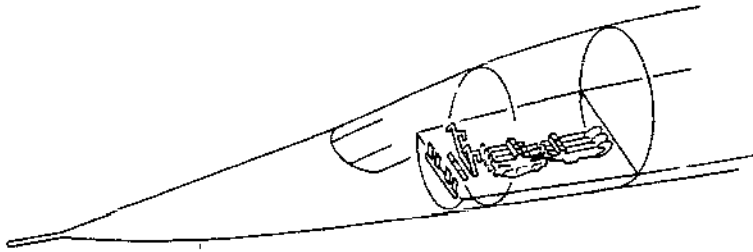
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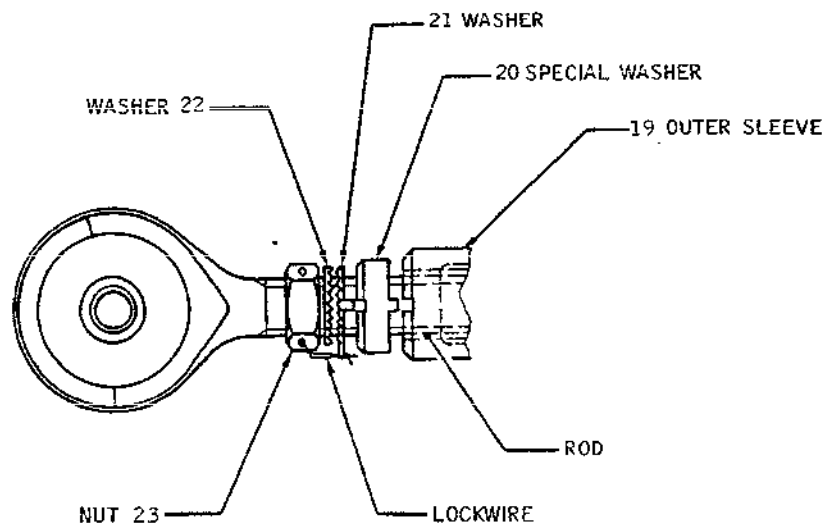
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## MAINTENANCE MANUAL



**A**



CMA 27 21 13 4 ACM0

Adjustment of AP Force Limiter  
Figure 402

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## MAINTENANCE MANUAL

AP force limiter as follows :

- (a) Cut lockwire, loosen nut (23), disengage washers (21) and (22).
  - (b) Hold special washer (20) inserted in recess in outer sleeve (19) and rod.
  - (c) Turn by hand the rod and outer sleeve assembly in order to lengthen or shorten the AP force limiter, until rigging pin E925019105 can be inserted and removed freely.
  - (d) Make certain that special washer (20) is inserted in recess in rod and outer sleeve (19).
  - (e) Engage lockwasher (21), tab in slot provided on the front face of special washer (20).
  - (f) Engage the second lock washer (22).
  - (g) Tighten nut (23).  
Torque to between 80 and 90 lbf.in. (0.9 and 1 m.daN) and wirelock.
- (12) Check adjustment of relay jack sensor (Ref. 22-13-61, Adjustment/Test).
  - (13) Remove items of equipment E925019010 and 92501914, and remove resolvers rigging pins (D925252002).
  - (14) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, procedure to set Flight Controls in mechanical mode).

### F. Test

- (1) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (2) Carry out an operational test (27-21-00, Adjustment/Test).
- (3) Install yaw resolvers rigging pin D925252002.
- (4) Install items of equipment E925019010 and E925019014. Make certain that they can be inserted freely on yaw axis.
- (5) Remove items of equipment E925019010 and E925019014. Remove resolver rigging pin (D925252002).

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- (6) Shut down pressurization of hydraulic systems.  
(Ref. 27-00-00, Servicing, procedure to set Flight Controls in mechanical mode).
- (7) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access doors and panels 121FB, 121GB and 151DB.
- (3) Remove access platforms.

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R

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## MAINTENANCE MANUAL

### LOAD LIMITING MECHANISM - INSPECTION/CHECK

#### 1. General

The purpose of the following procedure is to check the yaw channel load limiting mechanism.

#### 2. Load Limiting Mechanism

##### A. Equipment and Materials

DESCRIPTION	PART NO.
-------------	----------

Access Platform 3.672 m (12 ft)

##### B. Prepare

- R  
R (1) Remove access panel 121GB, giving access to load limiting mechanism.

##### C. Check

- R (1) Check relay jack rod attachment to load limiting mechanism corresponding yoke for correct safetying of nut and for absence of end play.  
Check bonding strip for correct condition.
- R (2) Check jam detection strut attachment to load limiting mechanism lower bellcrank for correct safetying of nut and for absence of end play.
- (3) Check roller for correct condition.  
Check that there are no wear marks, due to roller displacement, on cam roller track.

##### D. Tests

##### E. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access door 121GB.

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## MAINTENANCE MANUAL

### CABLE TENSION REGULATOR - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The cable tension regulator maintains a constant cable tension at all temperatures.

#### 2. Cable Tension Regulator

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Zero Rigging Device - Relay Chassis	E925019000
Neutral Setting - Rudder	E920112000
Rigging Pins - Synchro Pack	D925252000
Cable Grip	D921620000
Rigging Pin - Quadrant	D925422000
Locking Equipment - Cable Tension Regulator	D921606000
Tensiometer	

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DESCRIPTION	PART NO.
Access Platforms - 3.672 m (12 ft.) 11.25 m (36ft.11in.)	
Warning Notices	
Circuit Breaker Safety Clips	
Lockwire Dia. 1 mm (0.041 in.) Corrosion Resistant Steel	

### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3, PROHIBITING PRESSURIZATION OF BLUE, YELLOW AND GREEN HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEMS ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS USED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (3) Check that pitch, yaw and roll trim controls are set to zero.
- (4) Remove access panel 121FB, immobilize yaw resolvers with pin D925252002.
- (5) Remove access panel 323NR, immobilize cable quadrant in

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## MAINTENANCE MANUAL

fin with pin D925422000.

- (6) Open door 151DB, depressurize Green, Yellow and Blue hydraulic systems.
- (7) Open floor panel 231JF, giving access to turnbuckles.
- (8) Open floor panel 215AF, giving access to cable tension regulators.

Open access panel 121GB, giving access to cable tension regulators.

### C. Remove (Ref. Fig. 401 )

- (1) Guard strut (35) between hydraulic lines and control rods.
  - (a) Remove pin, unscrew nuts (33), remove washers (34), bolts (31), spacers (32).
  - (b) Remove pin, unscrew nuts (37), remove washers (38), bolts (36). Remove struts (35).
- (2) Remove pin, unscrew nuts (5), remove washers (6), bolts (7).
- (3) Remove pin, unscrew nuts (1), remove washers (2), bolts (3), spacers, and the cable guard.
- (4) Unsafety locknuts and adjusting screw (39). Loosen locknuts and draw back cable guard (40) from regulator pulley by means of adjusting screw.
- (5) Remove locking clips from cable turnbuckles corresponding to yaw linkage regulator.  
Turn turnbuckles symmetrically in order to obtain a tension which permits to install the locking equipment D921606000 on the regulator.  
Install locking equipment D921606000.  
Slacken cables so that they can be removed from regulator cable quadrants.  
Install cable grip D921620000 to immobilize cables.
- (6) Remove pin, unscrew nut (24), remove washers (25), bolt (23), free the rod (9) from the control lever.
- (7) Remove cotter pin and nut (15), remove washer (14) and bolt (13). Tilt cable attachment fitting (16) on fixed pin and disengage the lower cable.

EFFECTIVITY: ALL

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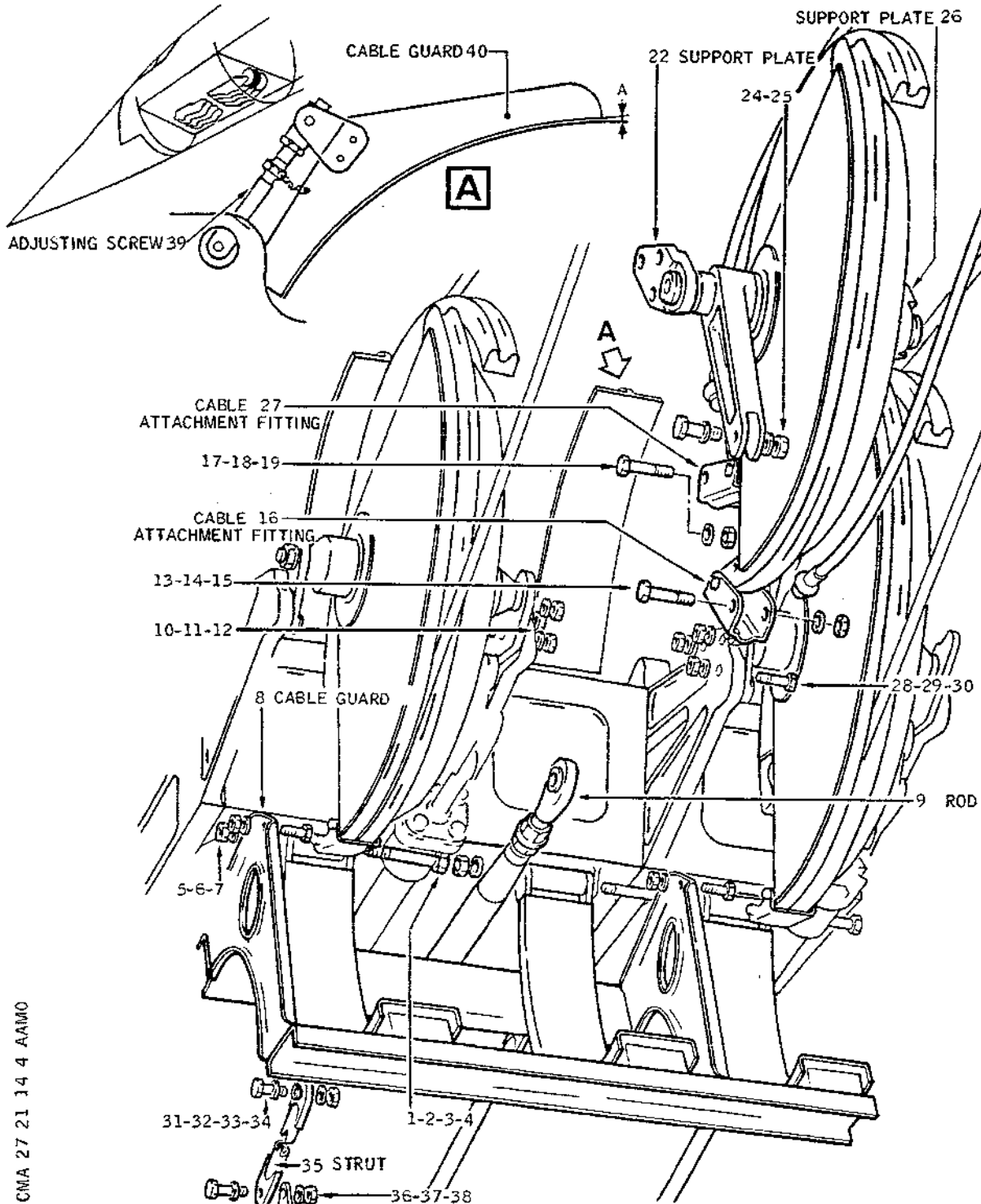
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Cable Tension Regulator  
Figure 401

R

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## MAINTENANCE MANUAL

- (8) Remove cotter pin and nut (19) ; remove washer (18) and bolt (17). Tilt cable attachment fitting (16) on fixed pin and disengage the upper cable.

NOTE : For removing bolts (17) and (13), it is necessary to press plunger on head of bolt in order to free the locking system balls.

- (9) Remove pin, nuts (10 and 28), remove washers (11 and 29). Support the tension regulator to remove screws (12 and 30), remove the cable tension regulator.

### D. Preparation of Replacement Component

Check presence of locking equipment D921606000 on new regulator. This equipment maintains the two flanges at adjustment point 10.

### E. Install (Ref. Fig.402 and 401)

- (1) Remove equipment D921620000.
- (2) Position the regulator and install support plates (26 and 22) on the chassis with bolts (30 and 12), washers (11 and 29), nuts (10 and 28).
- (3) Engage end fitting of upper cable in its recess on quadrant. Tilt cable attachment fitting (27) on fixed pin and engage bolt (17). Install washer (18), nut (19). Tighten nut (19) and safety with cotter pin.
- (4) Rotate tension regulator and engage end fitting of lower cable in its recess on quadrant. Tilt cable attachment fitting (16) on fixed pin and engage bolt (13). Install washer (14), nut (15). Tighten nut (15) and safety with cotter pin.
- (5) Connect rod (9) to control lever, engage bolt (23), washers (25), tighten nut (24). Torque to between 27 and 32 lbf.in. (0.30 and 0.36 m.daN). Safety with cotter pin.
- (6) Adjust the cable tension
  - (a) Install equipment E925019010 and immobilize yaw linkage with equipment E925019014.
  - (b) Tighten turnbuckles symmetrically until a sufficient and balanced tension of the two cables is obtained, so that rigging pins of equipment D921606000 can be removed easily.

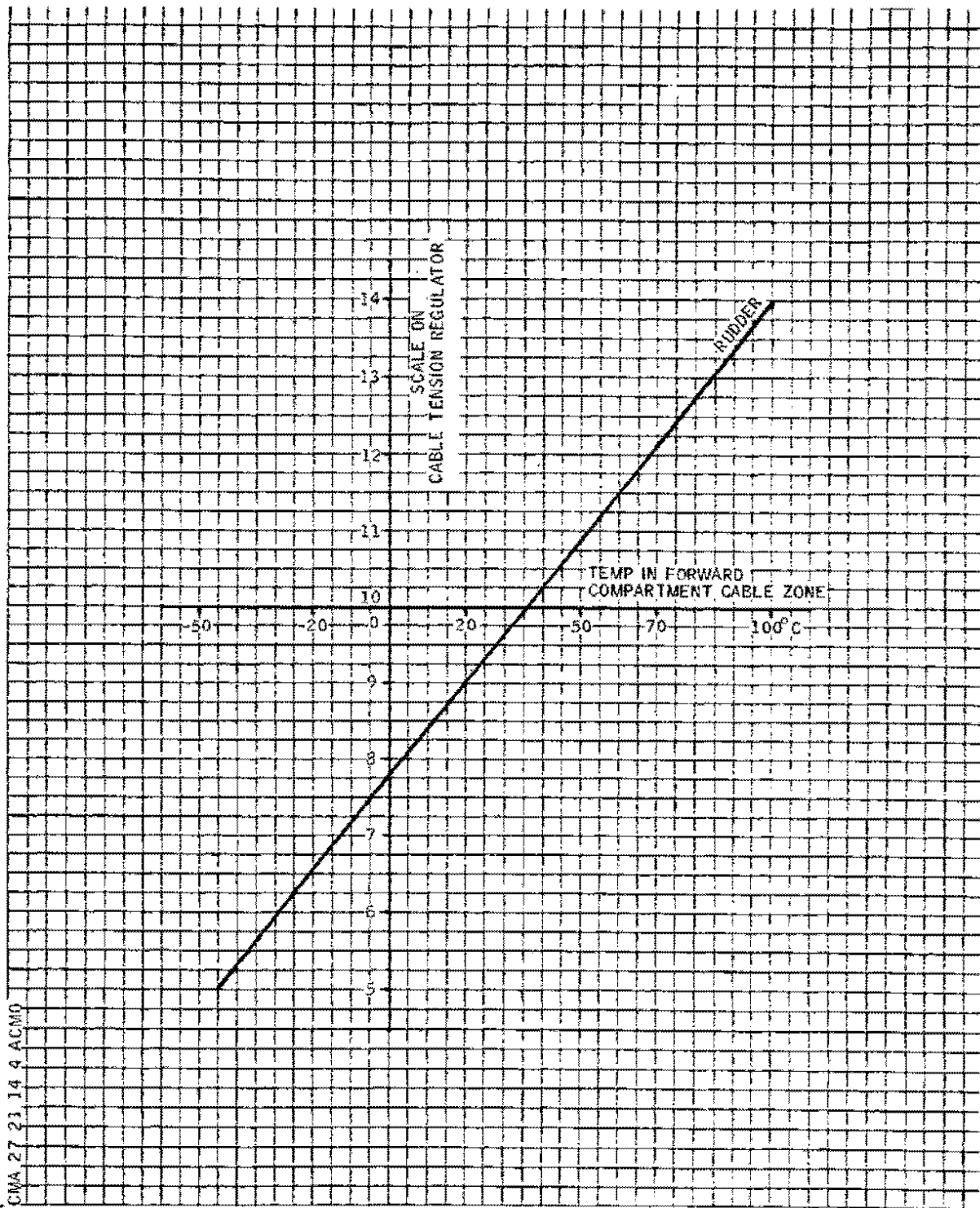
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Cable Tension Adjustment Graph  
Figure 402

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- (c) Remove locking equipment D921606000 from regulator.
- (d) Adjust cable tension according to temperature and referring to adjustment graph.  
TENSION = 25 daN (56.2 lbf.)
- (e) Make certain that attachment pin of equipment E925019014 located on the lever of the load limiting mechanism and pin D925422000 on cable quadrant in fin can be easily removed. If it is not the case, adjust the tension and the balance of the cables.
- (7) Safety turnbuckles with locking clips.
- (8) Position lower cable guard (8), install spacers (4), bolts (3), washers (2), tighten nuts (1).  
Torque to between 12 and 15 lbf.in. (0.14 and 0.17 m.daN).
- (9) Install bolts (7), washers (6), tighten nuts (5).  
Safety with cotter pin.
- (10) Make certain that clearance between cable guard and tension regulator is between 0.03 and 0.08 in. (0.762 and 2.03 mm).
- (11) Turn adjusting screw (39) so that clearance between cable guard (40) and tension regulator pulley is between 0.03 and 0.08 in. (0.762 and 2.03 mm). Tighten locknuts.  
Safety adjusting screw and locknuts as per 20-21-13.  
Torque to between 27 and 32 lbf.in. (0.305 and 0.361 m.daN).
- (12) Connect guard struts (35), between hydraulic lines and control rods.
- (13) Install bolts (31), washers (34), spacers (32), washers (34), tighten nuts (33). Safety with cotter pin.
- (14) Install bolts (36), washers (38), tighten nuts (37).  
Safety with cotter pin.
- (15) Remove pin D925422000 from cable quadrant in fin.
- (16) Set circuit breaker M626, Panel 15-216, Map Ref. F22.
- (17) Remove warning notices.

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- (18) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (19) Check that rigging pin D925422000 can be easily inserted (or removed) on cable quadrant in fin. Do not remove rigging pin.
- (20) Install equipment E920112000 on fin and check that rudders are at neutral plus or minus two minutes. (If required, adjust PFCU input rods). Wirelock rod adjustment system as per 20-21-13.
- (21) Remove rigging pin D925422000 and items of equipment E925019014 and E925019010.
- (22) Remove rigging pin D925252002 from yaw linkage resolvers.
- (23) Fully deflect rudder pedals several times (3 minimum) in each direction.
- (24) Immobilize yaw linkage resolvers with rigging pin D925252002.
- (25) Check that rudders are at neutral as previously. (If not, position to neutral by adjusting PFCU input rods. Wirelock rod adjustment system as per 20-21-13).
- (26) Remove rigging pin D925252002.
- (27) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing : Procedure to set Flight Controls in mechanical mode).

### F. Test

- (1) Carry out an operational test (Ref. 27-21-00, Adjustment/Test).
- (2) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close floor panels 231JF and 215AF.

EFFECTIVITY: ALL

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R

BA

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## MAINTENANCE MANUAL

- (3) Close access doors and panels 121FB, 323NR, 151DB, 121GB.
- (4) Remove access platforms.

EFFECTIVITY: ALL

R

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## MAINTENANCE MANUAL

### CABLE TENSION REGULATOR - INSPECTION/CHECK

#### 1. General

The purpose of the following procedure is to check the cable tension regulator of the yaw channel.

#### 2. Cable Tension Regulator

##### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

R      Access Platform 3.672 m (12 ft.)

##### B. Prepare

- (1) Open door 121GB and floor panel 215AF, giving access to the cable tension regulators.

##### C. Check (Ref. Fig. 601 )

- (1) On cable quadrants

- R      - Check attachment of cable ends and cable attachment fittings.  
         - Check that there are no wear and damage marks on the cable quadrant grooves.

- (2) Check lockwiring of rod adjusting screw.

- R      (3) Make certain there is no play at the adjustable control  
R      lever fulcrums.

- (4) On the regulator

- (a) Note value indicated by the regulator marker.

- (b) Near the regulator, bring together manually the two cables and check the balance arm displacement on locking shaft.

- (c) Release the two cables.

- R      (d) Make certain that the value indicated by the marker is identical with that noted previously.

EFFECTIVITY: ALL

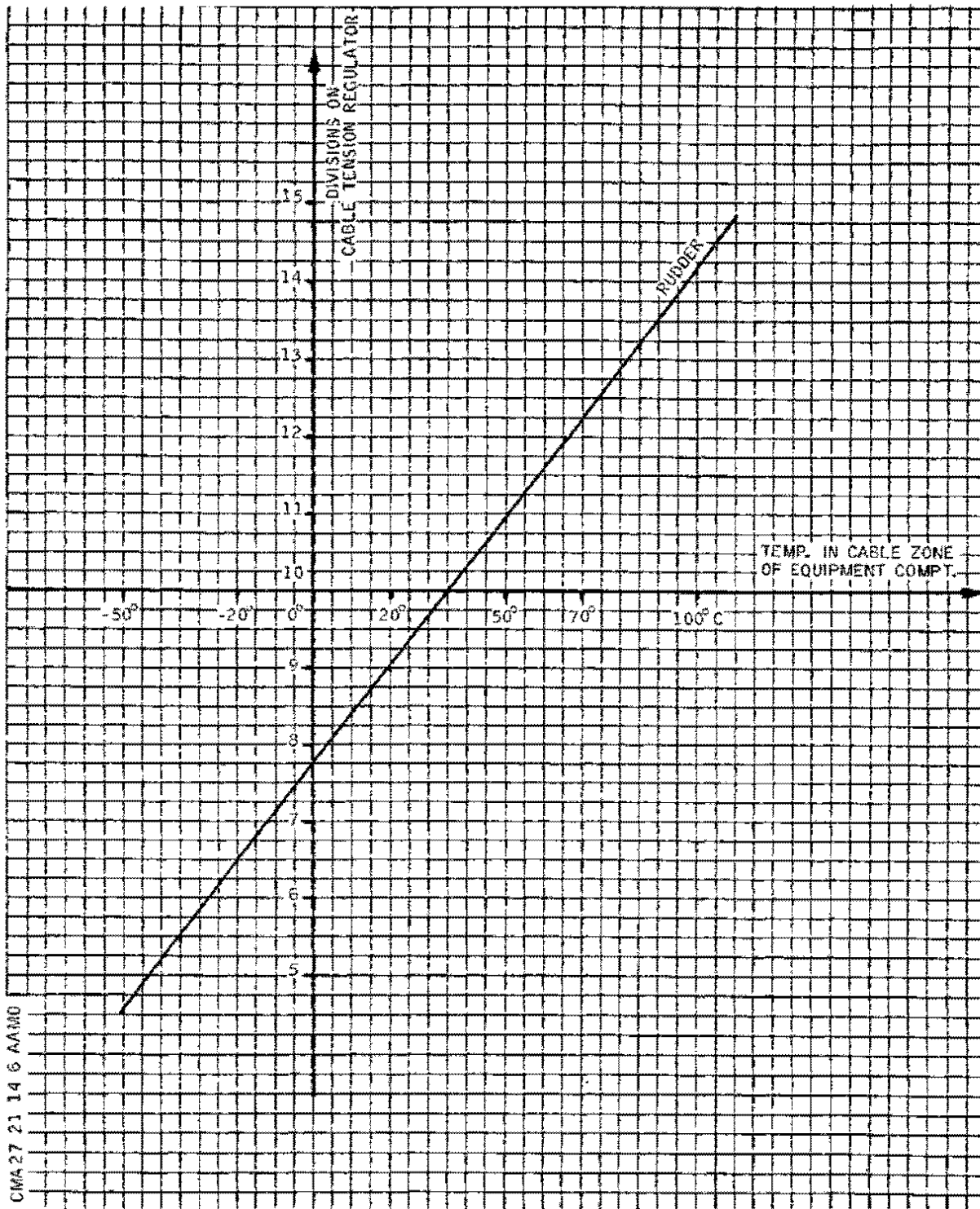
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Cable Tension Adjustment Graph.  
Figure 601

R

EFFECTIVITY: ALL

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- (5) Place a thermometer near the regulator and note temperature.

R By means of cable tension adjustment graph, make certain that value indicated by the marker corresponds to the value shown on graph, (determined by noted temperature).

- R (6) Check that clearance between lower and upper cable guards and tension regulator pulley is between 0.03 and 0.08 in. (0.762 and 2.03 mm)

### D. Tests

### E. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close door 121GB and floor panel 215AF.
- (3) Remove access platform.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### RUDDER PEDAL ADJUSTER - REMOVAL/INSTALLATION

#### 1. General

The Captain's and First Officer's rudder pedal adjuster jacks are identical. Only the removal/installation of the Captain's pedal adjuster jack will therefore be described.

#### 2. Adjuster Jack

##### A. Equipment and Materials

DESCRIPTION	PART NO.
-------------	----------

R Lockwire - Corrosion  
R Resistant Steel Dia. 1 mm (0.041 in.)

##### B. Prepare

R (1) Removal of pedals (Ref. 27-21-11, Removal/Instal-  
R lation).

##### C. Remove (Ref. Fig. 401 )

- (1) Remove cotter-pin and remove nut (17), remove washer (18) and withdraw bolt (19). Separate turnbuckle (20) from jack locking spigot.
- (2) Remove cotter-pin and remove nuts (8). Remove washers (7) and bolts (6). Cut lockwire (1). Remove bolts (4). Remove attachment plate (5), retain adjusting shims (2) and light alloy shim (3).
- (3) Remove cotter-pin and remove nuts (9), remove washers (10) and bolts (11), cut lockwire (14) and remove bolts (13) holding jack and attachment plate (12). Remove attachment plate (12), adjusting shims (15) and light alloy shim (16). Remove jack.

##### D. Preparation of Replacement Component

##### E. Install

The jack body must be assembled to its support with a lateral clearance of 0.003 to 0.008 in. (0.08 to 0.2 mm) after assembly. A trial installation is required in order to determine the number of adjusting shims (2 and 15) which will provide this clearance.

EFFECTIVITY: ALL

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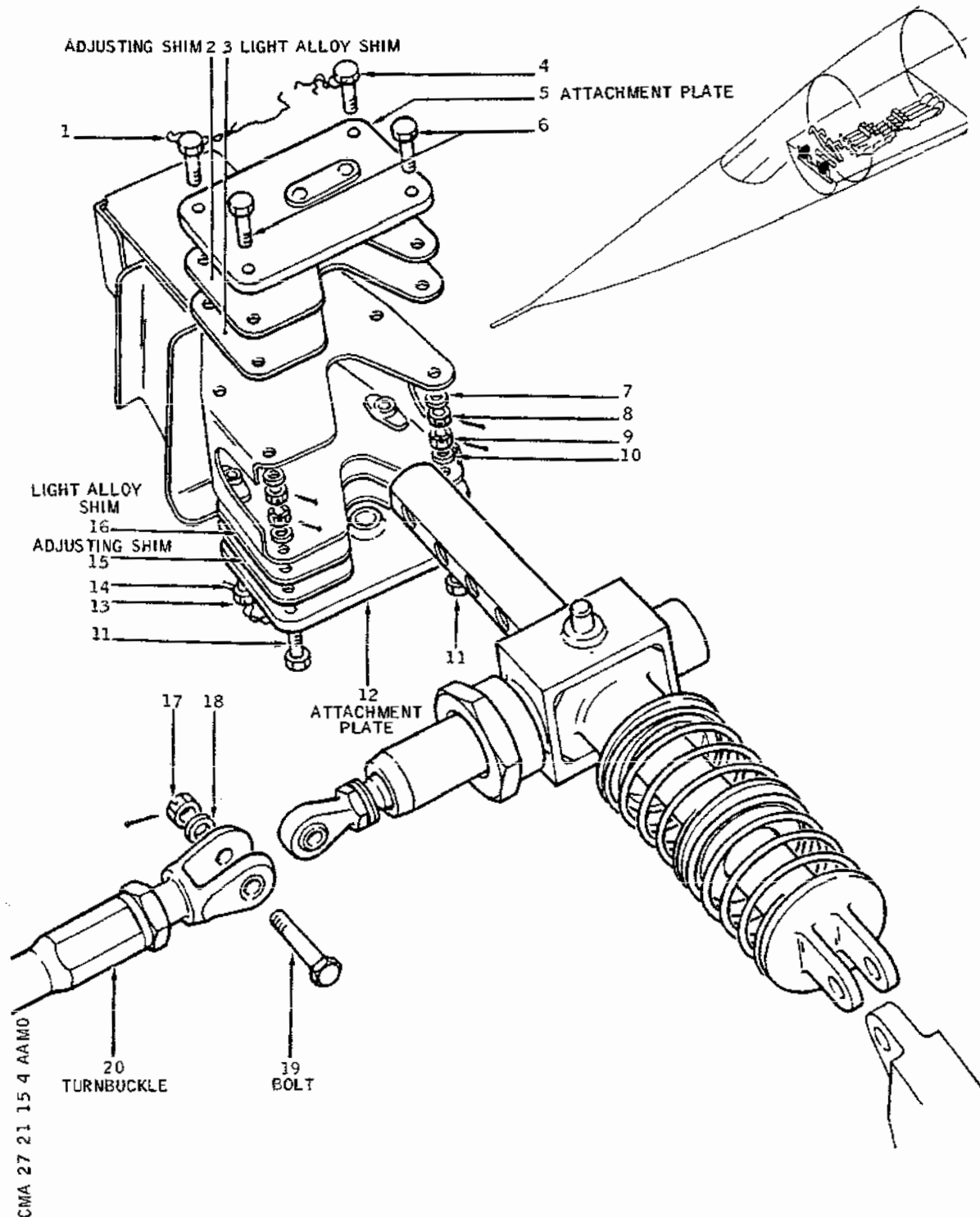
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## MAINTENANCE MANUAL



Rudder Pedal Adjuster Jack  
Figure 401

R

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## MAINTENANCE MANUAL

- (1) Position jack inside its support in its installed position.
- R (2) Install attachment plate (12) onto jack body trunnion ; insert light alloy shim (16) and install bolts (13) but do not fully tighten at this stage. Install bolts (11) washers (10) and nuts (9) but do not fully tighten at this stage.
- (3) Install attachment plate (5) onto upper jack body trunnion ; interpose light alloy shim (3) and install bolts (4) but do not fully tighten at this stage. Install bolts (6) washers (7) and nuts (8) but do not fully tighten at this stage.
- R (4) Tighten bolts (13) and nuts (9) sufficiently to adjust attachment plate (12) correctly to structure of support.
- (5) Slightly tighten bolts (4) and nuts (8) and determine the thickness of shims to be added in order to achieve specified clearance after assembly.
- (6) Re-assemble parts compensating the clearance determined above by adding shims (2 and 16) which exist in four dimensions : 0.002, 0.003, 0.005 and 0.010 in. (0.05, 0.08, 0.13 and 0.25 mm).
- R (7) Tighten bolts (13) and nuts (9) then bolts (4) and nuts (8) making certain that the lateral clearance still remains at jack body.  
Torque to between 12 and 15 lbf.in. (0.13 and 0.17 m.daN). Measure lateral clearance at jack body. If this clearance is less than 0.003 in. (0.08 mm) or more than 0.008 in. (0.2 mm) it must be brought back within these limits by changing shim (2 and 16) arrangement.
- R (8) After torque tightening final assembly, lock bolts (4 and 13) with lockwire (1 and 14) and safety nuts (8 and 9) with cotter pins.

### F. Locking Control Adjustment

- (1) Pull control handle then push fully back after interposing a 0.050 in. (1.27 mm) shim between handle and cable assembly mounting flange.
- (2) Make certain that locking spigot is fully engaged in one of the adjustment holes of the jack rod.
- (3) Connect turnbuckle (20) to locking spigot. Break lock-

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

wires, release the two adjustment points of turnbuckle and adjust it to make the bores of its fork end fitting coincide with those of the locking spigot. Make certain that fork ends are not unscrewed beyond indicator holes on turnbuckle (20).

- (4) Install bolt (19), washer (18) and tighten nut (17). Torque to between 27 and 32 lbf.in. (0.30 and 0.36 m.daN). Safety nut with a cotter pin.
- (5) Immobilize the two adjustment points on turnbuckle and wirelock.
- (6) Remove shim.

### G. Tests

- (1) Pull unlock handle fully out and check that pedal adjustment rod is moved to its fully aft position by spring. Fully compress adjustment rod and check that it is possible to reach fully forward position.
- (2) Make certain that locking is possible in each of the 7 adjustment positions. Check that when handle is pulled fully forward locking spigot is completely released from each of the adjustment positions.
- (3) Make certain that once the handle has been released the locking spigot is fully inserted into each of the adjustment positions, and that clearance remains between handle and cable mounting flange.
- (4) Repeat these tests after installing rudder pedal support.

### H. Close-Up

- R  
R
- (1) Install rudder pedal assembly (Ref. 27-21-11, Removal/Installation).
  - (2) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

## 3. Teleflex Cable Jack Locking Control

### A. Equipment and Materials

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	DESCRIPTION	PART NO.
R	Lockwire - Corrosion Resistant	
R	Steel, Dia. 1 mm (0.041 in.)	
	B. Prepare	
	(1) Remove rudder pedal assembly (Ref. 27-21-11, Removal/Installation).	
	(2) Remove Altitude Alert panel from Captain's side console and disconnect its electrical power connector.	
	C. Remove (Ref. Fig. 402 )	
	(1) Disconnect end of cable from lever (1). Remove cotter-pin and remove nut (2). Remove washer (3) and bolt (4).	
	(2) Detach attachment from lower end of cable sleeve. Remove cotter-pin and remove nuts (11). Remove half clip (10) and retain bolts (13) and washers (12).	
	(3) Remove pins (7 and 8) and remove handle (9) from sliding rod of pull knob.	
	(4) Remove bolts (6) and remove pull knob body from bore in Captain's side console panel.	
	(5) Remove control cable.	
	D. Preparation of Replacement Component	
	E. Install	
	(1) Position control cable in its installed position and attach pull knob body to Captain's console panel. Insert pull knob body into bore of panel and attach with bolts (6). Torque to between 50 and 60 lbf.in. (0.6 and 0.7 m. daN).	
	(2) Place handle (9) on rod of push knob and turn it to a vertical position. Immobilize handle on rod by means of pins (7 and 8).	
	(3) Install the end of sleeve onto clip (5). Install half-clip (10) and assemble it with bolts (13) and nuts	

EFFECTIVITY: ALL

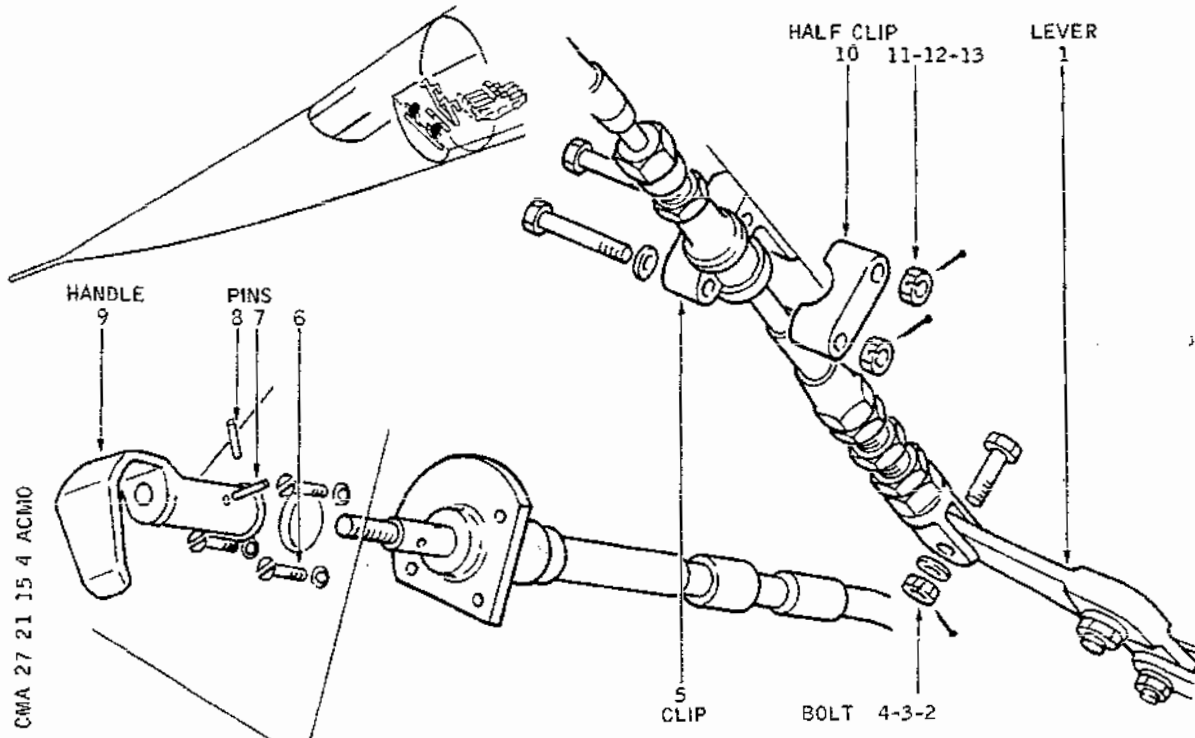
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Teleflex Cable Jack Locking Control  
Figure 402

R

(11). Check that sleeve is installed correctly and free of bends, then tighten nuts (11). Torque to between 12 and 15 lbf.in. (0.13 and 0.17 m. daN). Safety nuts with cotter pins, installing washers (12) under bolt heads if required.

(4) Make certain that fork end of cable is in line with lever (1). If necessary, change orientation of fork end using its adjustment point on sliding end of cable.

### F. Control Adjustment (Ref. Fig.402 and 401)

- (1) Pull control handle then push it back fully after inserting a 0.050 in (1.27 mm) shim between handle and mounting flange of cable assembly.
- (2) Check that locking spigot is fully engaged in one of the adjustment holes on jack rod.
- (3) Connect end of the cable to lever (1). Break lockwires, unlock the two adjustment points of control turnbuckle, and adjust the turnbuckle to align

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## MAINTENANCE MANUAL

the holes of the cable fork end with the hole of lever (1).

Install bolt (4) washer (2) and tighten nut (3).

Torque to between 27 and 32 lbf.in. (0.30 and 0.36 m. daN). Safety nut with cotter pin. Wirelock the two adjustment points of turnbuckle. Remove shim.

- (4) Make certain that fork ends are not unscrewed beyond indicator holes on turnbuckle (20).

### G. Tests

- (1) Pull unlock handle fully out and check that pedal adjustment rod is moved to its fully aft position by spring. Fully compress adjustment rod and check that it reaches fully forward position.
- (2) Check that locking is possible in each of the 7 adjustment positions. Check that when the handle is pulled fully out the locking spigot is completely released from each of the adjustment positions.
- (3) Check that when the handle is released the locking spigot engages fully in each of the adjustment positions and that there is a clearance between handle and cable mounting flange.
- (4) Repeat these tests after installing rudder pedal support.

### H. Close-Up

- (1) Install rudder pedal assembly (Ref. 27-21-11, Removal/Installation).
- (2) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

## 4. Control Lever

### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

R	Lockwire - Corrosion Resistant
R	Steel Dia. 1 mm (0.041 in.)

### B. Prepare

EFFECTIVITY: ALL
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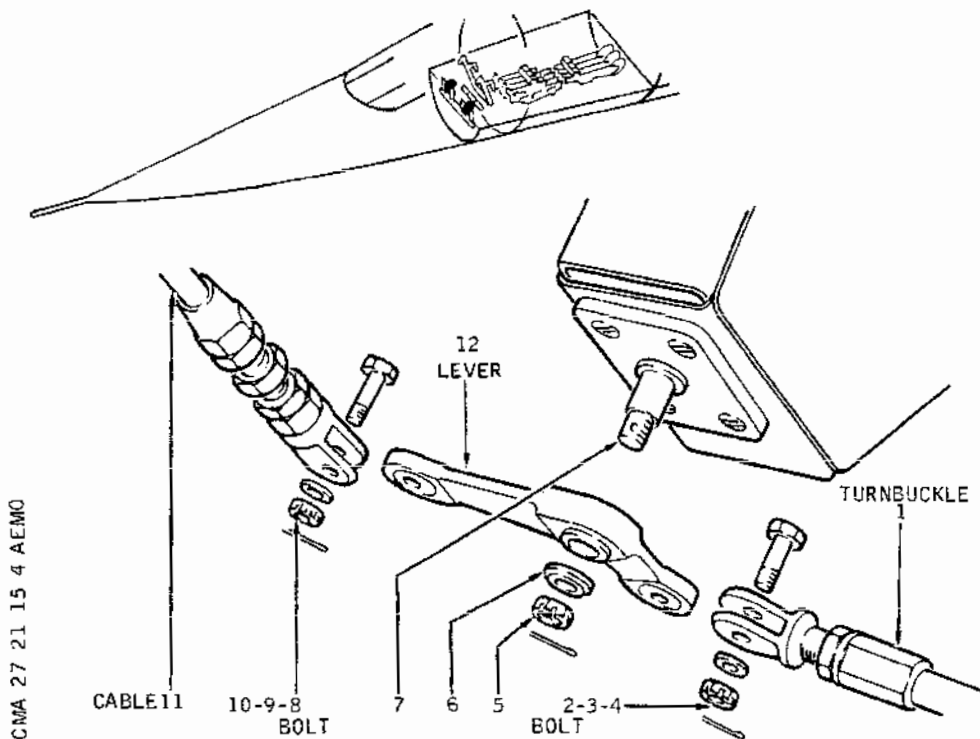
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## MAINTENANCE MANUAL

- R (1) Remove rudder pedal assembly (Ref. 27-21-11, Removal/  
R Installation).

### C. Remove (Ref. Fig. 403 )

- R (1) Remove cotter-pin and remove nut (4). Remove washer  
(3) and bolt (2). Disengage turnbuckle (1) from lever  
(12).
- (2) Remove cotter-pin and remove nut (10). Remove washer  
(9) bolt (8). Disconnect cable (11) from lever (12).
- (3) Remove cotter-pin and remove nut (5). Remove washer  
(6) and lever (12).



Control Lever  
Figure 403

### D. Preparation of Replacement Component

### E. Install

- (1) Place lever on bolt (7), install washer (6) and nut  
(5). Safety with a cotter-pin.

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## MAINTENANCE MANUAL

Torque to between 27 and 32 lbf.in. (0.30 and 0.36 m. daN).

- (2) Position turnbuckle fork end. Install bolt (2). Install washer (3) and nut (4). Safety with a cotterpin. Torque to between 27 and 32 lbf.in. (0.30 and 0.36 m. daN).

### F. Control Adjustment

- (1) Pull control handle then push it fully back after interposing a 0.050 in (1.27 mm) shim between handle and cable assembly mounting flange.
- (2) Make certain that locking spigot is fully engaged in one of the adjustment holes on jack rod.
- (3) Connect end of cable (11) to lever. Break lockwires and unlock the two adjustment points of turnbuckle (1). Adjust turnbuckle to align the holes of the cable fork end with the hole of lever. Check that fork ends are not unscrewed beyond indicator holes on turnbuckle (1).
- (4) Install bolt (8). Install washer (9) and screw on nut (10). Safety with a cotter-pin. Torque to between 27 and 32 lbf.in. (0.30 and 0.36 m. daN). Wirelock the two adjustment points of turnbuckle. Remove shim.

### G. Tests

- (1) Pull unlock handle fully out and check that pedal adjustment rod is moved to fully aft position by spring. Fully compress adjusting rod and check that it enables maximum forward position to be reached.
- (2) Check that locking is possible in each of the 7 adjustment positions. Check that when the handle is pulled fully out, the locking spigot is fully released from each of the adjustment positions.
- (3) Check that when handle is released, locking spigot fully engages in each of the adjustment positions, and that there is clearance between handle and cable locking flange.
- (4) Repeat these tests after installing rudder pedal support.

- R (5) Carry out a double inspection of work performed and

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## MAINTENANCE MANUAL

R area affected as per instructions detailed in 05-55-11

### H. Close-Up

- (1) Install rudder pedal assembly (Ref. 27-21-11, Removal/Installation).
- (2) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

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**END OF THIS  
SECTION**

**NEXT**

# *Concorde*

## MAINTENANCE MANUAL

### AUTO PILOT FORCE LIMITER - REMOVAL/INSTALLATION

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The auto pilot force limiter ensures the automatic disengagement of the AP when loads applied to linkage reach its threshold value. It is located level with frame 6 in zone 121.

#### 2. Auto Pilot Force Limiter

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Zero Rigging Device - Relay Chassis	E925019000
Rigging Pin - Synchro Pack	D925252000
Lockwire Dia 0.041 in. (1mm) Corrosion Resistant Steel	
Access Platform 3.67 m (12 ft.)	
Circuit Breaker Safety Clips	

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER		MAP REF.
AP/FD SYS 1 CONT	1-213	1C	17	Q13
AP/FD SYS 1 SUP	2-213	1C	20	C 5
AP/FD SYS 2 CONT	5-213	2C	17	A11
AP/FD COMP 1 SUP	13-215	1C	18	A 5
AP/FD COMP 2 SUP	13-216	2C	18	F18
AP/FD SYS 2 SUP		2C	20	A17

- (3) Make certain that the yaw trim control is in zero position.
- (4) Remove access door 121FB and immobilize yaw synchro pack with rigging pin D925252002.
- (5) Remove access door 121GB and install items of equipment E925019010 and E925019014.
- (6) Open access door 151DB and depressurize the Green, Blue and Yellow hydraulic systems. (Ref. 29-11-00, 29-12-00 and 29-21-00, Servicing).

**WARNING :** DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.  
DISPLAY ALSO A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZATION SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS USED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF AIRCRAFT HYDRAULIC SYSTEMS.

### C. Remove

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## MAINTENANCE MANUAL

NOTE : For installing or removing attachment bolts it is necessary to press the plunger on head of bolt to free the locking system balls.

- (1) Remove the protective housings (7) and (12) from the yaw resolvers.
- (2) Disconnect electrical connectors (1).
- (3) Remove cotter and unscrew nut (5) : retain washer (4).
- (4) Remove cotter and unscrew nut (11) : retain washer (10).
- (5) Support force limiter (2) and remove bolt (8).
- (6) Remove bolt (3) and disengage the force limiter (2). Handle it with care.

### D. Preparation of Replacement Component

- (1) Adjust the replacement force limiter to the same length as that of the removed component. The nut (19) of the adjustable end fitting must be tightened. Torque to between 115 and 125 lbf.in. (1.3 and 1.42 m.daN). Safety with lockwire (Ref. 20-21-13).

### E. Install

- (1) Carefully install force limiter (2) and insert bolts (8) and (3).
- (2) Install washer (4) and tighten nut (5). Torque to between 27 and 32 lbf.in. (0.30 and 0.36 m.daN). Safety with cotter.
- (3) Install washer (10) and tighten nut (11). Torque to between 27 and 32 lbf.in. (0.30 and 0.36 m.daN). Safety with cotter.
- (4) Remove rigging pin E925019105 from load limiting mechanism.
- (5) Remove warning notices.
- (6) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (7) Make certain that rigging pin E925019105 can be inserted or removed easily.  
If not, adjust AP force limiter length as follows :

EFFECTIVITY: ALL

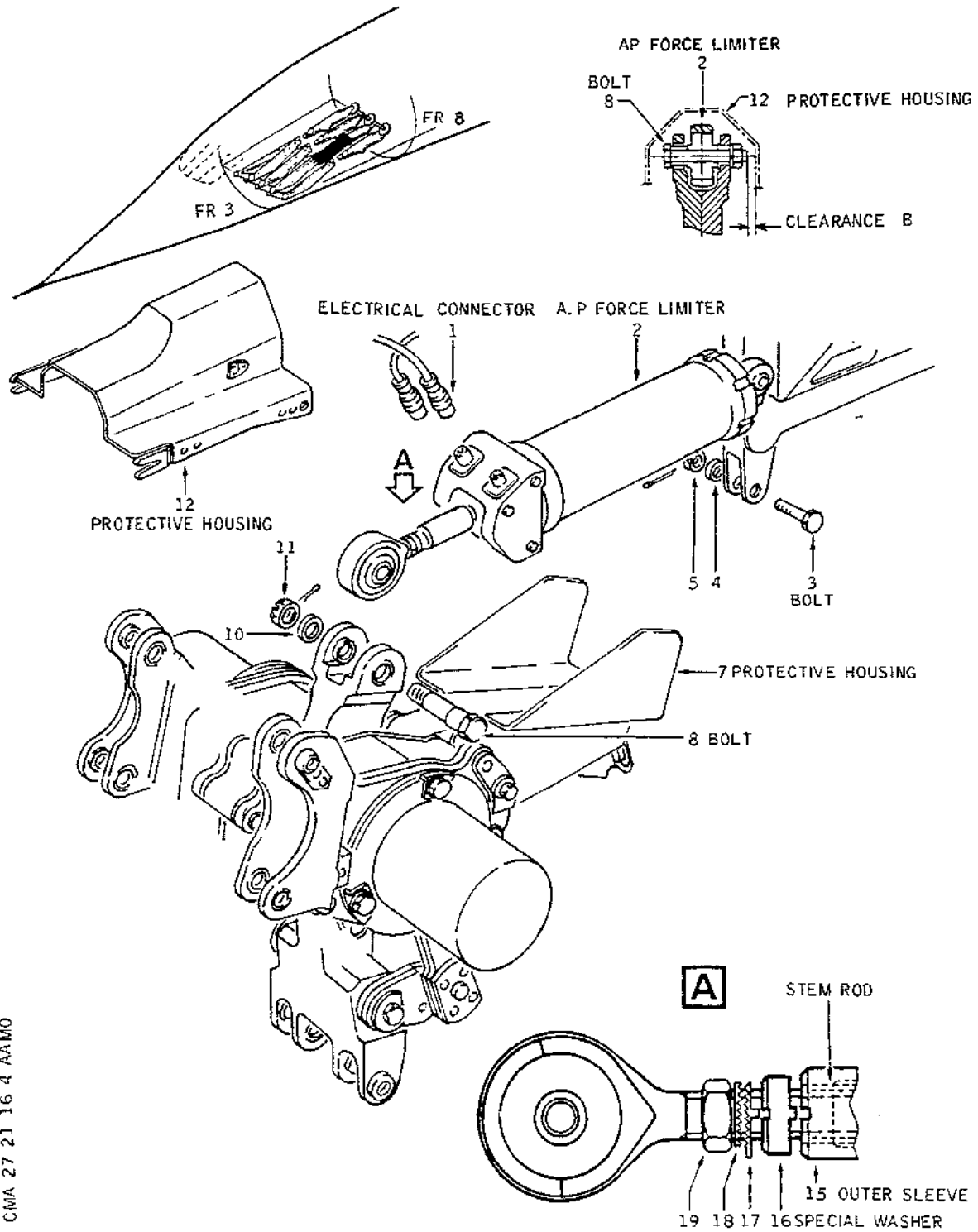
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## MAINTENANCE MANUAL



CMA 27 21 16 4 AAMO

Auto Pilot Force Limiter  
Figure 401

R

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## MAINTENANCE MANUAL

- (a) Remove rigging pin E925019105, cut lockwire and unscrew nut (19) disengage washers (18 and 17).
- (b) Maintain special washer (16) inserted in groove provided on outer sleeve (15) and rod stem.
- (c) Manually turn sleeve and rod stem to lengthen or shorten the AP force limiter until pin E925019105 can be inserted or removed freely.
- (d) Make certain that special washer (16) is inserted in groove of rod stem and outer sleeve (15).
- (e) Engage lock washer (17), tab in the slot provided on the front face of special washer (16).
- (f) Engage the second lock washer (18).
- (g) Tighten nut (19).  
Torque to between 115 and 125 lbf.in. (1.3 and 1.42 m.daN). Safety with lockwire.
- (h) Check adjustment of relay jack sensor (Ref. 22-13-61, Adjustment/Test).
- (8) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
- (9) Connect electrical connectors (1).
- (10) Install yaw resolver protective housings (7) and (12). Tighten screws and safety with lockwire (Ref. 20-21-13).

NOTE (Ref. Fig. 401 )

Check that clearance B between bolt (8) and protective housing (12) is within the following limits :

Nominal clearance : 0.1181 in. (3 mm)

Minimum clearance : 0.0138 in. (0.35 mm)

- (11) Remove items of equipment E925019014, E925019010 and rigging pin D925252002.
- (12) Remove safety clips and tags and set the following circuit breakers :

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SERVICE	PANEL	CIRCUIT BREAKER		MAP REF.
AP/FD SYS 1 CONT	1-213	1C	17	Q13
AP/FD SYS 1 SUP	2-213	1C	20	C 5
AP/FD SYS 2 CONT	5-213	2C	17	A11
AP/FD COMP 1 SUP	13-215	1C	18	A 5
AP/FD COMP 2 SUP	13-216	2C	18	F18
AP/FD SYS 2 SUP		2C	20	A17

### F. Tests

- (1) Carry out an operational test (Ref. 27-21-00, Adjustment/Test).
- (2) Carry out AP force limiter test (Ref. 22-10-00, Adjustment/Test, paragraph 3.F (3)).
- (3) Immobilize yaw resolvers with rigging pin D925252002.
- (4) Install items of equipment E925019010 and E925019014. Check that rigging pins can be inserted easily ; if not, adjust length of AP force limiter.
- (5) Remove items of equipment E925019014, E925019010 and rigging pin D925252002.
- (6) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access doors and panels 121GB, 121FB and 151DB.
- (3) Remove access platform.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### AUTO-PILOT FORCE LIMITER - INSPECTION/CHECK

#### 1. General

The purpose of the following procedure is to check the yaw channel AP force limiter.

#### 2. AP Force Limiter

##### A. Equipment and Materials

DESCRIPTION	PART NO.
-------------	----------

R Access Platform 3.672 m (12 ft)

##### B. Prepare

R (1) Open door 121FB.

R (2) Remove protective case of yaw resolvers.

##### C. Check

(1) Rod attachment on synchro pack bellcrank.

(a) Check bolt of rod yoke for absence of end play.

R (b) Check bolt nut for correct safetying.  
R Check rod adjusting nut for correct safetying.

(2) Check electrical connectors of microswitch box for correct attachment.

R (3) Check safetying condition of microswitch box nuts.

R (4) Check rod yoke attachment to the relay jack input  
R lever for absence of end play.  
R Check rod attaching bolt nut for correct safetying.

##### D. Tests

##### E. Close-Up

(1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2) Install resolver protective case.

EFFECTIVITY: ALL

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(3) Close door 121FB.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### CONTROL CABLE QUADRANT IN FIN - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The cable quadrant in fin transmits the movement of cables to the yaw linkage control rods.

#### 2. Control Cable Quadrant in Fin

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Protractor - Elevon and Rudder	TE2012
Zero Rigging Device - Relay Chassis	E925019000
Rigging Pin - Quadrant	D925422000
Rigging Pins - Synchro Pack	D925252000
Rigging Device - Upper Bellcrank	D925420000
Rigging Device - Lower Bellcrank	D925421000
Jig - Neutral Setting - Rudder	E920112000

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DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Locking Equipment - Cable Tension Regulator	D921606000
Cable Grip	D921620000
Access Platforms 3.672 m (12 ft.) 11.25 m (36 ft.11in.)	

### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Make certain that the rudder controls are in zero position.
- (3) Make certain that the yaw trim control is set to zero position.
- (4) Remove access panel 121FB and immobilize yaw resolvers with rigging pin D925252002. Open access door 121GB and install equipment D925019010 and E925019014 on the rudder linkage.
- (5) Remove access panel 151DB and depressurize the Blue, Green and Yellow hydraulic systems.

**WARNING :** DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS USED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (6) Trip, safety and tag the following circuit breaker :

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22
(7) Open floor panel 231JF allowing access to the cable turnbuckles.			
(8) Remove fairings 352BR, 352CR, 351BL and 351CL from the fin (Ref. 55-31-31, Removal/Installation) and install units of equipment D925420000 and D925421000.			
(9) Remove access panel 323MR on the fin allowing access to the control cable quadrant.			
(10) Open floor panel 215AF allowing access to cable tension regulators.			
C. Remove (Ref. Fig. 401 )			
(1) Remove cotters and unscrew nuts (21), remove washers (22) and bolts (23) attaching cable guard (24). Remove cable guard.			
(2) Remove cable stop pins (19) from the cable-end recesses on quadrant (20).			
(3) Disengage locking clips from yaw linkage cable turnbuckles.			
(4) Turn turnbuckles symmetrically until reaching a tension enabling locking equipment D921606000 to be installed on cable tension regulator.			
(5) Install locking equipment on regulator.			
(6) Slacken the yaw cable sufficiently to be able to disengage the cable ends from their recesses in the quadrant. Install equipment D92162000 to immobilize the cables.			
(7) Remove cotters and unscrew nuts (3). Remove washers (4) and (5). Remove bolts (2) and disconnect rods (1) and (14) from levers (6) of double crank (7).			
(8) Remove cotter and unscrew nuts (10) and (15), recover washers (9) and (16) and remove bolt (8) and (17)			

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attaching bearings (11) and (18) to structure.

(9) Remove cable quadrant.

### D. Preparation of Replacement Component

### E. Install

- (1) Install cable quadrant assembly in its recess.  
Install bearing (18) by means of bolts (17) washers (16) and nuts (15). Safety with cotter.  
Install bearing (11) by means of bolts (8) washers (9) and nuts (10). Safety with cotter.

**CAUTION :** NOMINAL CLEARANCE BETWEEN CABLE QUADRANT AND VENTILATION DUCT IS 10 MM (0.934 IN.). MINIMUM PERMISSIBLE CLEARANCE MUST NOT BE LESS THAN 5 MM (0.196 IN.).

- (2) Remove equipment D921620000 from cables. Install the cable ends in their recesses on quadrant (20) and install stop pins (19).
- (3) Install rigging pin D925422000 in quadrant.
- (4) Adjust cable tension (Ref. Fig. 402 )

**NOTE :** The cable tension regulator locking equipment maintains the two flanges at adjustment point 10.

- (a) Screw up the turnbuckles symmetrically until the tension is sufficient and equal on each cable to enable removal of the tension regulator locking equipment rigging pins without effort.
- (b) Remove cable tension regulator locking equipment D921606000.
- (c) Adjust the cable tension according to the graph as a function of the temperature in the equipment compartment.  
TENSION : 25 daN (56.2 lbf.).
- (d) Check that cable tension is equally distributed between cables by removing rigging pin of equipment E925019014 from rudder control and rigging pin D925422000 from quadrant (easy removal of rigging pins).
- (e) Safety the turnbuckles.

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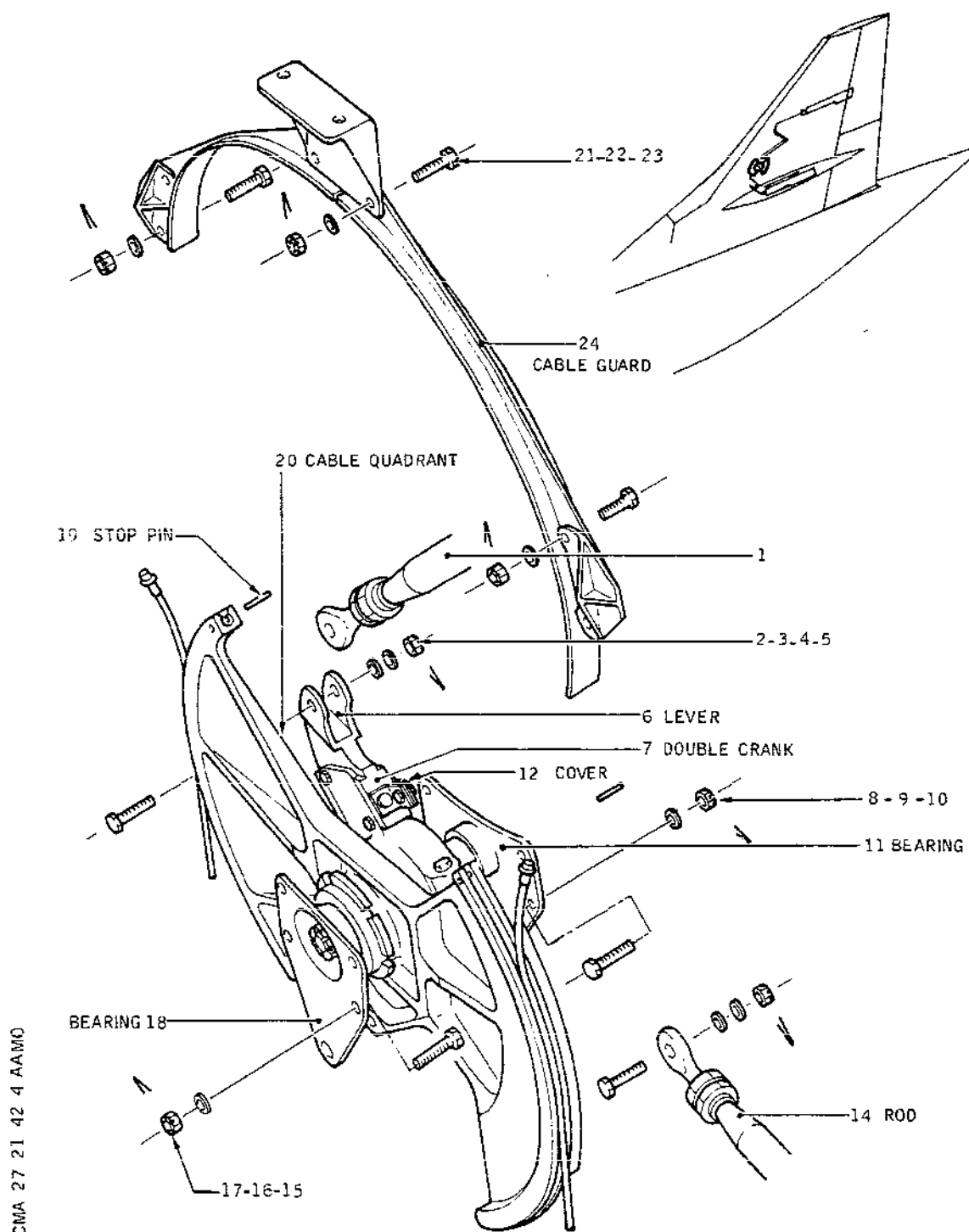
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Control Cable Quadrant in Fin  
Figure 401

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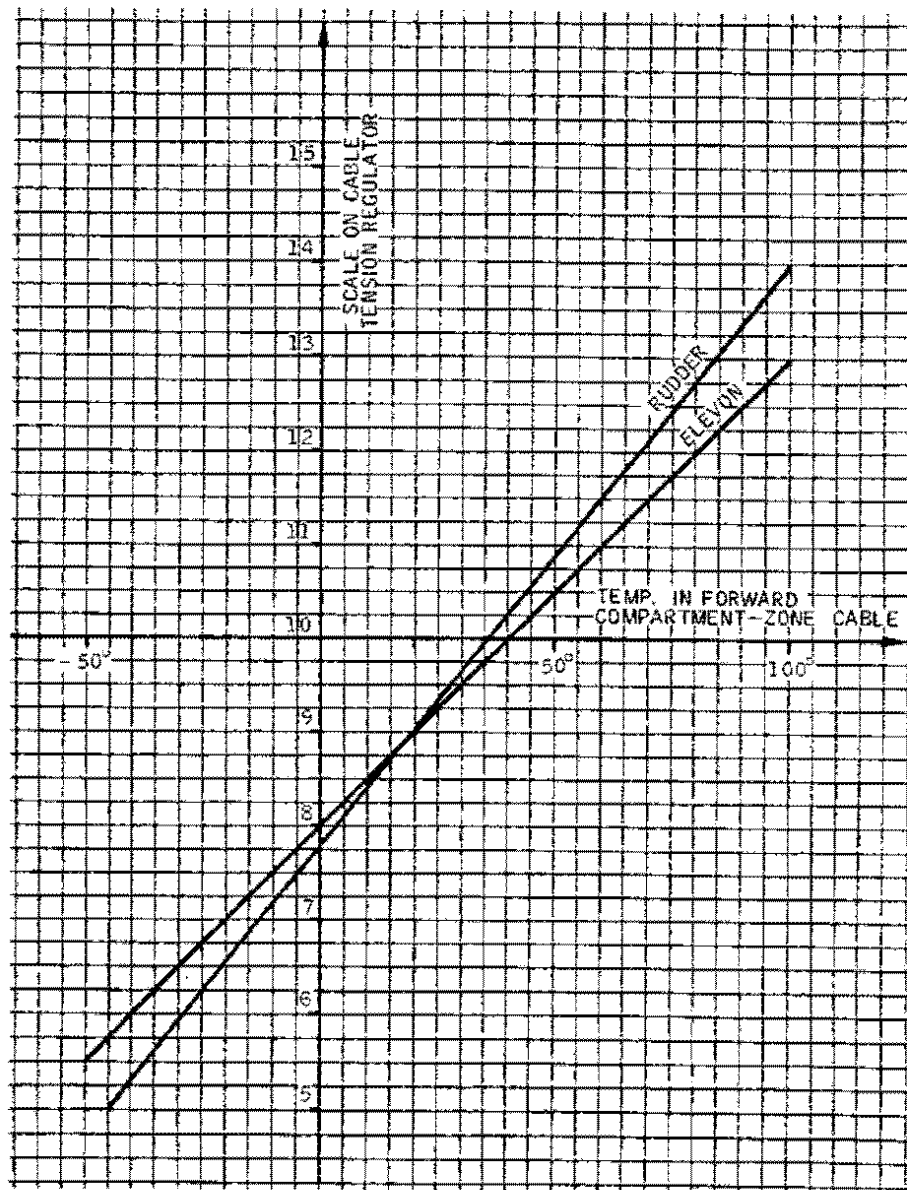
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Cable Tension Adjustment Graph as a Function  
of Temperature  
Figure 402

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- (5) Install cable guard (24) with bolts (23), washers (22) and nuts (21). Safety with cotters.
- (6) Connect rods (1) and (14) to levers (6) of double crank (7). Install bolts (2), washers (4) and (5) and nuts (3). Safety with cotters.
- (7) Adjust the two levers (6) on quadrant to their nominal length : 118,36 mm (4.66 in).  
Do not drill bolt holes (13) at this stage. Maintain levers adjusted to that length using appropriate tool.
- (8) If required, adjust length of rods (1) and (14), until marks line up on equipment D925420000 and equipment D925421000. Tighten and safety with lockwire rod adjustment system as per 20-21-13.
- (9) Install equipment E920112000. Make certain that upper and lower rudders are at neutral. (If rudders are not at neutral, disconnect actuating rods from PFCU input levers and position rudders at neutral).
- (10) Install protractors TE2012 on each section of rudder ; set them to zero. (If they have been disconnected, connect actuating rods of PFCU input levers using bolts, washers, nuts ; torque to between 0.31 and 0.37 m.daN (27.42 and 32.73 lbf.in). Safety with cotter pin.
- (11) Remove items of equipment E920112000, D925420000, D925421000, rigging pin D925422000 and items of equipment E925019014 and E925019010.
- (12) Take the precautions described in the WARNING paragraph. Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (13) Check that rigging pin D925422000 can be inserted and removed freely. Do not remove rigging pin. Check neutral position of rudders. (If required, adjust length of PFCU actuating rods so as to read zero plus or minus 2 minutes for each rudder on protractor TE2012. Lock these rods to the length thus obtained. Remove rigging pins D925422000 and D925252002.
- (14) Fully deflect rudder pedals in both directions and check that upper and lower rudders deflect 30 degrees plus or minus 30 minutes in both directions. If required, adjust length of levers (6) to obtain these deflection angles.

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**CAUTION** : Nominal clearance between rods (cable quadrant/upper and lower bellcranks) and edge of hole in spar 7 and ribs 9, 11, 13 and 14, at position of maximum travel, is 10 mm (0.394 in.).  
Minimum permissible clearance is 8 mm (0.315 in.).  
Nominal clearance between Flight Control cables and edge of holes in ribs 7 to 11 inclusive is 10 mm (0.394 in.).  
Minimum permissible clearance is 8 mm (0.315 in.).

- (15) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing ; Procedure to set Flight Controls in mechanical mode).
- (16) Drill and ream holes of bolts (13) dia : 0.25 in (6.35 mm) on levers (6) adjusted to their final length. Install bolts, washers, nuts and safety with cotter pin.
- (17) Install cover (12). Wirelock as per 20-21-13.

**NOTE** : Clearance between head of bolts (8) and cover (12) must be 0.054 in (1.37 mm) minimum.

- (18) Take the safety precautions described in the previous WARNING paragraph. Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (19) Operate yaw control several times (at least three times) and allow control to return to neutral. Check that rudder neutral position has not been modified by lever (6) adjustment. If required, adjust PFCU actuating rods to obtain zero plus or minus 2 minutes. Tighten and safety with lockwire rod adjustment system as per 20-21-13.
- (20) Remove protractors TE2012.

### F. Tests

- (1) Carry out an operational test (Ref. 27-21-00, Adjustment/Test).
- (2) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

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- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close floor panels 231JF and 215AF.
- (3) Close access doors 121FB, 121GB, 151DB, access panel 323MR, and install fairings 352BR, 352CR, 351BL and 351CL (Ref. 55-31-31, Removal/Installation).
- (4) Remove safety clip and tag and reset circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

- (5) Remove access platforms.
- (6) Remove warning notices.

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### CONTROL CABLE QUADRANT IN FIN - INSPECTION/CHECK

#### 1. General

R The purpose of the following procedure is to check the Control  
R Cable Quadrant in Fin.

#### 2. Control Cable Quadrant in Fin

##### A. Equipment and Materials

	DESCRIPTION	PART NO.
R	Access Platform 11,250 m (36 ft. 11 in.)	
	Access Platform 3,672 m (12 ft)	
R	Rigging Pins - Synchro Pack	D925252000

##### B. Prepare

- R (1) Open door 121FB, and immobilize yaw synchro pack with  
R rigging pin D925252002.
- R (2) Open access panel 323NR on fin, to gain access to  
control cable quadrant.

##### C. Check

- R (1) Check lockwiring of cable guard attaching nuts (1).
- R (2) Check safetying of rod ends (3).
- R (3) Check safetying of bolt nuts attaching rod (3) to  
R double bellcrank (8).
- R (4) On splined shaft, check safetying of double bellcrank  
R attachment bolt nut (10).
- R (5) On Double bellcrank, check safetying of screws (6).
- R (6) Check castellated nut attaching cable quadrant to its  
R spindle.
- R (7) On structure, check bearing attachment bolt nuts (9).
- R (8) Check safetying of nuts (7).

EFFECTIVITY: ALL

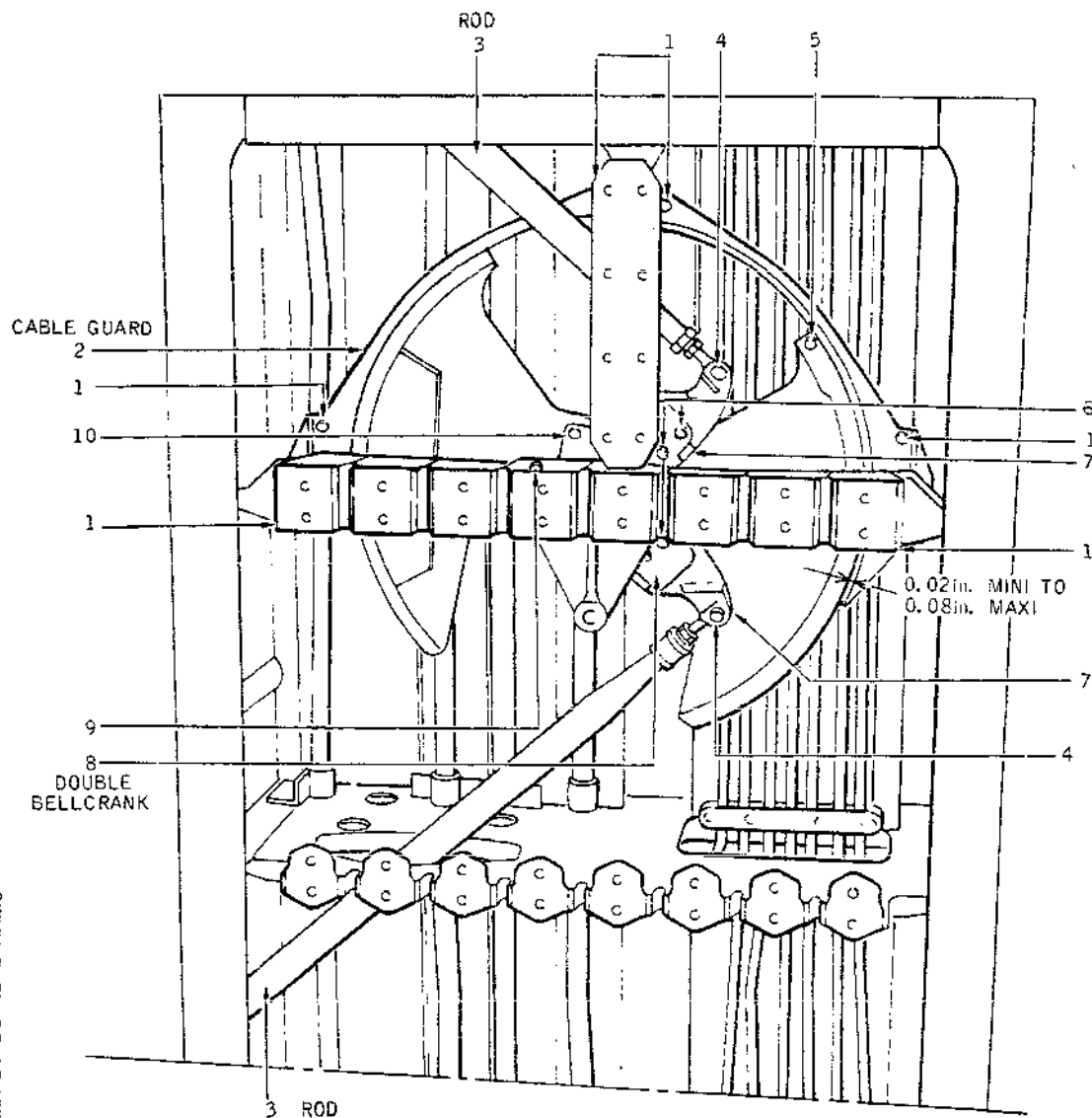
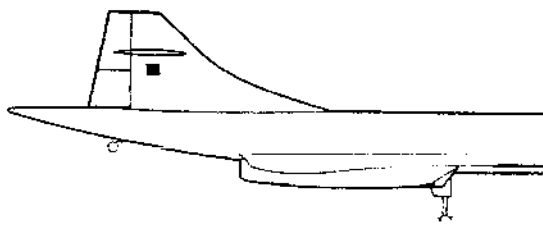
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Control Cable Quadrant in Fin  
Figure 601

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- R (9) Check quadrant grooves for wear and damage. Make  
R certain that cable stop pins are in position.
- R (10) Make certain that cable guard (2) is in good condition  
R and that clearance between cable guard and quadrant is  
R 0.02 in. minimum and 0.08 in. maximum (0.5 mm minimum  
R and 2 mm maximum).
- D. Test
- E. Close-Up
- (1) Make certain that working area is clean and clear of  
tools and miscellaneous items of equipment.
- R (2) Remove rigging pin D925252002 and close access door  
R 121FB and access panel 323NR.
- R (3) Remove access platforms.

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### UPPER BELLCRANK AT RIB 15 - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The upper bellcrank absorbs loads exerted by the control surface on yaw linkage in case of gusts on the ground.

#### 2. Upper Bellcrank at RIB15

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Device - Upper Bellcrank	D925420000
Rigging Pin - Quadrant	D925422000
Jig - Neutral Setting - Rudder	E920112000
Rigging Pins - Synchro Pack	D925252000
Circuit Breaker Safety Clips	
Access Platform 11.25 m (36 ft. 11 in.)	
Lockwire Dia. 1 mm (0.041 in.)	
Corrosion Resistant Steel	

EFFECTIVITY: ALL

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### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Make certain that the rudder controls and trim controls are in zero position.
- (3) Remove access panel 121FB and immobilize yaw resolvers with rigging pin D925252002.
- (4) Open access door 151DB and depressurize the Green, Blue and Yellow hydraulic systems.

**WARNING** : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMP.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (5) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

- (6) Open access panels 323NR and 323ML.
- (7) Remove fairings 352CR and BR.(Ref. 55-31-31, Removal/ installation).
- (8) Remove upper section of clamp blocks (2) attaching hydraulic lines.
- (9) Disconnect electrical connectors (1).
- (10) Unsafety and loosen screws (3) attaching hydraulic lines mounting (4).

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- (11) Disengage mounting (4) to make upper bellcrank assembly installation or removal easier.

C. Remove  
(Ref. Fig. 401 )

NOTE : In order to remove or install captive bolts, it is necessary to press the locking plunger located on head of bolt.

- (1) Remove cotter pin and unscrew nut (11), remove washer (12), special washer (13) and captive bolt (14). Disengage rod (10).
- (2) Remove cotter pin and unscrew nut (21), remove washer (22), special washer (23) and captive bolt (25). Disengage rod (24).
- (3) Remove cotter pin and unscrew nuts (33), remove saddle washers (34) and tapered bolts (35).
- (4) Remove lever (36).
- (5) Remove cotter pin and unscrew nut (29), remove saddle washer (30) and tapered bolt (31).
- (6) Remove rigging pin location lever (32).
- (7) Cut lockwire, and unscrew and remove special nut (28).
- (8) Remove bearing (27).
- (9) Cut lockwire, unscrew bolts (15), remove bearing housing (26).
- (10) Cut lockwire, unscrew bolts (17) disengage bearing cover (19) from bearing housing (20).

NOTE : Bearing housing (20) must not be removed.

- (11) Tilt assembly rearwards and remove through access panel 323ML.

D. Preparation of Replacement Component (Ref. Fig. 402 )

- (1) Remove cotter pin and unscrew nut (42).
- (2) Remove bearing (41) and bearing cover (19).
- (3) Remove spacer (39).

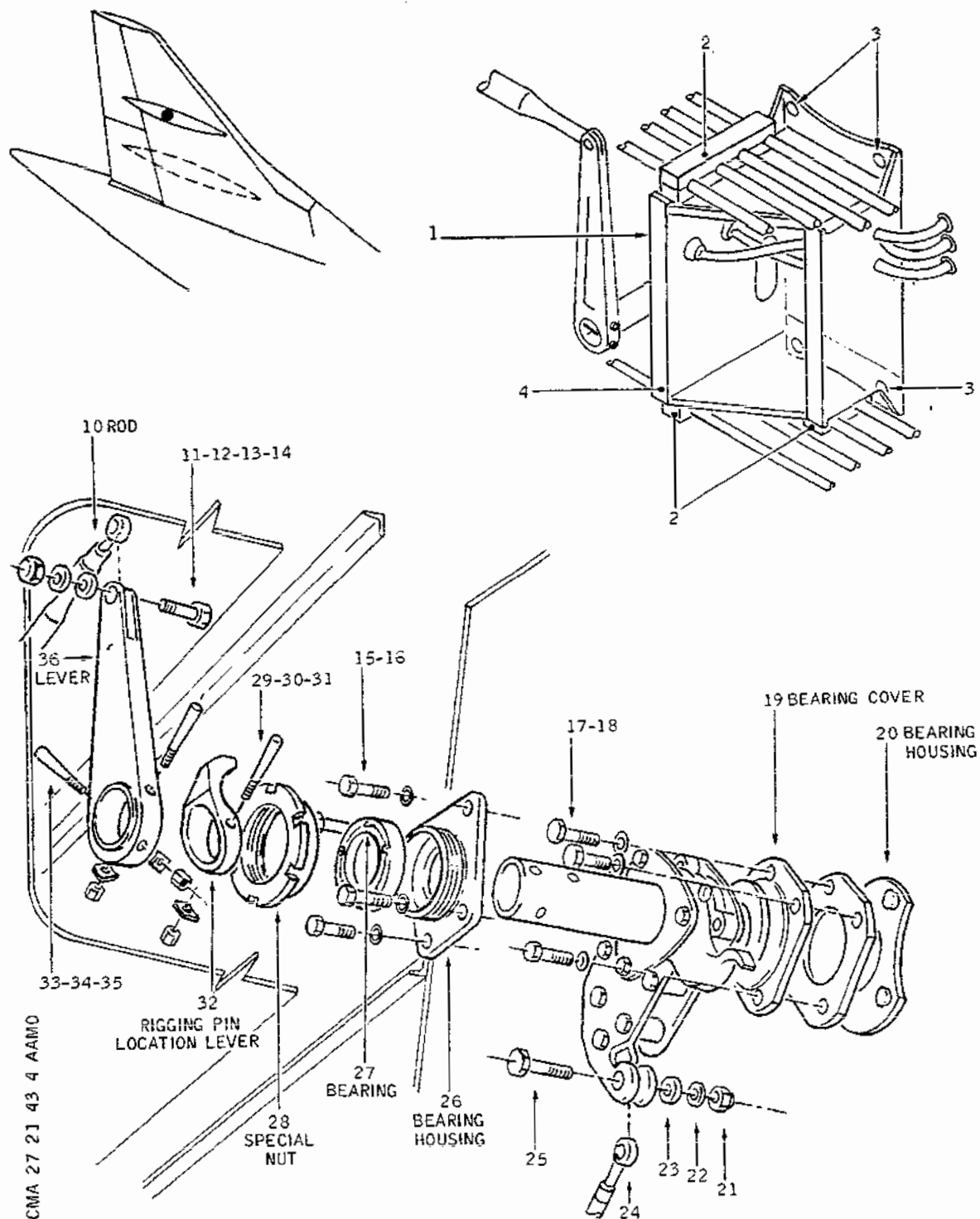
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Upper Bellcrank at RIB 15  
Figure 401

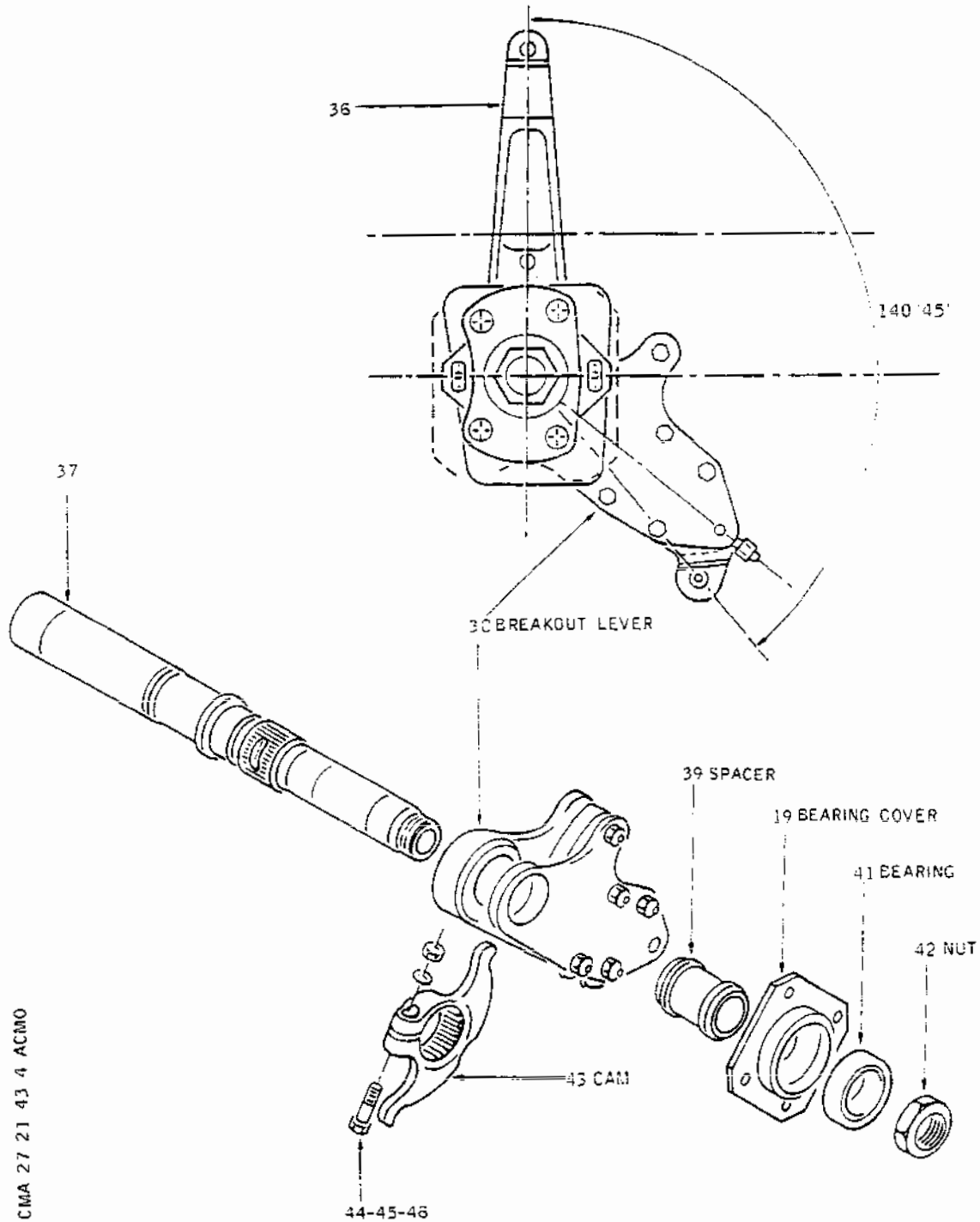
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Installation of Upper Bellcrank at RIB 15  
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- (4) Remove cotter pin and unscrew nut (46); remove bolt (44) and washer (45).
- (5) Remove breakout lever (38) with cam (43) taking care not to damage splines.
- (6) Install cam (43) between the flanges of lever (38) with the roller engaged in its location.  
Slide lever (38) on shaft (37) and engage the splines of cam (43) with the splines of shaft (37).  
Only one position of the cam on the shaft enables bolt (44) to be engaged freely.  
Install washer (45) and tighten nut (46). Safety with cotter pin.
- (7) Install spacer (39), bearing cover (19), bearing (41) and nut (42).  
Torque to between 60 and 70 lbf.in. (0.67 and 0.79 m.daN). Safety with cotter pin.

### NOTE:

- (a) If shaft (37) has been replaced, it is necessary to drill and ream new shaft (37) from holes in levers (36) and (38).  
Ream so that thread runout of tapered bolts is just clear of levers when finally torque tightened to 20 lbf.in. (0.22 m.daN).  
When shaft is completely equipped, levers (36) and (32) must be aligned and must form an angle of 140 degrees 45 minutes with lever (38).
- (b) Breakout load of lever (38) must be 20 lbf. plus or minus 5 lbf. (9 daN plus or minus 2 daN).  
Check for smooth operation throughout breakout travel of 60 degrees each side of zero position.  
Maximum load during breakout travel must not exceed 40 lbf. (18 daN).  
Restoring force must not be less than 5 lbf. (2.2 daN) within this travel.
- (c) On installation of new bearings measure and record axial end float of bearing (41) and axial movement in the ball bearing to make acceptability judgements possible during maintenance checks.

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### E. Install

- (1) Install shaft assembly in fin, aligning attachment holes of bearing cover (19) with those of bearing housing (20). Attach with bolts (17) washers (18). Torque to between 70 and 80 lbf.in. (0.79 and 0.90 m.daN). Safety with lockwire (as per 20-21-13).
- (2) Install bearing housing (26), aligning attachment holes of bearing housing (26) with those on RH bulkhead support. Attach with bolts (15) washers (16). Safety with lockwire (as per 20-21-13).
- (3) Install bearing (27) in bearing housing (26).
- (4) Install and tighten special nut (28). Torque to between 100 lbf.in. (1.29 m.daN). Safety with lockwire (as per 20-21-13).
- (5) Install rigging pin location lever (32); attach with tapered bolt (31), saddle washer (30) and tighten nut (29). Torque to between 20 lbf.in. (0.22 m.daN). Safety with cotter pin. Drill new tapered bolt (dia 0.076 in. (1.93 mm)) in order to engage cotter pin.

**NOTE:** The smooth projecting part of the tapered bolt must be between 0.15 and 0.20 in. (3.81 mm and 5.08 mm). Cut to length (Ref. 20-24-29).

- (6) Install lever (36). Attach with tapered bolts (35) saddle washers (34) nuts (33). Torque to between 20 lbf.in. (0.22 m.daN). Safety with cotter pin. Drill new tapered bolt (dia 0.076 in. (1.93 mm)) in order to engage cotter pin.

**NOTE:** The smooth projecting part of the tapered bolt must be between 0.15 and 0.20 in. (3.81 mm and 5.08 mm). Cut to length (Ref. 20-24-29).

- (7) Check that upper bellcrank assembly rotates freely.
- (8) Connect rod (24) to lever. Engage captive bolt (25), special washer (23), washer (22) and nut (21). Tighten and safety with cotter pin.
- (9) Connect rod (10) to lever (36). Engage captive bolt (14), special washer (13), washer (12) nut (11). Tighten and safety with cotter pin.

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- (10) Position mounting (4); attach with screws (3). Safety with lockwire (as per 20-21-13).
- (11) Install hydraulic lines on clamp blocks. Position upper section of clamp blocks (2) attach with washers, nuts and screws. Safety with cotter pin.
- (12) Connect electrical connectors (1).
- (13) Install equipment E920112000.
- (14) Remove warning notices and set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (15) Immobilize cable quadrant in fin with rigging pin D925422000.
- (16) Install equipment D9254520000 on upper bellcrank.
- (17) Make certain that bellcrank is at neutral. If required, adjust length of rod (24) to set bellcrank to neutral. Tighten and safety with lockwire (as per 20-21-13) rod adjustment system.
- (18) Make certain that rudder is at neutral plus or minus 2 minutes. If required, adjust length of PFCU actuating rod to set rudder to neutral plus or minus 2 minutes.
- (19) Remove equipment D925420000 and rigging pins D925422000 and D925252002.
- (20) Fully deflect rudder pedals in both directions, at least three times.
- (21) Immobilize resolvers with rigging pin D925252002.
- (22) Check that rudder is at neutral plus or minus two minutes. If required adjust length of PFCU actuating rod to set rudder to neutral plus or minus two minutes. Tighten and safety with lockwire (as per 20-21-13) rod adjustment system.
- (23) Remove rigging pin D925252002.
- (24) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in mechanical mode).
- (25) Remove equipment E920112000.

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- (26) Remove safety clips and tags and set circuit breaker M626, panel 15-216, Map Ref. F22.

### F. Test (Ref. Fig. 403)

- (1) Carry out an operational test (Ref. 27-21-00, Adjustment/Test).

During this test, check that clearance between control rod and edges of hole (in spar 7, and ribs 13 and 14) at maximum travel is :

Nominal clearance	:	10 mm (0.393 in.)
Minimum clearance	:	8 mm (0.315 in.)

Check that clearance between PFCU control and input levers and fairing support structure is :

Nominal clearance	:	10 mm (0.393 in.)
Minimum clearance	:	5 mm (0.196 in.)

Check that clearance between PFCU input lever and fairing support arch is :

Nominal clearance	:	10 mm (0.393 in.)
Minimum clearance	:	7 mm (0.275 in.)

- (2) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-95-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access doors and panels 121FB, 151DB, 323NR, 323ML.
- (3) Install fairings 352CR and 352BR. (Ref. 55-31-31, Removal/Installation).
- (4) Remove access platforms.

EFFECTIVITY: ALL

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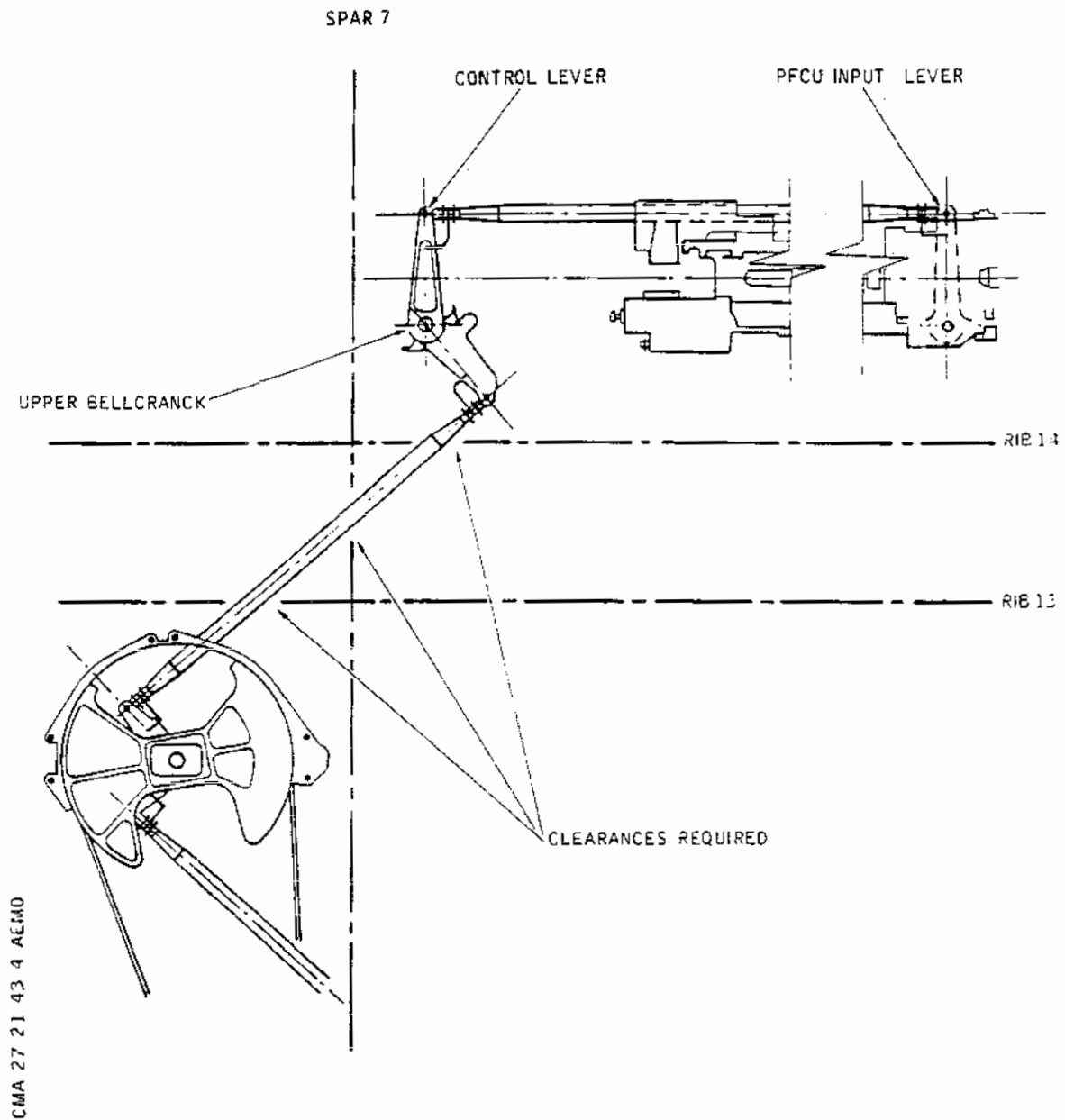
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## MAINTENANCE MANUAL



Structure/Control Rods - Clearance  
Figure 403

R

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

### UPPER BELLCRANK AT RIB 15 - INSPECTION/CHECK

R WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE,  
R MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SUR-  
R FACES ARE CLEAR.  
R MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM  
R SAFETY DEVICES ARE IN POSITION.

#### 1. General

R The purpose of the following procedure is to check during  
scheduled inspections, the disengagement and load operating  
values of upper bellcrank.

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pin - Quadrant	D925422000
Access Platform 11,25 m (36 ft. 11 in.)	
Circuit Breaker Safety Clips	
Warning Notices	

##### B. Prepare

- R (1) Take the precautions described in the previous WAR-  
R NING paragraph.
- R (2) Make certain that yaw control is in zero position  
R Make certain that yaw trim control is in zero posi-  
R tion.
- R (3) Open door 151BB, depressurize Blue, Green and Yellow  
R hydraulic systems.
- R (4) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
R HYD GRND CHECK OUT SEL R VALVE CONT	15-216	M 626	F22

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

**WARNING** : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

- (5) Open door 323NR, immobilize quadrant in fin with rigging pins.
- (6) Remove housing 352 BR.

### C. Check

- (1) Separate link rod from upper bellcrank and cable quadrant.
- (2) Separate actuating rod from PFCU input lever.
- (3) Immobilize torque tube manually or by means of any appropriate tool.
- (4) By means of a spring scale, apply a load at the end of the bellcrank on the control rod attachment point. Check that disengagement value is :  
20 lbf.  $\pm$  5 lbf. (9 daN  $\pm$  2 daN)

Effect a 60° displacement on each side of zero position. During this displacement, check that :

- Movements are free during displacement
- Maximum load during displacement, must not exceed 40 lbf. (18 daN).
- Return load must not be less than 5 lbf. (2.2 daN).

If loads exceed tolerances given above, replace mechanism.

- (5) Check shaft end float. If float exceeds the new installed value by .002 in. replace bearing (Ref Removal/Installation).
- (6) Check axial movement in the ball bearing. If movement is in excess of .0005 in. of the value recorded at installation of bearing when new, replace bearing (Ref Removal/Installation).

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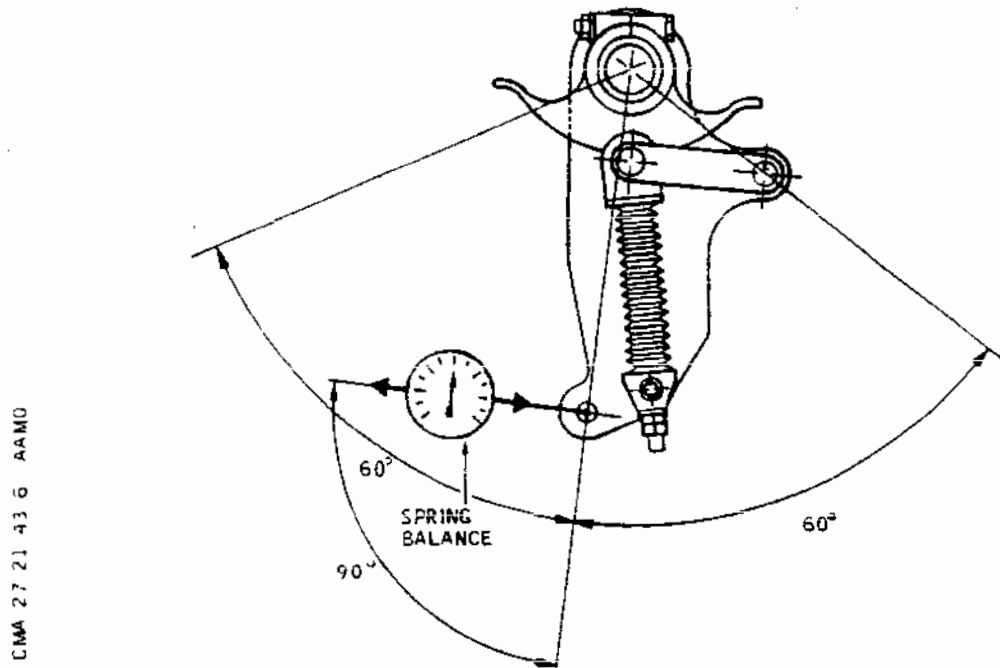
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## MAINTENANCE MANUAL

- (7) Attach link rod to upper bellcrank and cable quadrant.
- (8) Attach actuating rod to PFCU input lever.
- (9) Remove pin from cable quadrant.



Upper Bellcrank Checking  
Figure 601

### D. Tests

### E. Close-Up

- (1) Close access doors.
- (2) Install housing.
- (3) Remove warning notices.
- (4) Remove access platforms.
- (5) Remove safety clip and tag and reset circuit breaker M626.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### RUDDER LOWER SECTION - REMOVAL/INSTALLATION

**WARNING** : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

#### 2. Rudder Lower Section

##### A. Equipment and Materials

	DESCRIPTION	PART NO.
	Circuit Breaker Safety Clips	
	Tool Kit - for Installation and Removal of Rudder Hinge Pins	E925161000
	Jig - Neutral Setting - Rudder	E920112000
R	Test Set - Zero Setting - Resolvers	TE3016000
	General lubricant (Ref. 20-30-00, No.51)	
	Sling - Lower Rudder	E935034030
	Tool Kit - Rudder PFCU - Removal/Installation	E920111000
	Access Platform 11.25 m (36 ft. 11 in.)	
R	Rigging Pin - Quadrant	D925422000
R	Rigging Pin - Synchro Pack	D925252000

##### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- R (2) Make certain that flight controls are in zero position.

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## MAINTENANCE MANUAL

- R (3) Make certain that trim controls are set to zero.
- R (4) Open access door 151DB and depressurize Blue, Green and Yellow hydraulic systems.
- (5) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22
<p><u>WARNING</u> : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.</p> <p>DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.</p> <p>IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.</p>			

- R (6) Open access doors 331AL, AR, BL, BR, CR, DL and DR allowing access to rudder hinges.
- R (7) Remove rudder and PFCU fairings 351CL, DL and EL. (Ref. 55-31-31, Removal/Installation).
- (8) Remove sealing strips RL, SL, TL, TR, SR and RR.

### C. Remove

- (1) Disconnect the ground bonding leads on each hinge.
- (2) Remove cotter and unscrew nuts (13). Remove washers (12), press spring blades and remove bolts (11).
- (3) At hinge No.3, remove cotter and unscrew nut (9) : remove washers (8) and special washer (7).
- (4) At rudder hinge No.1, remove cotter and unscrew nut (5) : remove washer (4) and special washer (3).
- (5) At rudder hinge No.2, remove cotter and unscrew nut

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- (5). Remove washer (4) and special washer (3).
- (6) At rudder hinge No.4, remove cotter pin and unscrew nut (5). Remove washer (4) and special washer (3).
- (7) Install equipment E935034030.
- (8) Support rudder to be removed using lifting winch.
- (9) Remove bolts (2) and (6) using equipment E925161100 and remove rudder (1).

### D. Preparation of Replacement Component

- (1) Install equipment E935034030.

### E. Install

**CAUTION:** PRIOR TO INSTALLATION ENSURE THAT NDT TECHNIQUES K-55-U-80, K-55-U-81 AND K-55-U-82 HAVE BEEN CARRIED OUT.

- (1) Position rudder (1) and insert slave pins in hinges as follows:
  - (a) RIB 3 (PFCU level)                      slave pin E925161102
  - (b) RIB 1    slave pin E925161103
  - (c) RIB 4    slave pin E925161103
  - (d) RIB 2    slave pin E925161103
- (2) Replace successively slave pins by corresponding bolts as follows. Use equipment E925161100 to remove slave pins.

**NOTE:** Coat bolts with a light film of Product No.51 before installation.

- (a) RIB 3 (PFCU level)                      bolt (6)
  - (b) RIB 1    bolt (2)
  - (c) RIB 4    bolt (2)
  - (d) RIB 2    bolt (2)
- (3) At each hinge 1, 2 and 4, position and install special washer (3), washer (4) and tighten each nut (5).

Torque to between 112.5 and 122.5 lbf ft (15.25 and 16.6 mdaN). Safety with cotter pin.

- (4) At hinge (3), level with PFCU, position and install

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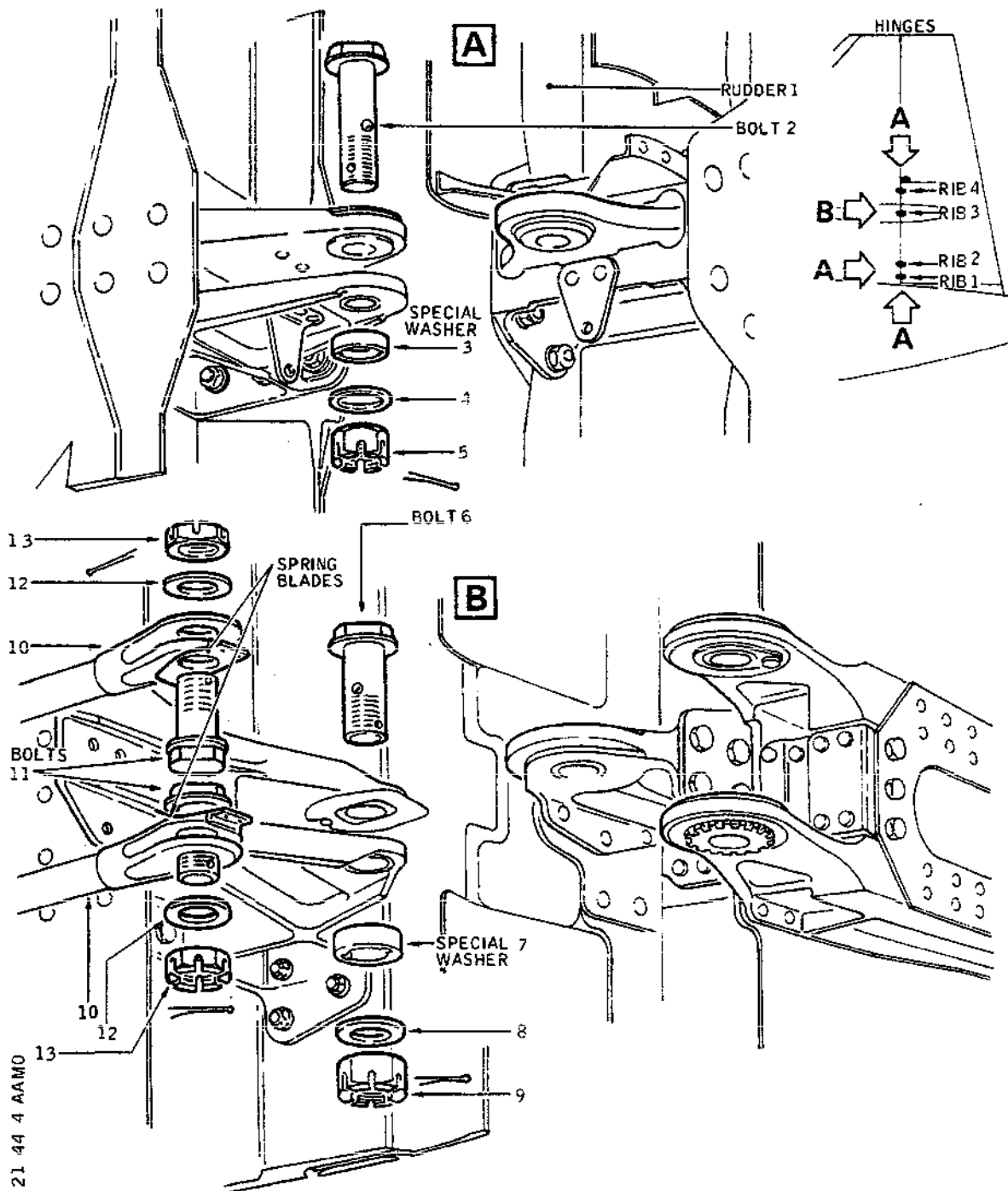
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Rudder Lower Section  
Figure 401

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special washer (7), washer (8), tighten nut (9).

Torque to between 112.5 and 122.5 lbf.ft. (15.25 and 16.6 m.daN). Safety with cotter pin.

- (5) Remove equipment E935034030.
- (6) Install equipment E920112000.
- (7) Make certain that rudder deflects freely at least 35° each side of neutral.
- (8) Place rudder in neutral position.
- R (9) Connect lower rod (10) to rudder and install bolts (11) washers (12) and tighten nuts (13).

R  
R NOTE : Coat bolts (11) with a light film of product No.51 before installation and check correct condition of spring blade.  
To insert bolt (11), it is necessary to press spring blade.  
Torque to between 137.5 and 149 lbf.ft. (18.5 and 20.2 m.daN).

- (10) Connect upper rod (10) to rudder, install bolt (11) washer (12) and tighten nut (13).  
Torque to between 137.5 and 149 lbf.ft. (18.5 and 20.2 m.daN). Safety with cotter pin.

NOTE : Upper rod (10) must be installed without forcing. If necessary adjust length of rod as follows :

- (a) On PFCU trunnion, remove cotter pin, unscrew and remove nut, shim washers ; press spring retainer of eccentric spacer and remove eccentric spacer. If necessary use extractor D921226100.
- (b) Press spring retainer and position spacer on trunnion so that bolt (11) attaching rod (10) to rudder can be easily inserted or removed.
- (c) Install shim washers on eccentric spacer and tighten nut.

Torque to between 300 and 400 lbf.in. (3.3 and 4.5 m.daN). Safety with cotter pin.  
If necessary adjust thickness of shim washers to achieve required torque loading.

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- (d) Connect rod to rudder (Ref. beginning of this paragraph (10)).
- (11) Connect the ground bonding leads. (If the ground bonding leads must be removed, make certain that the replacement leads are not stretched tight at maximum rudder deflection).
- (12) Check resolver electrical zero.
  - (a) Disconnect PFCU electrical connectors.
  - (b) Connect test set TE3016000 cables to PFCU electrical connectors.
  - (c) Supply test set with 28VDC.
  - (d) On test set, place POWER JACK AND NOSE WHEEL STEERING selector switch in BLUE CT CONTROL ELEVONS position.
  - (e) Check that rudders are at zero.
  - (f) On test set TE3016000 check that resolvers are set to zero.  
If resolvers are not set to zero carry out adjustment as follows ;  
(Ref. Fig. 402 )
    - (f1) Cut and remove lockwire from bolts (52), (54) and (55) and nut (51).
    - (f2) Slightly loosen bolts (52), (54) and (55).
    - (f3) Loosen nut (51) so that bolt (53) can be turned, but with slight resistance.
    - (f4) Turn bolt (53) in appropriate direction until adjustment indicator pointer indicates 0 degrees plus or minus 2 minutes. At the same time gradually increase test set sensitivity to maximum.
    - (f5) Tighten nut (51).  
Torque to between 0.15 and 0.17 m.daN  
(13 and 15 lbf.in.).
    - (f6) Check that electrical zero has not varied.
    - (f7) Tighten bolts (52) and (54).  
Torque to between 0.07 and 0.09 m.daN

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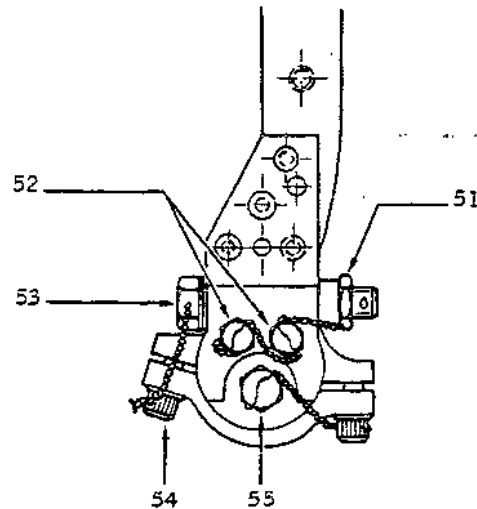
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### Resolver Electrical Zero Setting Figure 402

R

(6 and 8 lbf.in.).

R

Tighten bolt (55).

R

Torque to between 0.259 and 0.282 m.daN (23 and 25 lbf. in.).

R

R

(f8) Wirelock bolts (52) (54) and (55), nut (51) (Ref. 20-21-13).

(f9) Disconnect resolver feedback link from structure.

(f10) Disconnect Test Set from PFCU and connect aircraft circuit electrical connectors to PFCU.

(f11) Fully deflect rudder in both directions and check that in both PFCU stop positions, feedback link can be connected easily to structure.

WARNING : IN BOTH PFCU STOP POSITIONS, MAKE

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CERTAIN BEFORE CONNECTING FEEDBACK LINK TO STRUCTURE THAT THERE IS A CLEARANCE OF AT LEAST 1 mm (0.039 in.) BEFORE RESOLVERS ACHIEVE THEIR INTERNAL STOPS.

- (f12) Attach resolver feedback link to structure.  
Hollow bolt, washer, nut, bolt.  
Torque nut to between 1.12 and 1.24 m.daN (100 and 110 lbf.in.).  
Torque bolt to between 0.13 to 0.16 m.daN (12 and 15 lbf.in.). Safety with cotter pins.
- (f13) Remove warning notices and set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (f14) Open access door 121FB and immobilize yaw resolvers with rigging pin D925252002.
- (f15) Open panel 323NR and immobilize cable quadrant with rigging pin D925422000.
- (f16) Check that rudder is at neutral.  
If required adjust length of PFCU actuating rod to set rudder to neutral.  
Tighten and safety actuating rod adjustable ends.
- (f17) Remove rigging pins D925422000 and D925252000.
- (f18) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
- (f19) Close access door 121FB and panel 323NR.

- (13) Remove equipment E920112000.
- (14) Remove safety clip and tag and set circuit breaker M626, panel 15-216, Map. ref. F22.
- (15) Remove warning notices.

### F. Test

- (1) Carry out an operational test (Ref. 27-21-00, Adjustment/Test).  
During this test, check that clearance between PFCU control and input levers and fairing support structure

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is within the following limits :

Nominal clearance	10 mm (0.393 in.)
Minimum clearance	5 mm (0.196 in.)

Check that clearance between end of bolt (6), at hinge (RIB3), and lower actuating rod (10) is within the following limits :

Nominal clearance	3 mm (0.118 in.)
Minimum clearance	1 mm (0.039 in.)

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Install fairings 351CL, DL, EL (Ref. 55-31-31, Removal/Installation).  
Close access doors 331AL, AR, BL, BR, CR, DL, DR.
- (3) Install sealing strips RL, SL, TL, TR, SR and RR.
- (4) Remove access platforms.
- (5) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

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## MAINTENANCE MANUAL

### RUDDER LOWER SECTION- INSPECTION/CHECK

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The purpose of this procedure is to check the total deflection play in rudder and PFCU (Power Flight Control Unit) mechanism. It is necessary to locate and suppress play, if permissible limits are exceeded.

#### 2. Check of Play at Eye-End Fittings and Hinge Points of Lower Rudder

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Comparator	
Rigging Pin - Synchro Pack	D925252000
Rigging Pin - Quadrant	D925422000
Access Platform 36 ft. 11 in. (11.252 m) 10 ft. 7 in. (3.22 m)	
Warning Notices	

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## MAINTENANCE MANUAL

### B. Prepare

- (1) Open access doors  
121FB, access to resolvers  
323NR, access to cable quadrant in fin.
- (2) Take the precautions described in the previous WARNING paragraph.
- (3) Set Flight Controls in mechanical mode.  
(Ref. 27-00-00, Servicing).
- (4) Make certain that yaw trim control is set to zero.
- (5) Immobilize yaw mechanical linkage synchro pack with rigging pin D925252002.
- (6) Immobilize cable quadrant in fin with rigging pin D925422000.
- (7) Display a warning notice, in Flight Compartment, prohibiting operation of Flight Controls.

### C. Method for checking play at upper rudder mechanisms.

- (1) Measurement of rudder trailing edge displacement at the level of the PFCU enables the sum of play at the following mechanisms to be checked :
  - Actuating rod attachment to PFCU
  - Actuating rod attachment to rudder.
  - Rudder hinge point.
- (2) Maximum permissible play.  
Maximum permissible play at rudder trailing edge is 0.5 in. (12.7 mm).
- (3) Measurement procedure
  - (a) Apply a constant side load of 50 lbf. (22.2 daN) to the lower rudder trailing edge at the level of PFCU.  
  

NOTE : Use a load support plate to distribute load applied to rudder structure.
  - (b) With load applied, note trailing edge position with respect to fuselage fairing by means of a suction-held comparator or equivalent.
  - (c) Repeat operation of paragraph (a) above, load being applied in opposite direction.

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- (d) With load applied, note new position of rudder trailing edge with respect to fuselage fairing.
- (e) If difference between the two positions is greater than 0.5 in. (12.7 mm) check play at each eye-end fitting and hinge point (Ref. paragraph 3)

### D. Close-Up

- (1) Remove rigging pin D925422000 from cable quadrant in fin.
- (2) Remove rigging pin D925252002 from synchro pack.
- (3) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
- (4) Close access doors and panels 121FB and 323NR.
- (5) Remove tools
- (6) Remove access platforms.

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## MAINTENANCE MANUAL

### 3. Check of Play at Each Eye-End Fitting and Hinge Point

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Comparators	
Rigging Pins - Synchro Pack	D925252000
Rigging Pins - Quadrant	D925422000
Access Platforms 36 ft. 11 in. (11.252 m)	
10 ft. 7 in. (3.22 m)	
Warning Notices	

#### B. Prepare

- (1) Open access doors  
121FB access to resolvers  
323NR access to cable quadrant in fin.
- (2) Remove fairings 351CL, DL and EL.
- (3) Take the precautions described in the WARNING paragraph.
- (4) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (5) Make certain that yaw trim control is set to zero.
- (6) Immobilize yaw linkage synchro pack with rigging pin D925252002.
- (7) Immobilize cable quadrant in fin with rigging pin D925422000.
- (8) Display a warning notice, in Flight Compartment, prohibiting operation of Flight Controls.

#### C. Check Method (Ref. Fig. 601 )

- (1) Measurement points and permissible play.
  - (a) Check of rudder hinge play shall be carried out by

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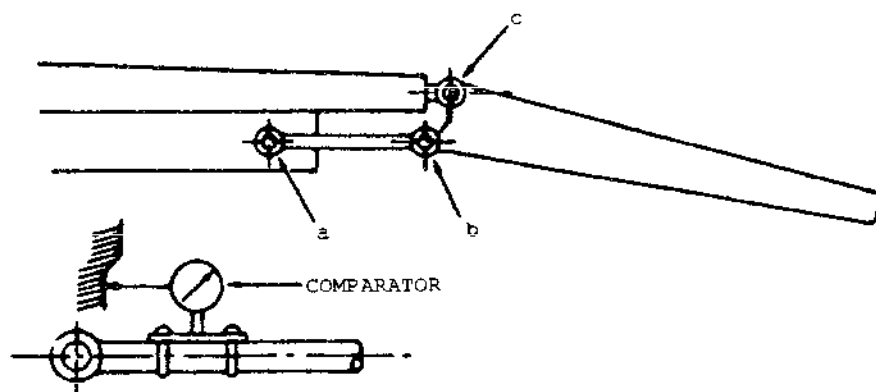
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Play Check  
Figure 601

measuring play at the three following points:

- "a" Actuating rod attachment to PFCU
- "b" Actuating rod attachment to rudder
- "c" Rudder hinge point.

- (b) Permissible play at each eye-end fitting or hinge point.

"a" Maximum permissible 0.020 in. (0.508 mm)

"b" Maximum permissible 0.020 in. (0.508 mm)

"c" Maximum permissible 0.015 in. (0.381 mm)

With a total play of 0.030 in. (0.762 mm) for points "a" and "b".

### (2) Measurement Procedure

**NOTE:** Measurements at points "a" and "b" shall be carried out following procedure described below; for point "c", measurement shall be carried out with rudder removed.

- (a) Disconnect upper actuating rod, between rudder and PFCU, from rudder.

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- (b) For each measurement point "a" and "b", install a comparator on one of the two components, the stylus being in contact with the other.  
(Ref. Fig. 601 )
- (c) Apply a constant side load of 50 lbf. (22.2 daN) to lower rudder trailing edge at the level of PFCU.  
  
NOTE : Use a load support plate to distribute load applied to rudder structure. Read displacement on comparators.
- (d) Without removing comparator, repeat operation of paragraph (c) above, with load applied in opposite direction.  
Read displacement on comparators.
- (e) Replace components having play out of tolerance  
(Ref. Approved Repairs).
- (f) Connect upper actuating rod to rudder.  
Bolt, washers, nut.  
Torque to between 137.5 and 149 lbf.ft.  
(18.6 and 20.2 m.daN). Safety with cotter pin.
- (g) Disconnect lower actuating rod, between rudder and PFCU, from rudder.
- (h) Repeat operations of the previous paragraphs (b), (c), (d) and (e).
- (i) Connect lower actuating rod to rudder.  
Bolt, washers, nut.  
Torque to between 137.5 and 149 lbf.ft.  
(18.6 and 20.2 m.daN).  
Safety with cotter pin.
- (j) Remove comparators.

### D. Close-Up

- (1) Remove rigging pin D92542200 from cable quadrant.
- (2) Remove rigging pin D925252002 from synchro pack.
- (3) Shut down pressurization of hydraulic systems  
(Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
- (4) Close access doors and panels 121FB and 323NR.

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- (5) Install fairings 351CL, DL, and EL.
- (6) Remove tools.
- (7) Remove access platforms.

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## MAINTENANCE MANUAL

### RUDDER UPPER SECTION - REMOVAL/INSTALLATION

**WARNING** : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

#### 2. Rudder Upper Section

##### A. Equipment and Materials

	DESCRIPTION	PART NO.
	Circuit Breaker Safety Clips	
	Tool Kit - For Installation and Removal of Rudder Hinge Pins	E925161000
	Jig-Neutral Setting-Rudder	E920112000
R	Test Set - Zero Setting - Resolvers	TE3016000
	Tool Kit - Rudder PFCU - Removal Installation	E920111000
	Sling - Upper Rudder	E935034031
	General Lubricant (Ref. 20-30-00, No.51)	
	Access Platform 11.25 m (36 ft. 11 in.)	
R	Rigging Pin - Quadrant	D925422000
R	Rigging Pin - Synchro Pack	D925252000

##### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- R (2) Make certain that flight controls are in zero position.

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## MAINTENANCE MANUAL

- R (3) Make certain that trim controls are set to zero.
- R (4) Open access door 151DB and depressurize Blue, Green and Yellow hydraulic systems.
- (5) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22
<p><u>WARNING</u> : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.</p> <p>DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.</p> <p>IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT, PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.</p>			

- R (6) Open access doors 332AL, AR, BL, CL, DL, EL, ER, FL, FR allowing access to rudder hinges.
- (7) Remove sealing strips TL, UL, VL, VR, UR and TR
- R (8) Remove rudder and PFCU fairings 352CR, DR and ER (Ref. 55-31-31, Removal/Installation).

### C. Remove

- (1) Disconnect the ground bonding leads on each hinge.
- (2) Remove cotter and unscrew nuts (5). Remove washers (6), press spring blades and remove bolts (7).
- (3) At the rudder hinge, level with PFCU, remove cotter and unscrew nuts (10) : remove washer (9), and special washers (8).
- (4) At rudder hinge No.8, remove cotter and unscrew nut (4) : remove washer (3) and special washer (2).

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- (5) At rudder hinge No.7, remove cotter pin and unscrew nut (4). Remove washer (3) and special washer (2).
- (6) At rudder hinge No.5, remove cotter pin and unscrew nut (4). Remove washer (3) and special washer (2).
- (7) Install equipment E935034031.
- (8) Support rudder to be removed using lifting winch.
- (9) Remove bolts (1) and (11) using equipment E925161100 and remove rudder.

### D. Preparation of Replacement Component

- (1) Install equipment E935034031 on replacement rudder.

### E. Install

RB CAUTION: PRIOR TO INSTALLATION ENSURE THAT NDT TECHNIQUES  
RB K-55-U-80, K-55-U-81 AND K-55-U-82 HAVE BEEN  
RB CARRIED OUT.

- (1) Position upper rudder and insert slave pins in hinges as follows:
  - (a) RIB 6 (PFCU level)                      slave pin E925161102
  - (b) RIB 8    slave pin E925161103
  - (c) RIB 5    slave pin E925161103
  - (d) RIB 7    slave pin E925161103
- (2) Replace successively slave pins by corresponding bolts. Use equipment E925161100 to remove slave pins, as follows:

NOTE: Coat bolts with a light film of Product No.51 before installation.

- (a) RIB 6 (PFCU level)                      bolt (11)
  - (b) RIB 8    bolt (1)
  - (c) RIB 5    bolt (1)
  - (d) RIB 7    bolt (1)
- (3) At each hinge 5, 7 and 8 position and install special washer (2), washer (3) and tighten each nut (4).

Torque to between 112.5 and 122.5 lbf ft (15.25 and 16.6 mdaN). Safety with cotter pin.

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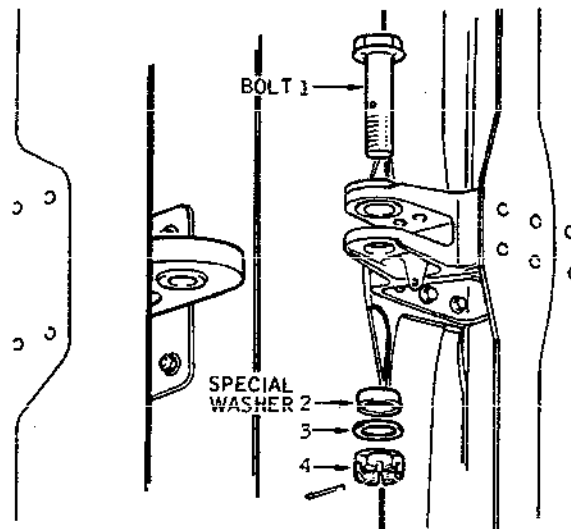
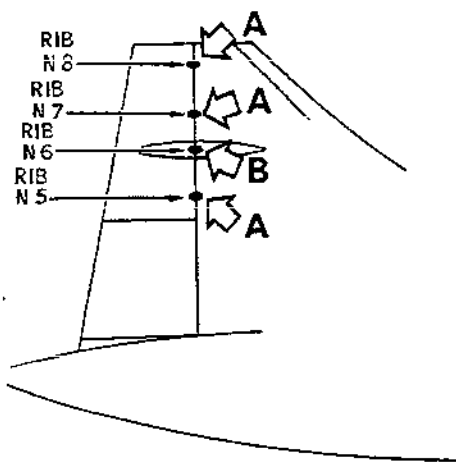
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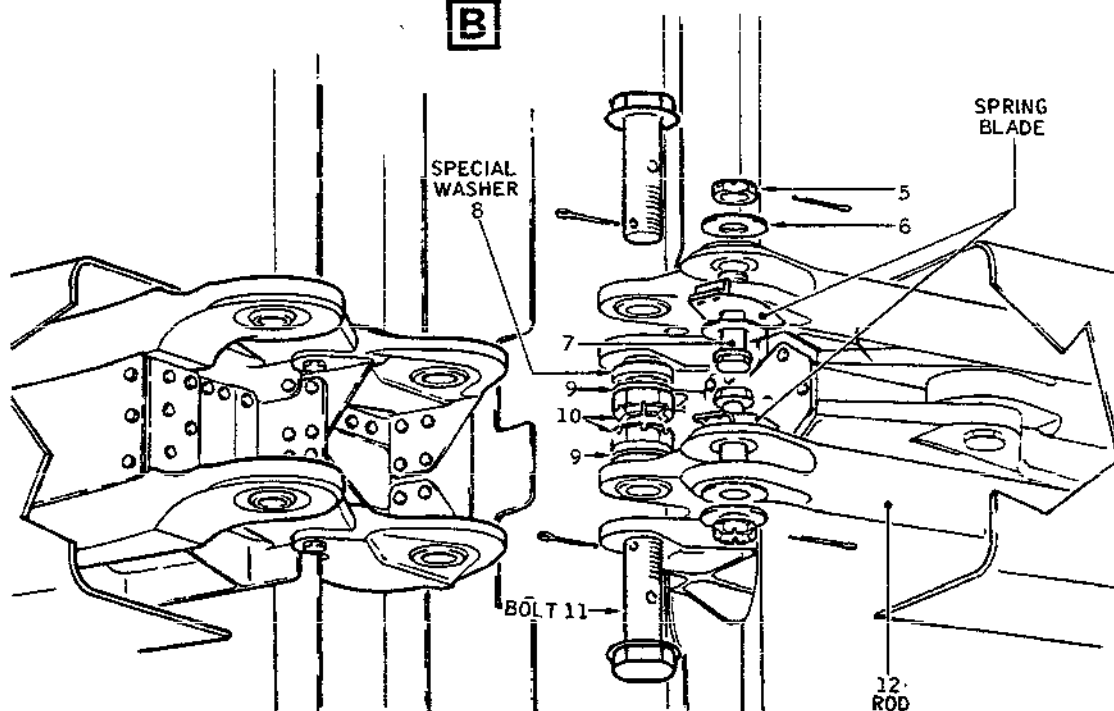
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**A**



**B**

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Rudder Upper Section  
Figure 401

R

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- (4) At hinges 6, level with PFCU, position and install special washers (8), washers (9), tighten nuts (10).

Torque to between 83.33 and 91.66 lbf. ft. (11.29 and 12.42 m.daN). Safety with cotter pin.

NOTE : In order to line up the nut slot with the pin hole it is necessary to use shim washers between washers (9) and special washers (8).

It is advisable to use a minimum of shim washers. The total thickness must not exceed 0.02 in. (0.5 mm).

- (5) Remove equipment E935034031.
- (6) Install equipment E920112000.
- (7) Make certain that rudder deflects freely at least 35° each side of neutral.
- (8) Place rudder in neutral position.

- R (9) Connect lower rod (12) to rudder and engage bolt (7), washer (6) and tighten nut (5).

Torque to between 137.5 and 149 lbf. ft. (18.5 and 20.2 m.daN). Safety with cotter pin.

R NOTE : Coat bolts (7) with a light film of product  
R No.51 before installation and check correct  
R condition of spring blade.  
To insert bolt (7), it is necessary to press  
edge of spring blade.

- (10) Connect upper rod (12) to rudder, install bolt (7), washer (6), tighten nut (5).  
Torque to between 137.5 and 149 lbf.ft (18.5 and 20.2 m.daN). Safety with cotter pin.

NOTE : Upper rod (12) must be installed without forcing. If necessary adjust length of rod as follows.

- (a) On PFCU trunnion, remove cotter pin, unscrew and remove nut, shim washer ; press spring retainer of eccentric spacer and remove eccentric spacer. If necessary use extractor D921226100.
- (b) Press spring retainer and position spacer on

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trunnion, so that bolt (7) attaching rod (12) to rudder can be easily inserted or removed.

- (c) Install shim washers on eccentric spacer and tighten nut.  
Torque to between 300 and 400 lbf.in (3.3 and 4.5 m.daN). Safety with cotter pin.  
If necessary adjust thickness of shim washers to achieve required torque loading.

- (d) Connect rod to rudder (Ref. beginning of this paragraph (10)).

- (11) Connect the ground bonding leads. (If the ground bonding leads must be renewed, make certain that the replacement leads are not stretched tight at maximum rudder deflection).

- (12) Check resolver electrical zero.

- (a) Disconnect PFCU electrical connectors.

- (b) Connect Test set TE3016000 cables to PFCU electrical connectors.

- (c) Supply test set with 28VDC.

- (d) On test set, place POWER JACK AND NOSE WHEEL STEERING selector switch in BLUE CT CONTROL ELEVONS position.

- (e) Check that rudders are at zero.

- (f) On Test set TE3016000 check that resolvers are set to zero.  
If resolvers are not set to zero, carry out adjustment as follows ;  
(Ref. Fig. 402 )

- R (f1) Cut and remove lockwire from bolts (52), (54)
- R and (55) and nut (51).

- R (f2) Slightly loosen bolts (52), (54) and (55).

- (f3) Loosen nut (51) so that bolt (53) can be turned, but with slight resistance.

- (f4) Turn bolt (53) in appropriate direction until adjustment indicator pointer indicates 0 degrees plus or minus 2 minutes.  
At the same time, gradually increase test

EFFECTIVITY: ALL

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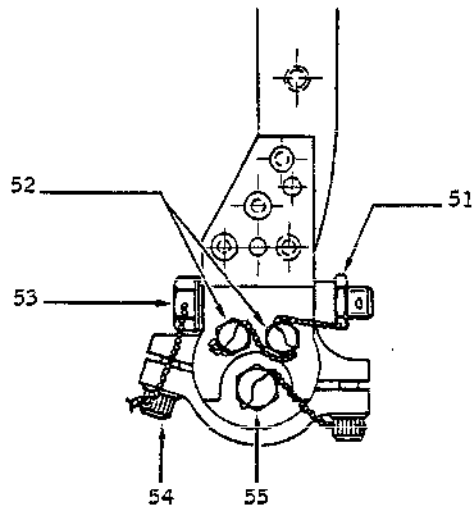
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### Resolver Electrical Zero Setting Figure 402

set sensitivity to maximum.

- (f5) Tighten nut (51).  
Torque to between 0.15 and 0.17 m.daN  
(13 and 15 lbf.in.).
- (f6) Check that electrical zero has not varied.
- (f7) Tighten bolts (52) and (54).  
Torque to between 0.07 and 0.09 m.daN  
(6 and 8 lbf.in.).
- Tighten bolt (55).  
Torque to between 0.259 and 0.282 m.daN (23  
and 25 lbf. in.).
- (f8) Wirelock bolts (52) (54) (55), nut 51  
(Ref. 20-21-13).
- (f9) Disconnect resolver feedback link from  
structure.

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(f10) Disconnect test set from PFCU, and connect aircraft circuit electrical connectors to PFCU.

(f11) Fully deflect rudder in both directions and check that in both PFCU stop positions, feedback link can be connected easily to structure.

WARNING : IN BOTH PFCU STOP POSITIONS, MAKE CERTAIN BEFORE CONNECTING FEEDBACK LINK TO STRUCTURE THAT THERE IS A CLEARANCE OF AT LEAST 1 mm (0.039 in.) BEFORE RESOLVERS ACHIEVE THEIR INTERNAL STOPS.

R

(f12) Attach resolver feedback link to structure. Hollow bolt, washer, nut, bolt. Torque nut to between 1.12 and 1.24 m.daN (100 and 110 lbf.in.). Torque bolt to between 0.13 and 0.16 m.daN (12 and 15 lbf.in.). Safety with cotter pins.

(f13) Remove warning notices and set flight controls in mechanical mode (Ref. 27-00-00, Servicing).

(f14) Open access door 121FB and immobilize yaw resolvers with rigging pin D925252002.

(f15) Open panel 323NR and immobilize cable quadrant with rigging pin D925422000.

(f16) Check that rudder is at neutral. If required adjust length of PFCU actuating rod to set rudder to neutral. Tighten and safety actuating rod adjustable ends.

(f17) Remove rigging pins D925422000 and D925252000.

(f18) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).

(f19) Close access door 121FB and access panel 323NR.

(13) Remove equipment E920112000.

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(14) Remove safety clip and tag and set circuit breaker M626, panel 15-216, Map ref. F22.

(15) Remove warning notices.

### F. Test

(1) Carry out an operational test (Ref. 27-21-00, Adjustment/Test).  
During this test, check that clearance between PFCU control and input levers and fairing support structure is within the following limits :

Nominal clearance : 10 mm (0.393 in.)

Minimum clearance : 5 mm (0.196 in.)

(2) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

(1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2) Install fairings 352CR, DR, ER (Ref. 55-31-31, Removal/Installation).  
Close access doors 332AL, AR, BL, CL, DL, EL, ER, FL, FR.

(3) Install sealing strips TL, UL, VL, WL, VR, UR and TR

(4) Remove access platforms.

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## MAINTENANCE MANUAL

### RUDDER UPPER SECTION - INSPECTION/CHECK

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The purpose of this procedure is to check the total deflection play in rudder and PFCU (Power Flight Control Unit) mechanisms. It is necessary to locate play and suppress it, if permissible limits are exceeded.

#### 2. Check of Play at Eye-End Fittings and Hinge Points of Upper Rudder

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins - Synchro Pack	D925252000
Rigging Pin - Quadrant	D925422000
Access Platform 36 ft. 11 in. (11.252 m) 10 ft. 7 in. (3.22 m)	
Warning Notices	
Comparator	

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### B. Prepare

- (1) Open access doors  
121FB, access to resolvers  
323NR, access to cable quadrant in fin.
- (2) Take the precautions described in the previous WARNING paragraph.
- (3) Set Flight Controls in mechanical mode  
(Ref. 27-00-00, Servicing).
- (4) Make certain that yaw trim control is set to zero.
- (5) Immobilize synchro pack of yaw linkage with rigging pin D925252002.
- (6) Immobilize cable quadrant in fin with rigging pin D925422000.
- (7) Display a warning notice in flight compartment.

### C. Method for checking play at upper rudder mechanisms

- (1) Measurement of rudder trailing edge displacement at the level of the PFCU enables the sum of play at the following mechanisms to be checked :
  - actuating rod attachment to PFCU
  - actuating rod attachment to rudder
  - rudder hinge point.
- (2) Maximum permissible play  
Maximum permissible play at upper rudder trailing edge is 0.35 in. (8.9 mm).
- (3) Measurement procedure.

- (a) Apply a constant side load of 50 lbf. (22.2 daN) to the upper rudder trailing edge at the level of PFCU.

NOTE : Use a load support plate to distribute load applied to rudder structure.

- (b) With load applied, note rudder trailing edge position with respect to lower rudder trailing edge by means of a suction-held comparator or equivalent.
- (c) Repeat operation of paragraph (a) above, load being applied in opposite direction.

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- (d) With load applied note new position of rudder trailing edge with respect to lower rudder trailing edge.
- (e) If difference between the two positions is greater than 0.35 in. (8.9 mm) check play at each eye-end fitting and hinge point (Ref. paragraph 3)

### D. Close-Up

- (1) Remove rigging pin D925422000 from cable quadrant in fin.
- (2) Remove rigging pin D925252002 from synchro pack.
- (3) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
- (4) Close access doors and panels 121FB and 323NR.
- (5) Remove tools.
- (6) Remove access platforms.

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### 3. Check of Play at Each Eye-End Fitting and Hinge Point

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Comparators	
Rigging Pins - Synchro Pack	D925252000
Rigging Pin - Quadrant	D925422000
Access Platform 36 ft. 11 in. (11.252 m) 10 ft. 7 in. (3.22 m)	
Warning Notices	

#### B. Prepare

- (1) Open access doors  
121FB access to resolvers  
323NR access to cable quadrant in fin.
- (2) Remove fairings 352ER, DR and CR.
- (3) Take the precautions described in the WARNING paragraph.
- (4) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (5) Make certain that yaw trim control is set to zero.
- (6) Immobilize yaw linkage synchro pack with rigging pin D925252002.
- (7) Immobilize cable quadrant in fin with rigging pin D925422000.
- (8) Display a warning notice, in Flight Compartment, prohibiting operation of Flight Controls.

#### C. Check method (Ref. Fig. 601 )

- (1) Measurement points and permissible play
  - (a) Check of rudder hinge play shall be carried out

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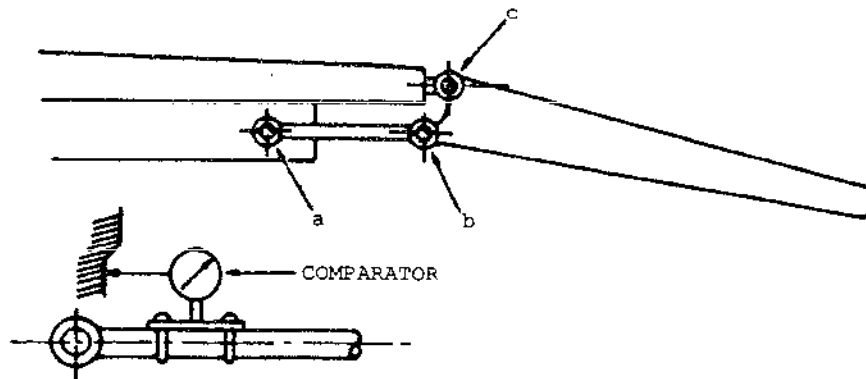
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Play Check  
Figure 601

by measuring play at the three following points:  
"a" Actuating rod attachment to PFCU  
"b" Actuating rod attachment to rudder  
"c" Rudder hinge point.

(b) Permissible play at each eye-end fitting or hinge point.

"a" Maximum permissible 0.020 in. (0.508 mm)

"b" Maximum permissible 0.020 in. (0.508 mm)

"c" Maximum permissible 0.015 in. (0.381 mm)

With a total play of 0.030 in. (0.762 mm) for points "a" and "b".

### (2) Measurement Procedure

NOTE: Measurements at points "a" and "b" shall be carried out following procedure described below; for point "c", measurement shall be carried out with rudder removed.

(a) Disconnect upper actuating rod, between rudder and PFCU, from rudder.

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(b) For each measurement point "a" and "b", install a comparator on one of the two components, the stylus being in contact with the other.  
(Ref. Fig. 601 )

(c) Apply a constant side load of 50 lbf. (22.2 daN) to upper rudder trailing edge at the level of PFCU.

NOTE : Use a load support plate to distribute load applied to rudder structure.  
Read displacement on comparators.

(d) Without removing comparator, repeat operation of paragraph (c) above with load applied in opposite direction.  
Read displacement on comparators.

(e) Replace components having play out of tolerance  
(Ref. Approved Repairs).

(f) Connect upper actuating rod to rudder.  
Bolt, washers, nut.  
Torque to between 137.5 and 149 lbf. ft.  
(18.6 to 20.2 m.daN).  
Safety with cotter pin.

(g) Disconnect lower actuating rod, between PFCU and rudder, from rudder.

(h) Repeat operations of previous paragraphs (b), (c), (d) and (e).

(i) Connect lower actuating rod to rudder.  
Bolts, washers, nut.  
Torque to between 137.5 and 149 lbf. ft.  
(18.6 and 20.2 m.daN).  
Safety with cotter pin.

(j) Remove comparators.

### D. Close-Up

- (1) Remove rigging pin D925422000 from cable quadrant.
- (2) Remove rigging pin D925252002 from synchro pack.
- (3) Shut down pressurization of hydraulic systems  
(Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).

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- (4) Close access doors and panels 121FB and 323NR.
- (5) Install fairings 353ER, DR and CR.
- (6) Remove tools.
- (7) Remove access platforms.

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## MAINTENANCE MANUAL

### LOWER BELLCRANK AT RIB 8 - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The lower bellcrank absorbs loads exerted by the control surface on the yaw linkage in case of gusts on the ground.

#### 2. Lower Bellcrank at RIB 8

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Device - Lower Bellcrank	D925421000
Rigging Pin - Quadrant	D925422000
Jig - Neutral Setting - Rudder	G920112000
Rigging Pins - Synchro Pack	D925252000
Circuit Breaker Safety Clips	
Lockwire Dia. 1.00 mm (0.041 in.) Corrosion Resistant Steel	
Access Platform 11,25 m (36 ft. 11 in.)	

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### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Make certain that Flight controls and yaw trim control are in zero position.
- (3) Remove access panel 121FB and immobilize yaw resolvers with rigging pin D925252002.
- (4) Open access door 151DB and depressurize the Blue, Green and Yellow hydraulic systems.

**WARNING :** DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS USED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (5) Trip, safety and tag the following circuit breaker

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRN CHECK OUT SEL VALVE CONT	15-216	M 626	F22

- (6) Open access panel 323NR.
- (7) Remove fairings 351BL and CL (Ref. 55-31-31. Removal/Installation), and door 323LR allowing access to lower bellcrank.
- (8) Remove upper section of clamp blocks (1) attaching hydraulic lines.
- (9) Disconnect electrical connectors (5).
- (10) Unsafety and loosen screws (4) attaching hydraulic lines mounting (2).

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(11) Disengage mounting (2) to make lower bellcrank removal or installation easier.

C. Remove  
(Ref. Fig. 401 )

NOTE : In order to remove or install captive bolts it is necessary to press the locking plunger located on head of bolt.

- (1) Remove cotter pin and unscrew nut (26), remove washer (27), special washer (28) and captive bolt (29). Disengage rod (25).
- (2) Remove cotter pin and unscrew nut (11), remove washer (12) special washer (13) and captive bolt (15). Disengage rod (14).
- (3) Remove cotter pins and unscrew nuts (24), remove saddle washers (23) and tapered bolts (20).
- (4) Remove lever (30).
- (5) Remove cotter pin and unscrew nut (22), remove saddle washer (21) and tapered bolts (32).
- (6) Remove rigging pin location lever (31).
- (7) Cut lockwire, unscrew and remove special nut (19).
- (8) Remove bearing (17).
- (9) Cut lockwire and unscrew bolts (18). Remove bearing housing (16).
- (10) Cut lockwire and unscrew bolts (34), disengage bearing cover (10) from bearing housing (9).

NOTE : Bearing housing (9) must not be removed.

- (11) Tilt assembly rearwards and remove through access panel 323NR.

D. Preparation of Replacement Component (Ref. Fig. 402 )

- (1) Remove cotter pin and unscrew nut (36).
- (2) Remove bearing (37) and bearing cover (10).
- (3) Remove spacer (38).

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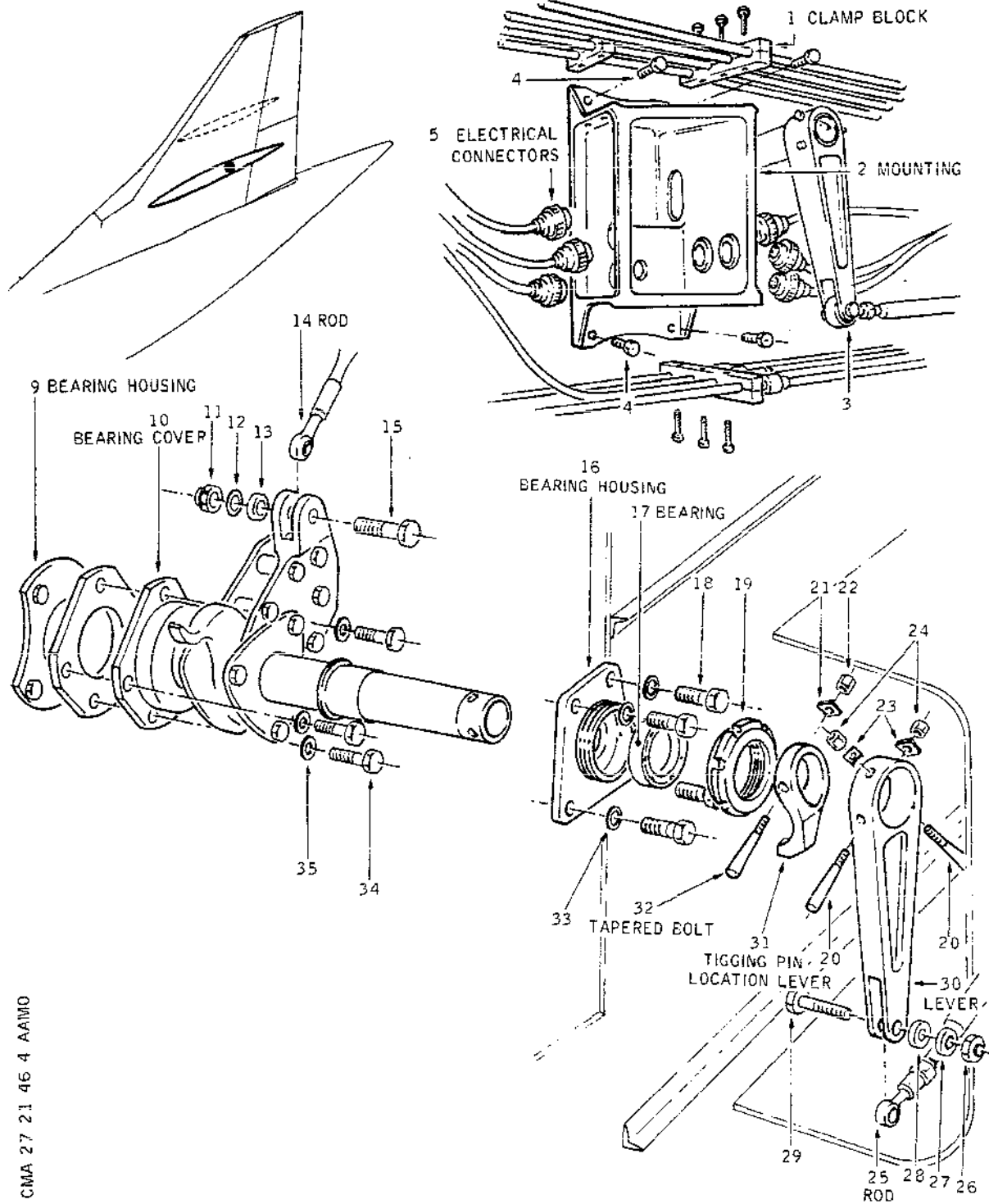
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Lower Bellcrank at RIB 8  
Figure 401

R

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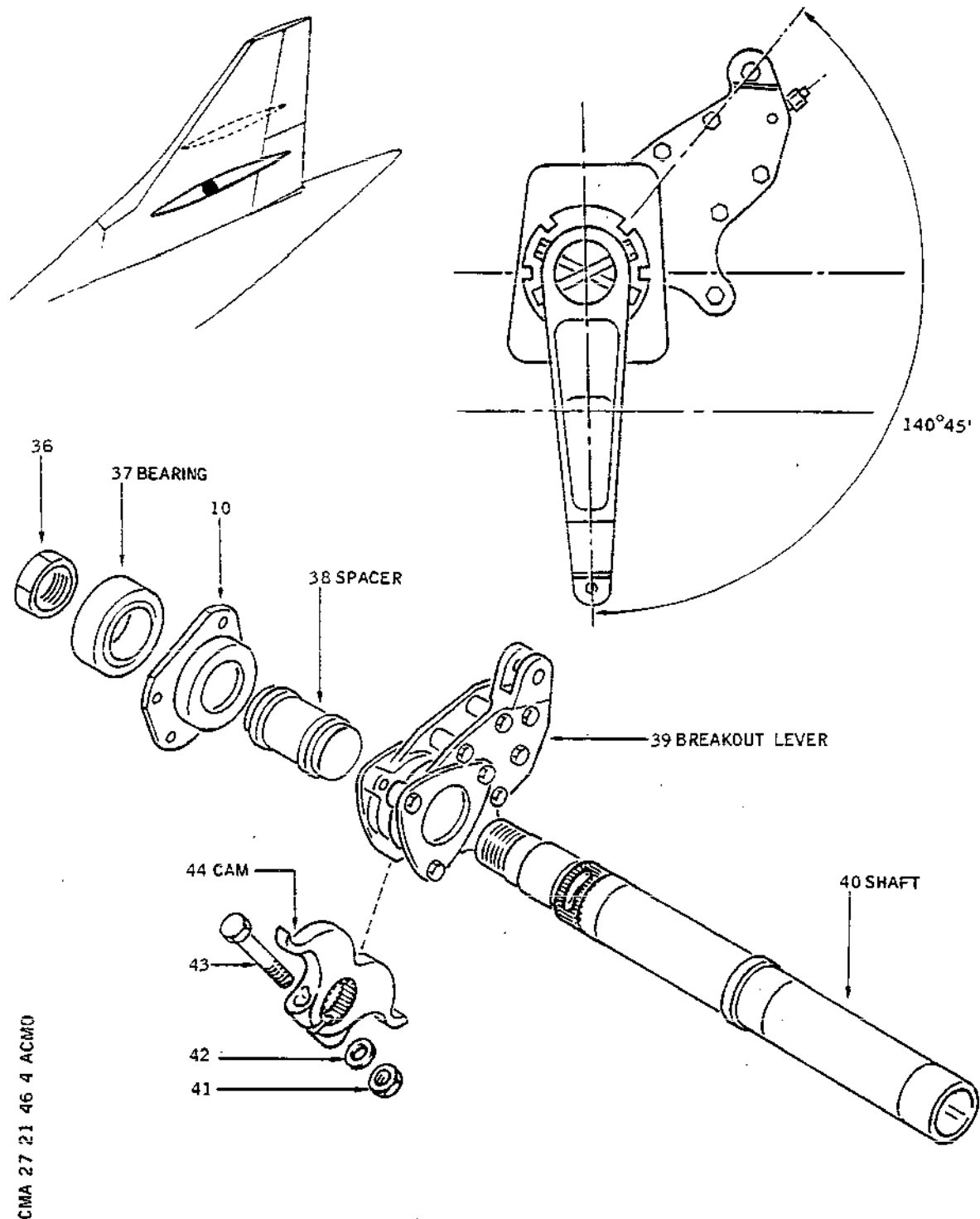
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# Concorde

## MAINTENANCE MANUAL



Installation of Lower Bellcrank at RIB 8  
Figure 402

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (4) Remove cotter pin and unscrew nut (41), remove bolt (43) and washer (42).
- (5) Remove lever (39) with cam (44) taking care not to damage splines.
- (6) Install cam (44) between the flanges of lever (39) with the roller engaged in its location.  
Slide lever (39) on shaft (40) and engage the splines of cam (44) with the splines of shaft (40).  
Only one position of the cam on shaft enables bolt (43) to be engaged freely.  
Install washer (42) and tighten nut (41).  
Safety with cotter pin.
- (7) Install spacer (38), bearing cover (10), bearing (37) and nut (36).  
Torque to between 60 and 70 lbf.in. (0.67 and 0.79 m.daN). Safety with cotter pin.

### NOTE:

- (a) If shaft (40) has been replaced, it is necessary to drill and ream new shaft (40) from holes in levers (30) and (39).  
Ream so that thread run out of tapered bolts is just clear of levers when finally torque tightened to 20 lbf.in. (0.22 m.daN).  
When shaft is completely equipped, levers (30) and (31) must be aligned and must form an angle of 140 degrees 45 minutes with lever (39).
- (b) Breakout load of lever (39) must be 20 lbf. plus or minus 5 lbf. (9 daN plus or minus 2 daN). Check for smooth operation throughout breakout travel of 60° each side of zero position.  
Maximum load during breakout travel must not exceed 40 lbf. (18 daN).  
Restoring force must not be less than 5 lbf. (2.2 daN) within this travel.
- (c) On installation of new bearings measure and record axial end float of bearing (37) and axial movement in the ball bearing to make acceptability judgements possible during maintenance checks.

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## MAINTENANCE MANUAL

### E. Install

- (1) Install shaft assembly in fin, aligning attachment holes of bearing cover (10) with those of bearing housing (9). Attach with bolts (34) washers (35). Torque to between 70 and 80 lbf.in. (0.79 and 0.90 m.daN). Safety with lockwire (as per 20-21-13).
- (2) Install bearing housing (16), aligning attachment holes of bearing housing (16) with those on LH bulkhead support. Attach with bolts (18) washers (33). Safety with lockwire (as per 20-21-13).
- (3) Install bearing (17) in bearing housing (16).
- (4) Install and tighten special nut (19). Torque to between 100 lbf.in. (1.29 m.daN). Safety with lockwire (as per 20-21-13).
- (5) Install rigging pin location lever (31), attach with tapered bolt (32) saddle washer (21) and tighten nut (22).  
Torque to between 20 lbf.in. (0.22 m.daN).  
Safety with cotter pin. Drill new tapered bolt (dia 0.076 in. (1.93 mm)) in order to engage cotter pin.

NOTE: The smooth projecting part of the tapered bolt must be between 0.15 and 0.20 in. (3.81 mm and 5.08 mm). Cut to length (Ref. 20-24-29).

- (6) Install lever (30). Attach with tapered bolts (20) saddle washers (23) nuts (24).  
Torque to between 20 lbf.in. (0.22 m.daN).  
Safety with cotter pin. Drill new tapered bolt (dia 0.076 in. (1.93 mm)) in order to engage cotter pin.

NOTE: The smooth projecting part of the tapered bolt must be between 0.15 and 0.20 in. (3.81 mm and 5.08 mm). Cut to length (Ref. 20-24-29).

- (7) Check that lower bellcrank assembly rotates freely.
- (8) Connect rod (14) to bellcrank. Engage captive bolt (15), special washer (13), washer (12) and nut (11). Tighten and safety with cotter pin.
- (9) Connect rod (25) to lever (30). Engage captive bolt (29), special washer (28), washer (27), nut (26). Tighten and safety with cotter pin.

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## MAINTENANCE MANUAL

- (10) Position mounting (2), attach with screws (4). Safety with cotter pin.
- (11) Install hydraulic lines on clamp blocks. Position upper section of clamp blocks (1); attach with washers, nuts and screws. Safety with cotter pin.
- (12) Connect electrical connectors (5).
- (13) Install equipment E920112000.
- (14) Remove warning notices and set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (15) Immobilize cable quadrant in fin with rigging pin D925422000.
- (16) Install equipment D925421 on lower bellcrank.
- (17) Make certain that bellcrank is at neutral. If required adjust length of rod (14) to set bellcrank to neutral. Tighten and safety rod adjustment system with lockwire (as per 20-21-19).
- (18) Make certain that rudder is at neutral plus or minus 2 minutes. If required, adjust length of PFCU actuating rod to set rudder to neutral plus or minus 2 minutes.
- (19) Remove equipment D925421000 and rigging pins D925422000 and D925252002.
- (20) Full deflect rudder pedals in both directions, at least three times.
- (21) Immobilize resolvers with rigging pin D925252002.
- (22) Check that rudder is at neutral plus or minus two minutes. If required adjust length of PFCU actuating rod to set rudder to neutral plus or minus two minutes. Tighten and safety with lockwire (as per 20-21-13) rod adjustment system.
- (23) Remove rigging pin D925252002.
- (24) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in mechanical mode).
- (25) Remove equipment E920112000.

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## MAINTENANCE MANUAL

- (26) Remove safety clip and tag and set circuit breaker M626, panel 15-216, Map Ref. F22.

### F. Test (Ref. Fig. 403)

- (1) Carry out an operational test (Ref. 27-21-00, Adjustment/Test).

During this test, check that clearance between control rod and edges of hole (in spar 7, and ribs 9 and 11) at maximum travel, is :

nominal clearance : 10 mm (0.393 in.)  
minimum clearance : 8 mm (0.315 in.)

Check that clearance between PFCU control and input levers and fairing support structure is :

nominal clearance : 10 mm (0.393 in.)  
minimum clearance : 5 mm (0.196 in.)

- (2) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access doors and panels 121FB, 151DB, 323NR, 323LR.
- (3) Install fairings 351BL and 351CL. (Ref. 55-31-31, Removal/Installation).
- (4) Remove access platforms.

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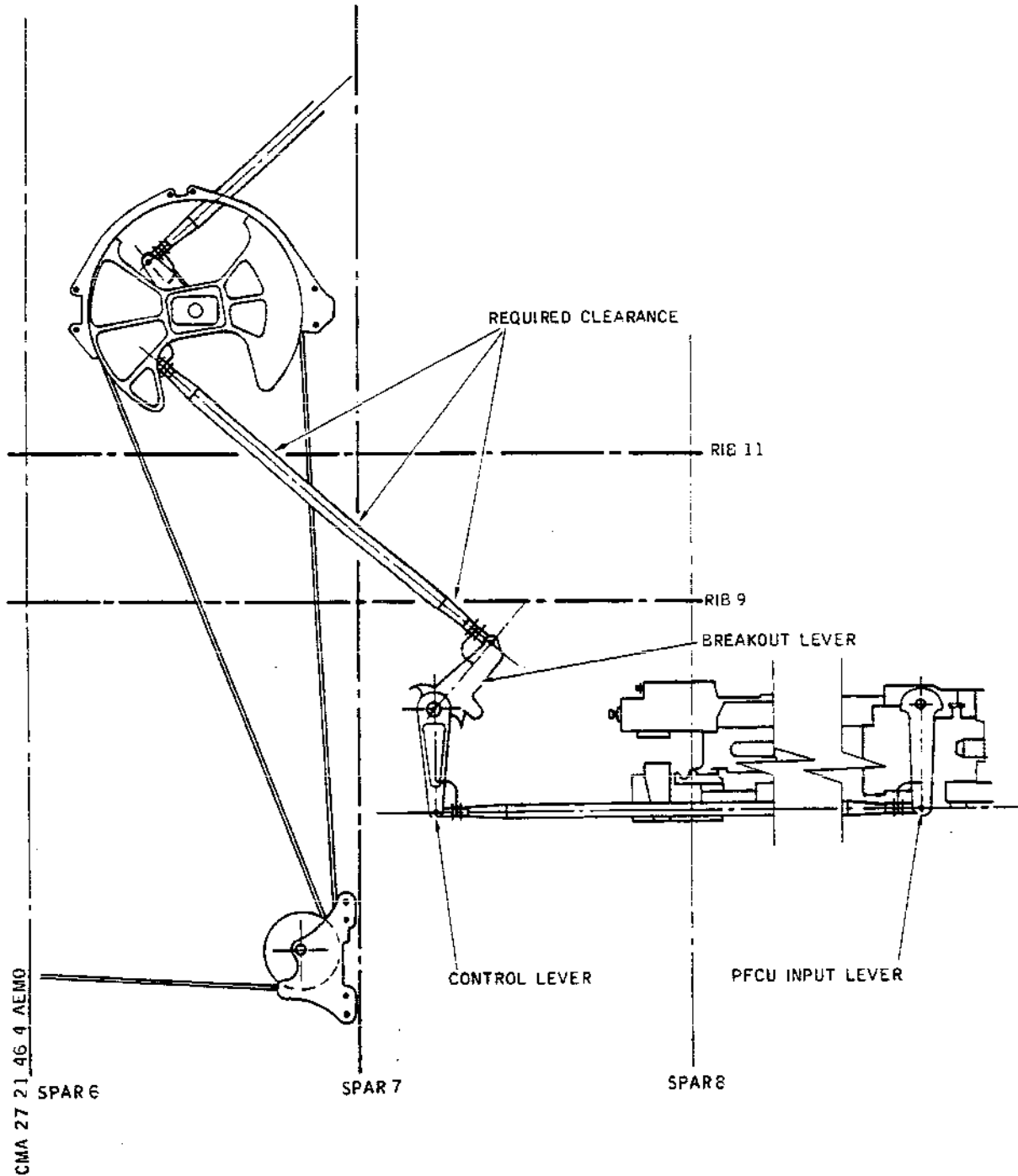
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## MAINTENANCE MANUAL



Structure/Control Rods - Clearance  
Figure 403

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## MAINTENANCE MANUAL

### LOWER BELLCRANK AT RIB 8 - INSPECTION/CHECK

**WARNING** : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The purpose of the following procedure is to check during scheduled inspections, the disengagement and load operating values of lower bellcrank.

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pin - Quadrant	D925422000
Access Platform 11,25 m (36 ft. 11 in.)	
Circuit Breaker Safety Clips	
Warning Notices	

##### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Make certain that yaw control is in zero position.
- (3) Make certain that yaw trim control is in zero position.
- (4) Open door 151DB and depressurize Blue, Green and Yellow hydraulic systems.
- (5) Trip, safety and tag the following circuit breaker :

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## MAINTENANCE MANUAL

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

**WARNING** : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

- (6) Open door 323NR, immobilize quadrant in fin with rigging pins.
- (7) Remove housing 351BL.

### C. Check

- (1) Separate link rod from lower bellcrank and cable quadrant.
- (2) Separate actuating rod from PFCU input lever.
- (3) Immobilize torque tube manually or by means of any appropriate tool.
- (4) By means of a spring scale, apply a load at the end of the bellcrank on the control rod attachment point. Check that disengagement value is :  
20 lbf.  $\pm$  5 lbf. (9 daN  $\pm$  2 daN)

Effect a 60° displacement on each side of zero position.

During this displacement, check that :

- Movements are free during displacement
- Maximum load during displacement, must not exceed 40 lbf. (18 daN).
- Return load must not be less than 5 lbf. (2.2 daN).

If loads exceed tolerances given above, replace mechanism.

- (5) Check shaft end float. If float exceeds the new installed value by .002 in, crank assembly must be dismantled and bearing replaced (Ref Removal/Installation).

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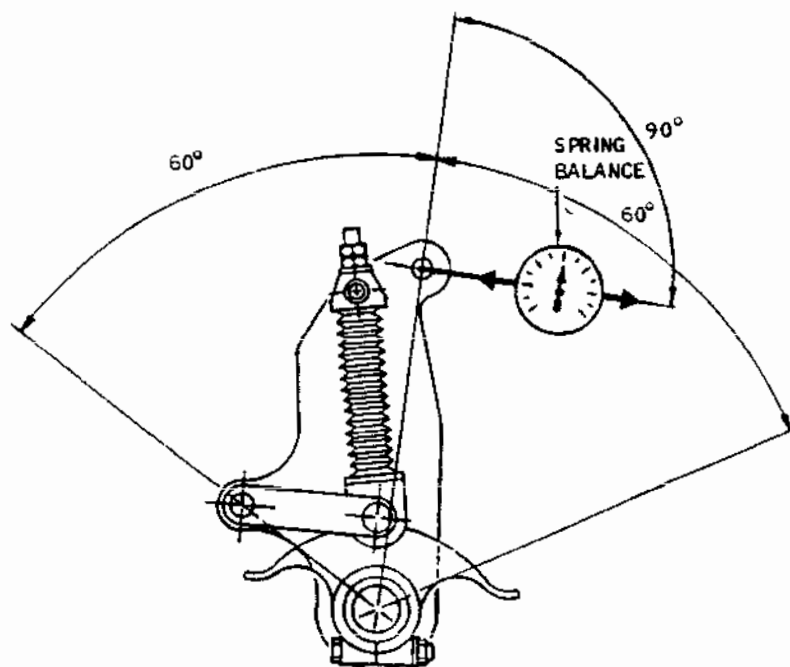
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## MAINTENANCE MANUAL

- R (6) Check axial movement in the ball bearing. If movement is  
R in excess of .0005 in. of the value recorded at  
R installation replace bearing (Ref Removal/Installation).
- (7) Attach link rod to lower bellcrank and cable quadrant.



Lower Bellcrank Checking  
Figure 601

- (8) Attach actuating rod to PFCU input lever.  
(9) Remove pin from cable quadrant.

### D. Tests

### E. Close-Up

- (1) Close access doors.  
(2) Install housings.  
(3) Remove warning notices.  
(4) Remove access platforms.  
(5) Remove safety clip and tag and reset circuit breaker M626.

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## MAINTENANCE MANUAL

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Lockwire Dia. 1.00 mm (0.041 in.)	
Corrosion Resistant Steel	
Access Platform 11,25 m (36 ft. 11 in.)	

### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Make certain that Flight controls and yaw trim control are in zero position.
- (3) Remove access panel 121FB and immobilize yaw resolvers with rigging pin D925252002.
- (4) Open access door 151DB and depressurize the Blue, Green and Yellow hydraulic systems.

**WARNING :** DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS USED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (5) Trip, safety and tag the following circuit breaker

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRN CHECK OUT SEL VALVE CONT	15-216	M 626	F22

- (6) Open access doors and panels 323NR, 323BR, 323BL, 323CL, 323LR, 323JL, 323MR and immobilize quadrant with pin D925422000.

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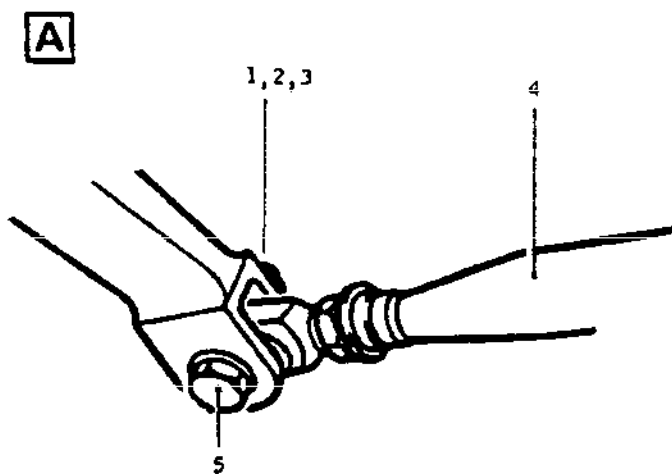
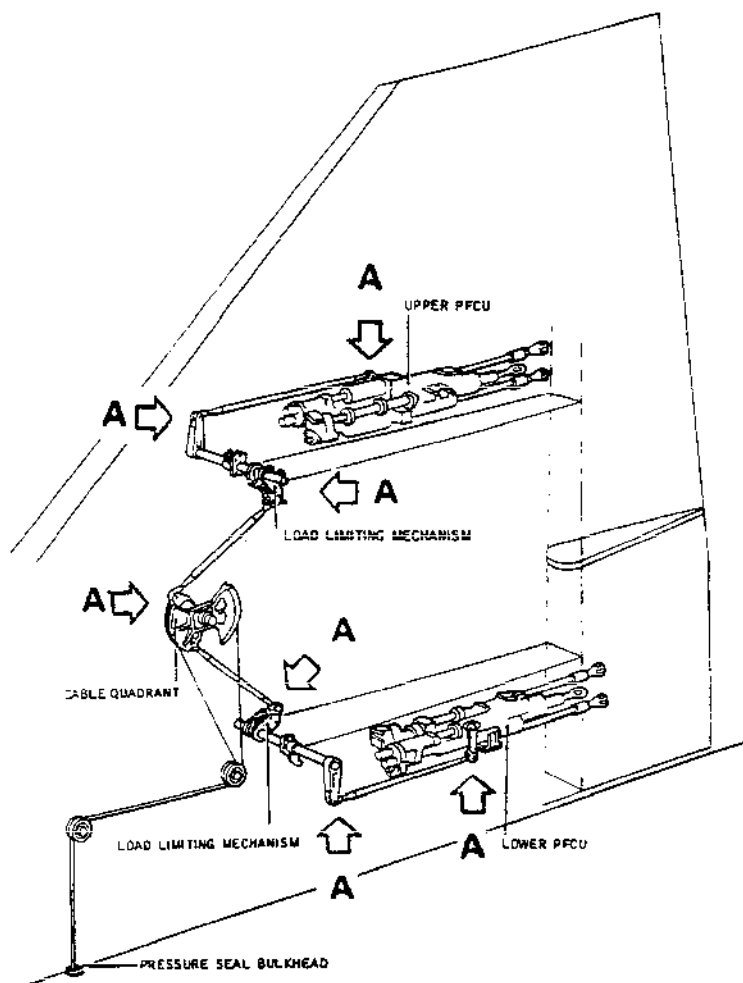
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## MAINTENANCE MANUAL

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Control Rod Installation - Fin  
Figure 401

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## MAINTENANCE MANUAL

- C. Remove  
(Ref. Fig. 401)

NOTE : In order to remove or install captive bolts it is necessary to press the locking plunger located on head of bolt.

- (1) Remove cotter pin and unscrew nut (1), remove washer (2), special washer (3) and captive bolt (5). Disengage rod (4) at one end.

- D. Install

- (1) Connect rod (4) to bellcrank. Engage captive bolt (5), special washer (3), washer (2) and nut (1). Tighten and safety with cotter pin.
- (2) Remove warning notices and set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (3) Install equipment D925421 on lower bellcrank.
- (4) Make certain that bellcrank is at neutral. If required adjust length of rod to set bellcrank to neutral. Tighten and safety rod adjustment system with lockwire (as per 20-21-19).
- (5) Make certain that rudder is at neutral plus or minus 2 minutes. If required, adjust length of FFCU actuating rod to set rudder to neutral plus or minus 2 minutes.
- (6) Remove equipment D925421000 and rigging pins D952422000 and D95252002.
- (7) Fully deflect rudder pedals in both directions, at least three times.
- (8) Immobilize resolvers with rigging pin D925252002.
- (9) Check that rudder is at neutral plus or minus two minutes. If required adjust length of FFCU actuating rod to set rudder to neutral plus or minus two minutes. Tighten and safety with lockwire (as per 20-21-13) rod adjustment system.
- (10) Remove rigging pin D925252002.
- (11) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in mechanical mode).

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## MAINTENANCE MANUAL

- (12) Remove equipment E920112000.
- (13) Remove safety clip and tag and set circuit breaker M626, panel 15-216, Map Ref. F22.

### E. Test

- (1) Carry out an operational test (Ref. 27-21-00, Adjustment/Test).

During this test, check that clearance between control rod and edges of hole (in spar 7, and ribs 9 and 11) at maximum travel, is :

nominal clearance : 10 mm (0.393 in.)  
minimum clearance : 8 mm (0.315 in.)

Check that clearance between PFCU control and input levers and fairing support structure is :

nominal clearance : 10 mm (0.393 in.)  
minimum clearance : 5 mm (0.196 in.)

- (2) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### F. Close-up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access doors and panels 323BR, 323BL, 323CL, 323JL, 323LR, 323MR and 323NR.
- (3) Remove access platforms.

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## MAINTENANCE MANUAL

### CONTROL RODS IN FIN - INSPECTION/CHECK

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

This topic deals with the Inspection/Check of the control rods in fin between spar 6 and spar 9.

#### 2. Control rods

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pin - Quadrant	D925422000
Jig - Neutral Setting - Rudder	G920112000
Rigging Pins - Synchro Pack	D925252000
Circuit Breaker Safety Clips	
Lockwire Dia. 1.00 mm (0.041 in.) Corrosion Resistant Steel	
Access Platform 11,25 m (36 ft. 11 in.)	

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## MAINTENANCE MANUAL

### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Make certain that Flight controls and yaw trim control are in zero position.
- (3) Remove access panel 121FB and immobilize yaw resolvers with rigging pin D925252002.
- (4) Open access door 151DB and depressurize the Blue, Green and Yellow hydraulic systems.

**WARNING :** DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS USED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (5) Trip, safety and tag the following circuit breaker

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRN CHECK OUT SEL VALVE CONT	15-216	M 626	F22

- (6) Open access doors and panels 323NR, 323BR, 323BL, 323CL, 323LR, 323JL, 323MR and immobilize quadrant with pin D925422000.
- (7) Remove control rods (Ref. Removal/Installation).

### C. Check

- (1) Check bearings at each end of control rods. Replace if one or both bearings has a total internal radial clearance exceeding .0025.

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## MAINTENANCE MANUAL

### D. Close-up

- (1) Install control rods in fin (Ref. Removal/Installation).
- (2) Remove rigging pin D92542200 from cable quadrant.
- (3) Remove rigging pin D925252002 from synchro pack.
- (4) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (5) Close access doors and panels 323NR, 323BR, 323BL, 323CL, 323LR, 323JL and 323MR.
- (6) Remove safety clip, tag and reset circuit breaker M626.
- (7) Remove warning notices.
- (8) Remove access platforms.

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## MAINTENANCE MANUAL

### ARTIFICIAL FEEL - DESCRIPTION AND OPERATION

#### R 1. General

##### R A. Purposes

R The AF system has three purposes :

- R - To restore loads to the flight controls compatible with
- R precise and stable piloting.
- R - To give considerable feel loads to the pilot before
- R reacting flight configurations that are dangerous to the
- R structure.
- R - To cut-in on the autopilot load limitation.

##### R B. Principle of Operation

R For the yaw axis, the object is to apply to rudder pedals  
R a load proportional to a function of calibrated airspeed  
R and to the deflection limit imposed by structure.  
R The variable resistance is ensured by two hydraulic jacks,  
R each controlled by a computer. Both jacks are controlled  
R permanently, but only one is operative, the second one  
R remaining at a stop.  
R The first jack, which acts in priority is supplied with  
R Blue hydraulic system pressure : the control computer is  
R activated when the YAW switch on ARTIFICIAL FEEL engage  
R switch unit No.1 (on overhead panel) is engaged.  
R The second jack is supplied with Green hydraulic system  
R pressure and the jack control computer is activated when  
R the YAW switch on ARTIFICIAL FEEL engage switch unit No.2  
R (on overhead panel) is engaged.  
R When both YAW switches are engaged, the Green jack auto-  
R matically replaces the Blue jack in the case of a failure  
R of the latter.  
R The stand-by hydraulic pressure (Yellow) is not used.  
R A spring rod provides the resistance corresponding to low  
R speed conditions and ensures a minimum safety in case of  
R a double electro-hydraulic failure.

#### R 2. Description

##### R A. Artificial Feel Mechanical System R (Ref. Fig. 001 )

R The Artificial Feel components for the three Flight Control  
R axes are mounted on a single chassis attached to the air-  
R craft structure in the forward compartment (zone 121).

R The system comprises :

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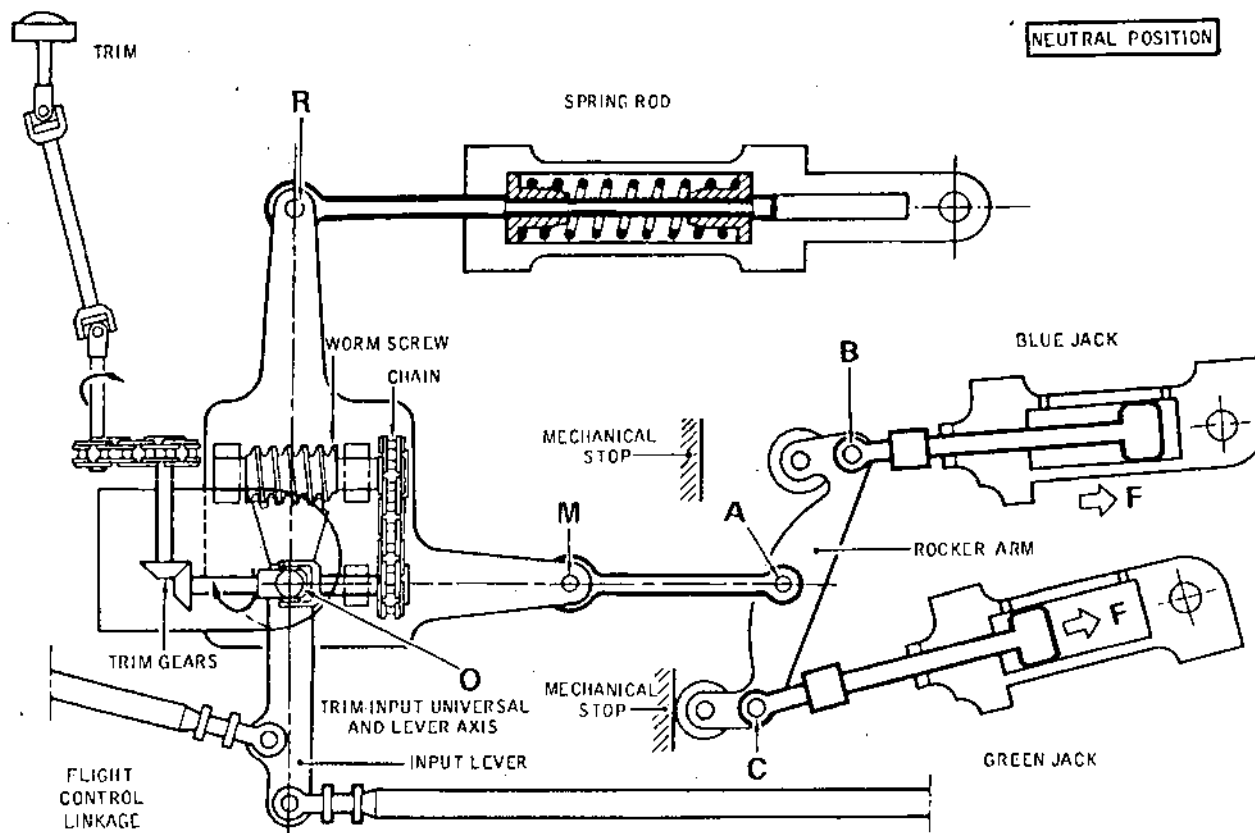
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## MAINTENANCE MANUAL

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Artificial Feel Mechanical System  
Figure 001

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## MAINTENANCE MANUAL

- R - An INTEGRAL TRIM ASSEMBLY, which enables the loads of
- R the artificial feel system to be cancelled by a mechani-
- R cal differential.
- R - A double action-load limiting spring rod which restores
- R loads proportional to out of trim deflections.
- R - A rocker arm which transmits loads delivered by the
- R electro-hydraulic jacks.
- R - Two electro-hydraulic jacks, controlled by computers,
- R ensuring variable resistance.

### R B. Artificial Feel Electronic System

R (Ref. Fig. 002 )

R Two identical Artificial Feel systems are provided on the

R aircraft. They operate simultaneously.

R The two systems comprise :

- R - Two Artificial Feel computers :  
R Computer No.1 (1C235) is located in LH electronics rack,  
R on shelf 6-215. Computer No.2 (2C235) in RH electronics  
R rack, on shelf 6-216.  
R They develop load laws and monitor the system.
- R - Two Artificial Feel engage switch units (1C236 and  
R 2C236) located on overhead panel.  
R They allow activation of the system and transmit orders  
R generated by the computer.
- R - Two press to test push buttons (1C245 and 2C245) located  
R on panel 29-214 at Flight Engineer's station.  
R They initiate the computer monitoring channel tests.
- R - A Yaw deflection sensor (C246), located in zone 121 and  
R driven by a link actuated by the Yaw torque tube. This  
R sensor comprises two potentiometers providing the two  
R artificial feel computers with yaw deflection data.

R In addition, the two systems are connected to the following

R components :

- R - Air Data Computer, for data concerning Calibrated Air
- R Speed and general ADC failure.
- R - Master Warning System which receives the GONG and FEEL
- R warning light activation order.

### 3. Assembly - Integral Trim

(Ref. Fig. 001 )

The assembly comprises :

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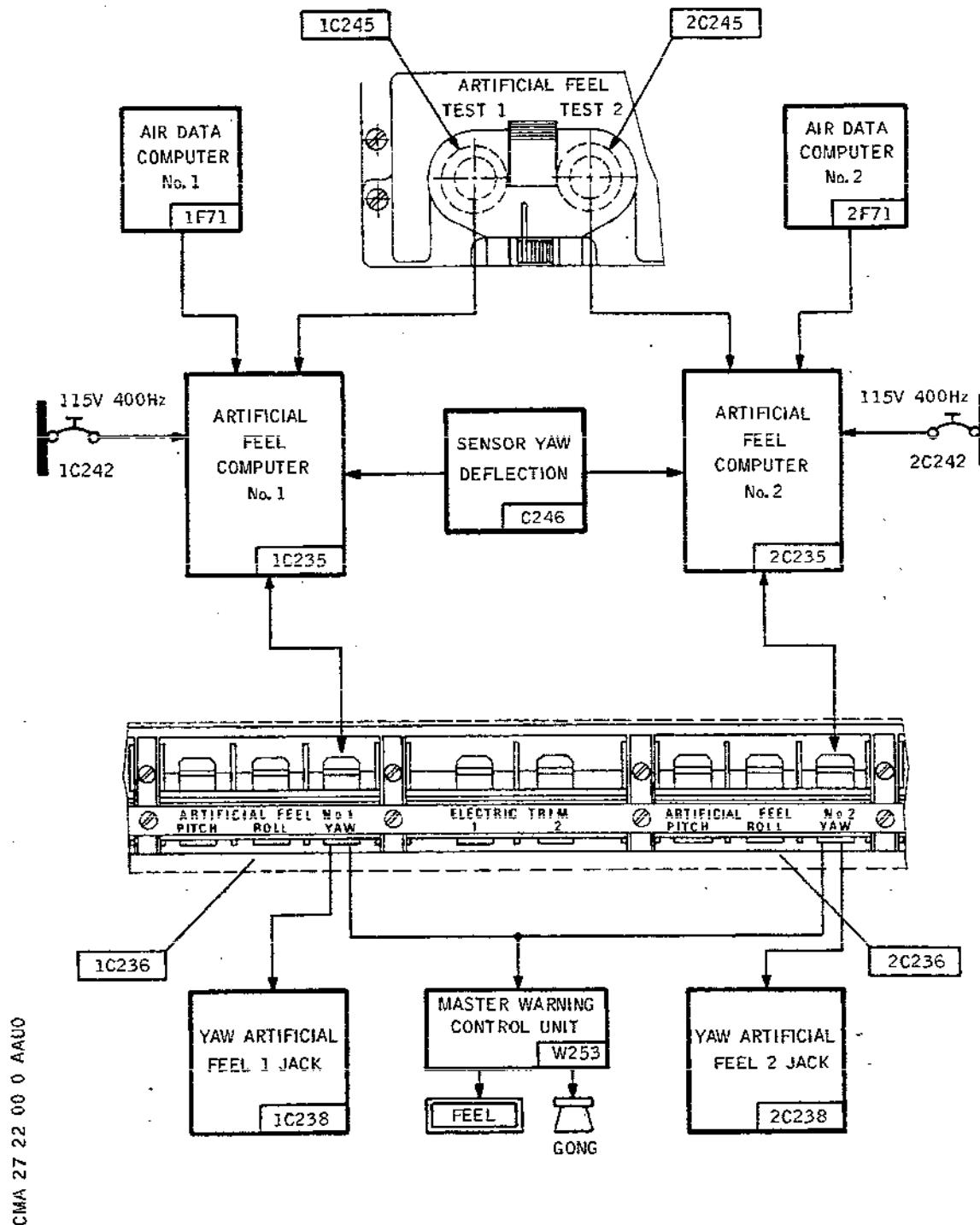
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## MAINTENANCE MANUAL



Artificial Feel Electronic System  
Figure 002

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## MAINTENANCE MANUAL

An input lever, actuated by the mechanical control from the pilot.

The end of this lever being machined as a toothed sector.

R A worm screw in which the input lever toothed sector is en-  
R meshed.

R The worm screw integral with the assembly flanges is fitted  
with a double pinion ensuring its drive by the trim reduction  
gear.

R The drive is effected by a universal joint in which the  
rotation axis is the same as that of the input lever.

R The flanges of the assembly form a right-angle in which the  
apexes are denoted by the points O, R and M in the illustra-  
tions.

R This assembly ensures two functions :

- R - cancellation of artificial feel system loads through a  
R differential mechanism.
- R - control of rudders through an irreversible mechanical control  
R (Flight using trim) independent of the main Flight Control.

R These two functions are ensured by the toothed sector/worm screw  
R mechanism described above.

#### R 4. Spring Rod R (Ref. Fig.001 and 003)

R The spring rod is made up of :

- R - a body (stationary) anchored to the chassis.
- R - a mobile rod attached to point R on the integral trim assembly  
R flanges.
- R - springs providing the load limit for returning rudder pedals  
R to neutral position and the variable resistance corresponding  
R to low speed conditions.
- R - two sliders ensuring junction between springs and mobile rod.

R Whatever the direction of movement, the reaction of the spring  
R rod tends to align points O, M and A.

#### 5. Jack - Artificial Feel (Ref. Fig. 004 )

One section of the artificial feel jack is hydraulic and the  
other section is electrical.

Hydraulic supply to the cylinder is via a spool valve controlled  
by an electro-valve.

EFFECTIVITY: ALL

BA

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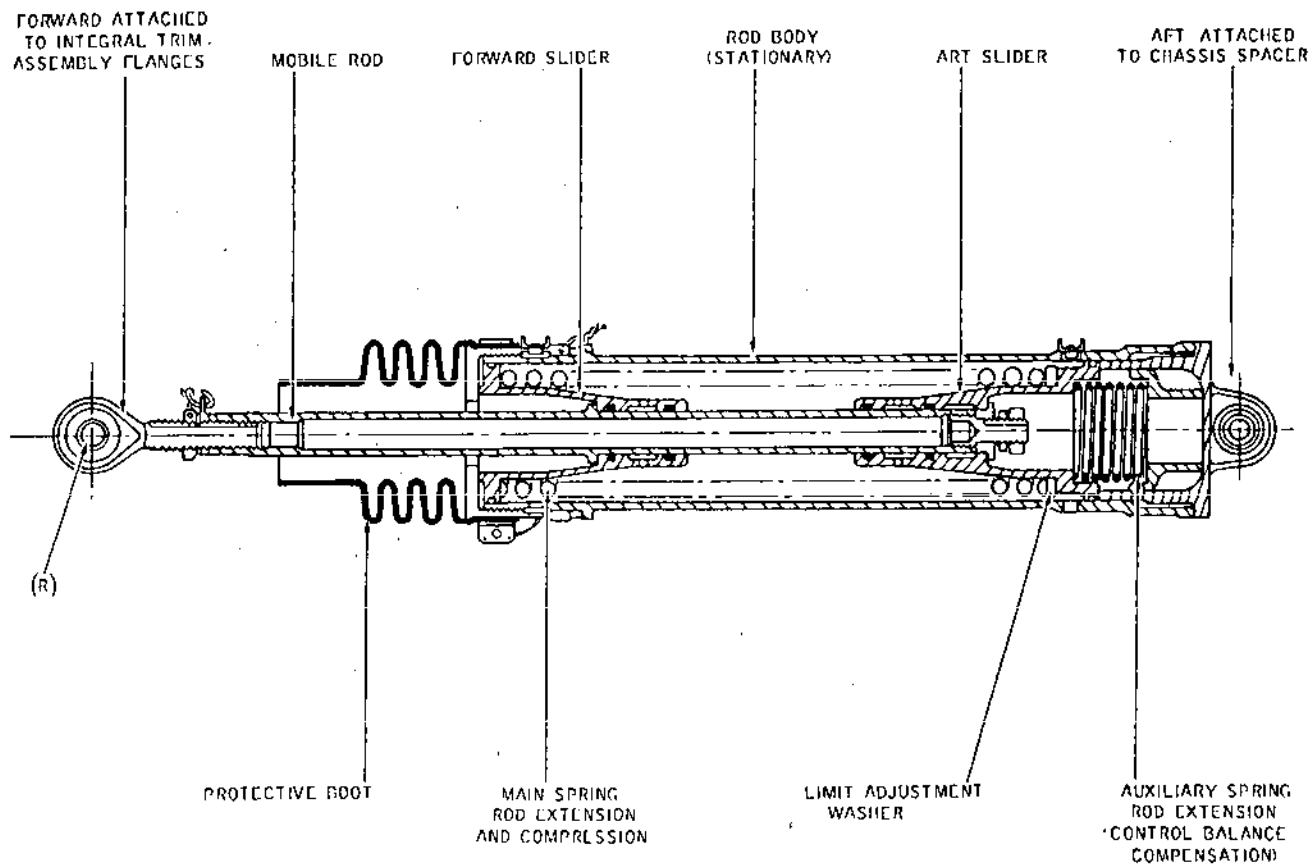
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## MAINTENANCE MANUAL

CMA 27 22 00 0 ABMO



R

Spring Rod  
Figure 003

EFFECTIVITY: ALL

BA

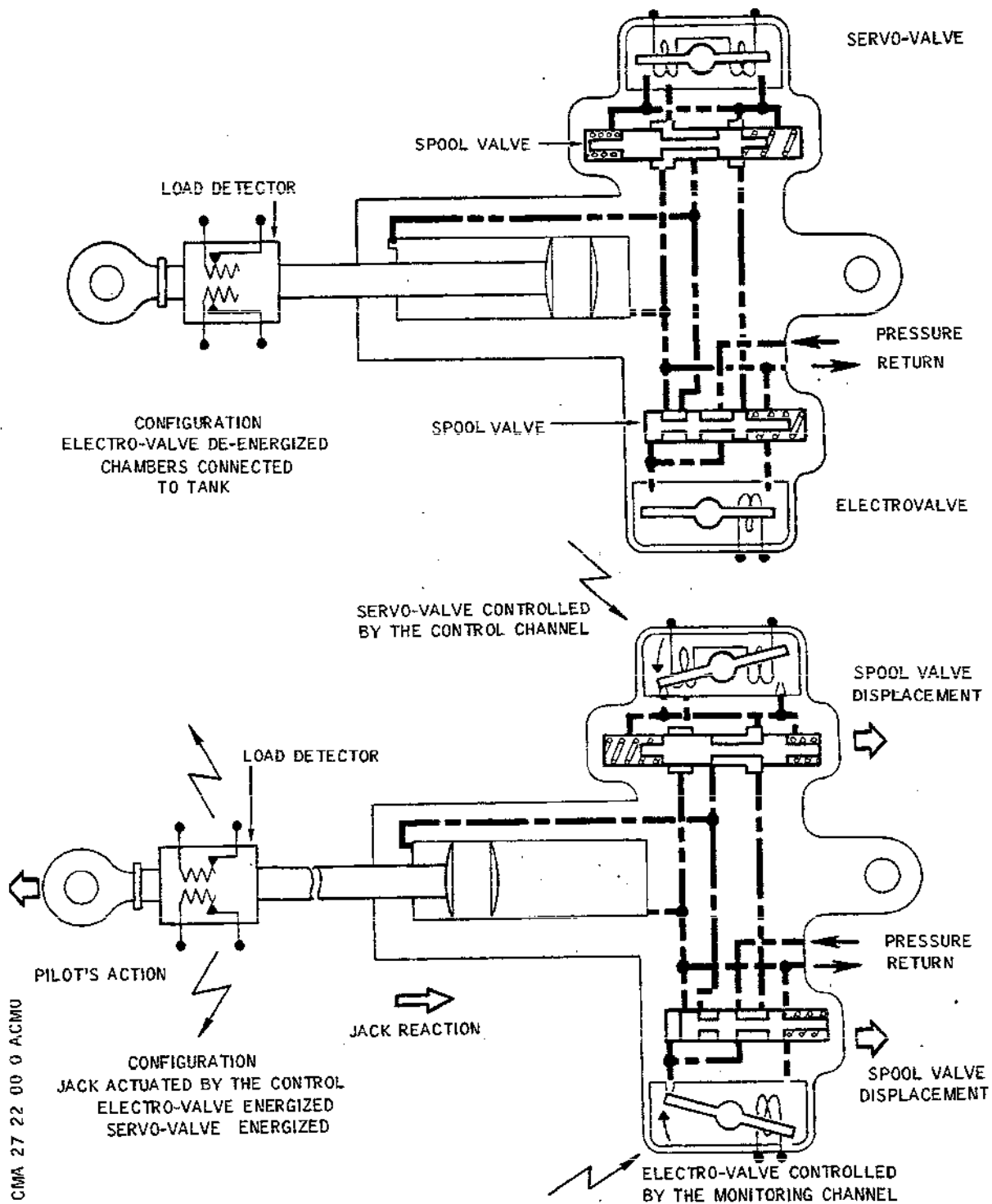
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## MAINTENANCE MANUAL



Artificial Feel Jack - Operation  
Figure 004

EFFECTIVITY: ALL

R

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## MAINTENANCE MANUAL

- R Pressure control in the jack is regulated by a servo valve.
- The electro-valve is controlled by the electrical monitoring channel.
- The servo-valve is controlled by the electrical control mode.
- The piston rod is fitted with a load detector which compares the actual load on the jack with the control order.
- R If the electro-valve does not receive a signal, there is no hydraulic pressure on the servo-valve and the jack chambers are connected to tank return.
- If the electro-valve is energized, hydraulic pressure is admitted to the servo-valve.
- R The servo-valve regulates the pressure from signals received from the control channel.
- Admitted to the front chamber of the jack, this pressure maintains a load corresponding to the control order.
- R The rear chamber is connected to tank return.
- R 6. Computers - Artificial Feel
- R (Ref. Fig. 005 )
- R Each computer is located in a housing.
- R This housing comprises : on the front panel, a P23 connector for test and maintenance purposes, an hour meter and a handling grip. On the rear panel a double connector (DP X2) is provided for connection to the aircraft electrical network.
- R A computer controls the hydraulic pressure of a jack. For each jack the electronic assembly consists of :
- One control channel
  - One monitoring channel
  - The supply of these channel load detectors
  - The supply of these channels
- R - The circuit necessary for testing of monitoring systems.
- The control channel achieves :
- the development of the control electrical order from the various control signals with which the channel is provided.
- R - the comparison of this order with the return signals from the load detector.
- the development of the servo-valve control signal.

EFFECTIVITY: ALL

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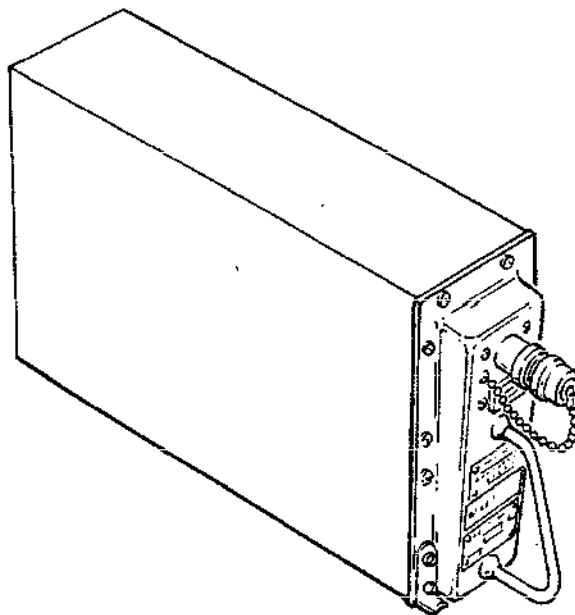
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## MAINTENANCE MANUAL



CMA 27 22 00 0 ADMO

Artificial Feel Computer  
Figure 005

R

The monitoring channel supervises the control channel

R

- It receives identical (and independent) control signals and develops a second electrical order.

R

- It compares this second order to the return signal from the load detector second circuit.

R

- It switches off the electrovalve electrical supply if the error signal resulting from the comparison exceeds a fixed threshold.

R

Computer No.1 receives information from Air Data Computer No.1

R

and controls the Blue Jacks - Computer No.2 receives information from Air Data Computer No.2 and controls the Green Jacks.

R

### 7. Hydro-mechanical Operation (Ref. Fig. 006 )

Actuated by the flight control rod, the input lever acts through the integral trim assembly :

On the spring rod about point R.

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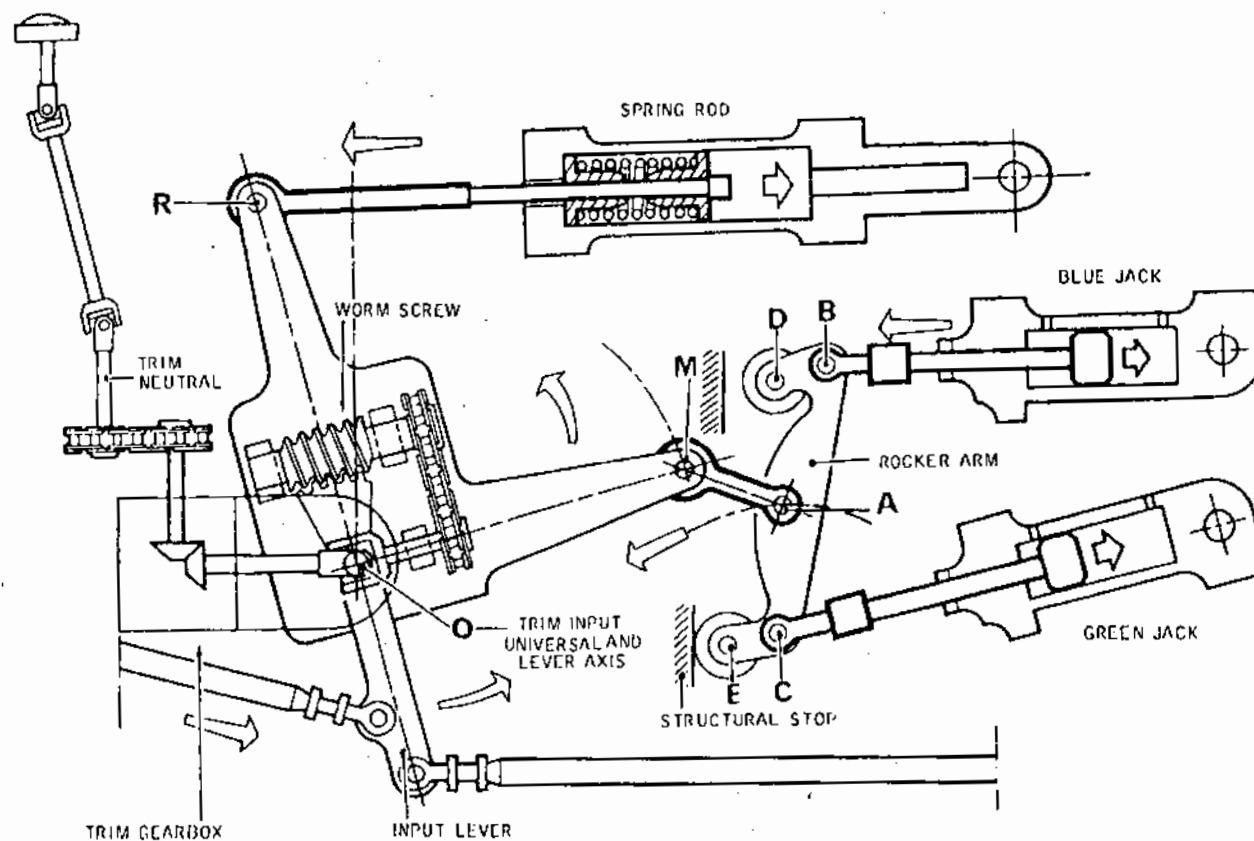
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## MAINTENANCE MANUAL

CMA 27 22 00 0 AEMO



Artificial Feel Hydro-mechanical Operation  
Figure 006

R

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## MAINTENANCE MANUAL

- R On the rocker arm about point M. The ends of the rocker arm are connected to two hydraulic jacks at B and C.
- R The upper (blue) jack is supplied by the blue hydraulic system and the lower (green) jack is supplied by the green hydraulic system.
- When both jacks are supplied they apply two equal forces at points B and C.
- R The lever AB of the rocker arm, being longer than AC gives priority to the blue jack. The green jack abuts the stop at point E.
- R Control actuation compresses the spring rod and displaces the rocker arm against the action of the hydraulic jack.
- R To overcome spring rod resistance and jack action, loads proportional to control displacement and resistance in the system must be applied to the control.
- R Blue jack failure  
(Ref. Fig. 007 )
- If a fault occurs and the monitoring channel closes the electro-valve :
- R There is no pressure at the servo-valve.
- R Both chambers of the jack are connected to the tank.
- R The rocker arm actuated by the green jack, tilts.
- The blue jack abuts the stop.
- The system operates on the green jack.
- R If both jacks fail, only the spring rod remains active.
- A speed reduction is then necessary.

EFFECTIVITY: ALL

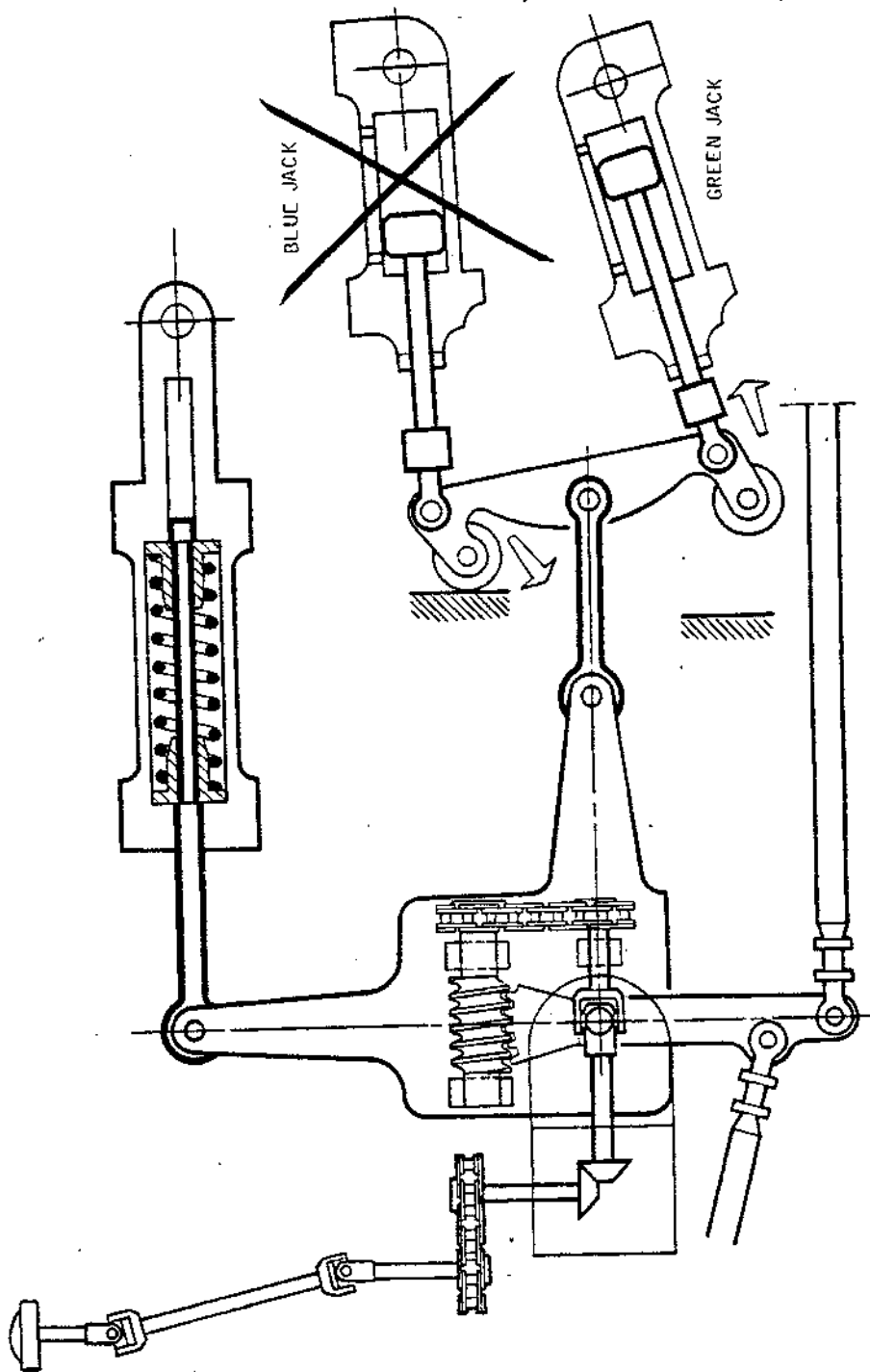
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# MAINTENANCE MANUAL



Blue Jack Failure  
Figure 007

CMA 27 22 00 0 AGMD

**R**

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### 8. Electronic Operation

R A. Achieved Load Law  
R (Ref. Fig. 008 )

R The load exerted by the jack is a linear law :

R - proportional to a function of calibrated air speed deve-  
R loped by the ADC.  
R - reduced by a constant value.

R The load exerted by the jack can be expressed as :

R 
$$F_j = kV - h$$

R where

R  $F_j$  is the load exerted by the jack.  
R  $V$  is the command voltage, function of calibrated air speed  
R developed by the ADC.  
R  $k$  and  $h$  are constants.

R A sudden increase of the load is achieved in order to  
R prevent rudder deflections which could be dangerous to the  
R structure at certain speeds.  
R When the deflection (detected at the Yaw torque tube by a  
R potentiometer) becomes greater than the deflection limit  
R which is a second function of calibrated air speed (deve-  
R loped by the ADC), the load law is :

R - multiplied by a 1.1 factor  
R - increased by a constant value

R The load exerted by the jack can be then expressed as  
R follows :

R 
$$F_j = 1.1 kV - h + c$$

R where

R  $c$  is a constant.

R NOTE : This limiting function provides intentionally  
R produced hysteresis to avoid repeated switching in  
R the region of the deflection limit.

R B. Control Channel  
R (Ref. Fig. 009 )

R This channel is made up of two cards :

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## MAINTENANCE MANUAL

INTENTIONALLY BLANK

R

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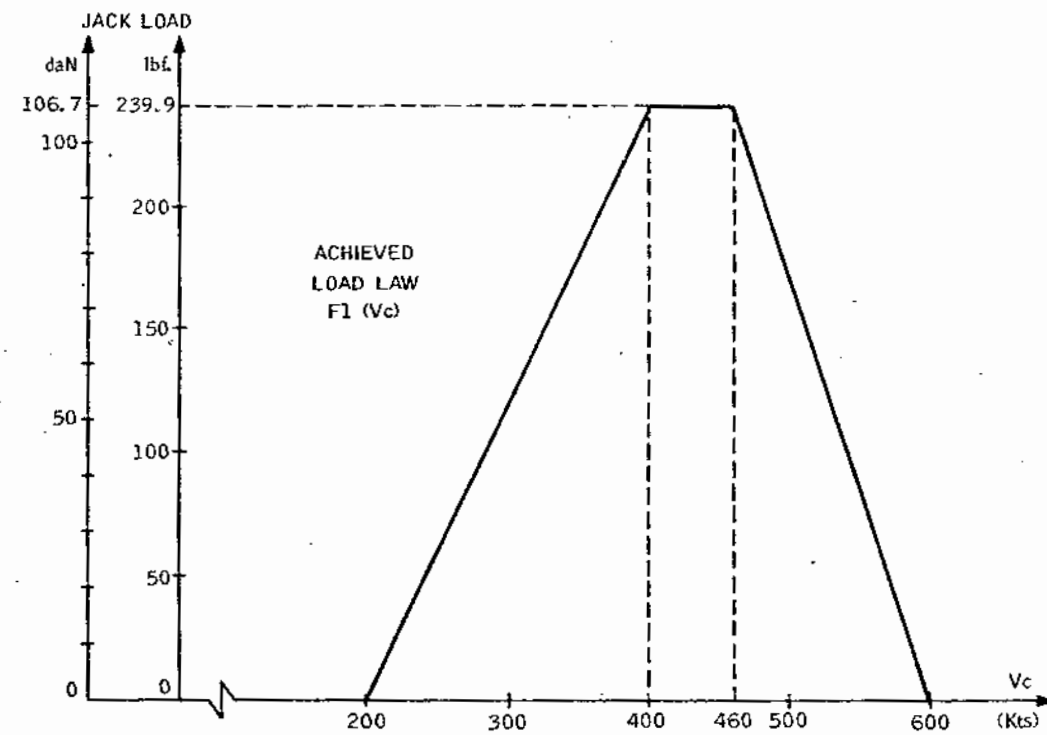
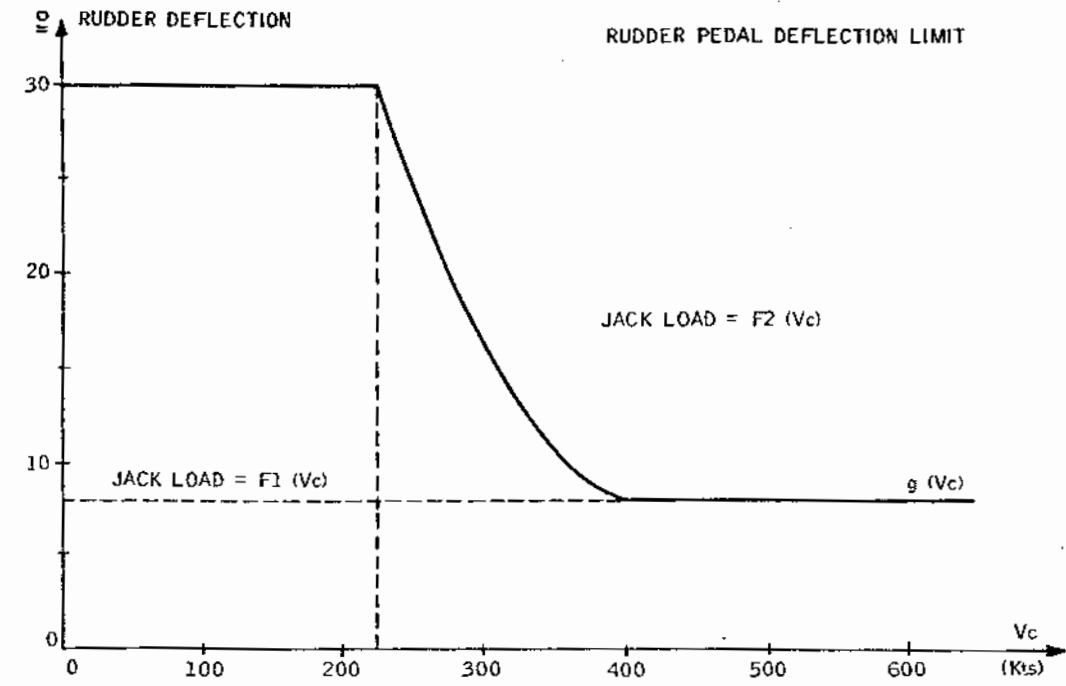
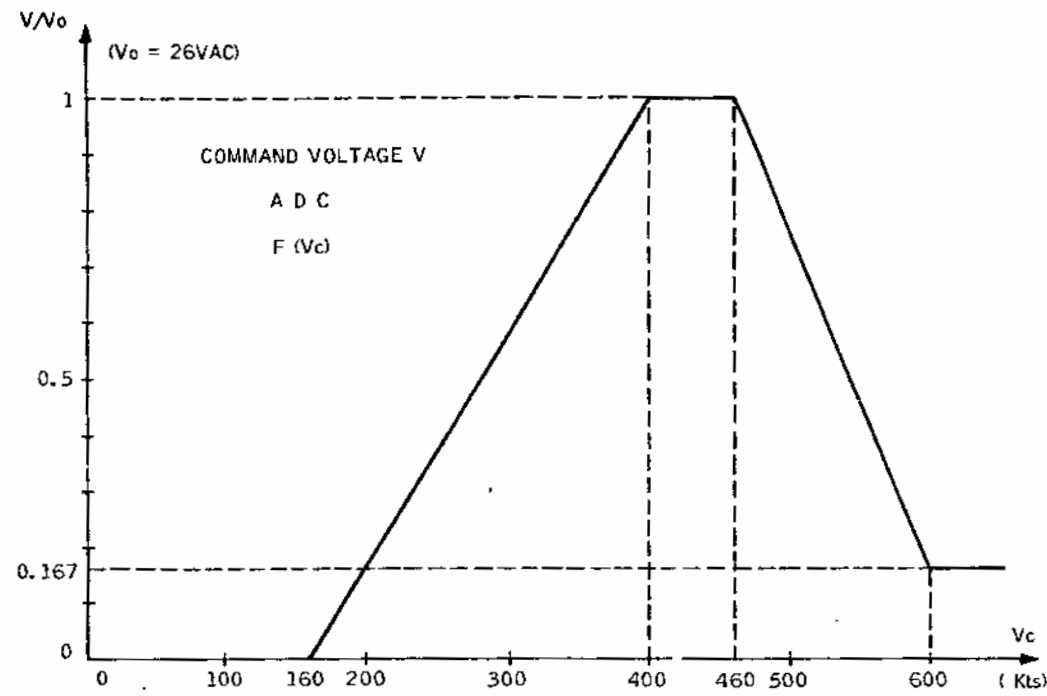
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## MAINTENANCE MANUAL



NOTE 1-  $F2(Vc) = F1(Vc) \times 1.1 + 31.8 \text{ (daN)}$

2-  $\text{RUDDER PEDAL RESISTANCE} = \text{JACK LOAD} \times 0.042 + \text{ROD RESISTANCE}$

CMA 27 22 00 0 AHMO

Load Law and Limitation  
Figure 008

EFFECTIVITY: ALL

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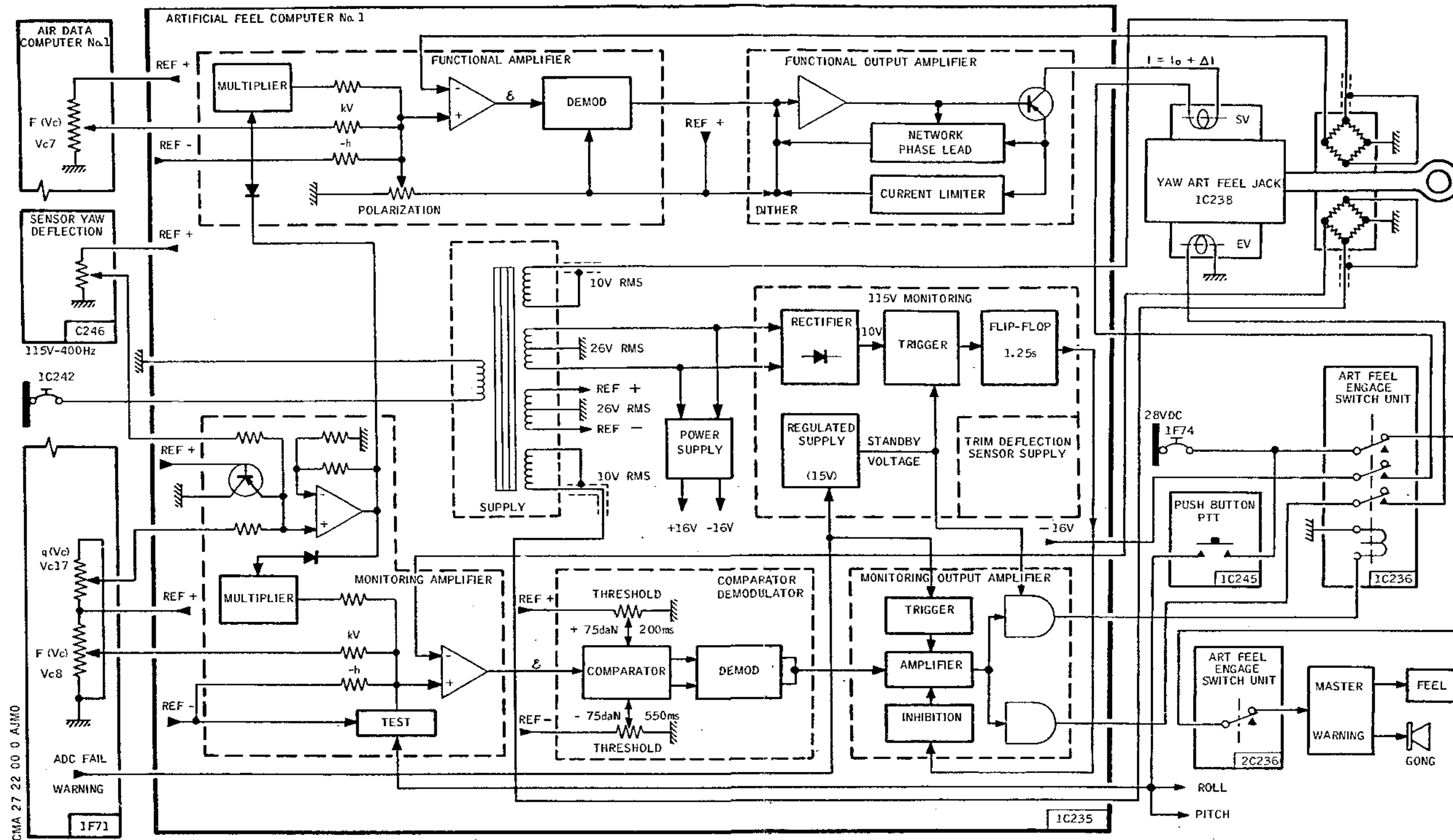
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## MAINTENANCE MANUAL



Artificial Feel Electronic Diagram System No.1  
Figure 009

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# Concorde

## MAINTENANCE MANUAL

- a functional amplifier
- a functional output amplifier

- (1) In the functional amplifier, the return signal from the load detector is compared to the sum of the signals representing the load law.

NOTE : In the case of limit of deflection, this load law is modified by a resistor network controlled by an analog gate which itself receives the load multiplication logic order from a circuit on the monitoring channel "comparison amplifier" card.

After demodulation, the resulting signal forms the control error signal ( $\epsilon$ ). A bias is superimposed on the error signal (difference between order to be carried out and measured force) and the sum of these two signals forms the functional channel control signal.

A demodulator filters parasitic components in the control signal by converting the alternating components of the latter to a DC signal. The parasitic components are then eliminated by the corrective network.

- (2) The functional output amplifier comprises :

- a phase lead corrective network
- a current amplifier
- a circuit limiting the servo valve current

At the channel output, the servo valve control current  $I$  is divided in two parts :

$$I = I_0 + \Delta I$$

where

$I_0$  = constant current resulting from the bias signal amplification.

$\Delta I$  = variable current, positive or negative, resulting from the error signal amplification.

This method permits the control of the servovalve the zero of which is offset (zero hydraulic flow for a  $I_0$  control current) in order to connect the jack to the tank in the event of accidental suppression of the servo valve current.

To reduce the inertia of the jack servovalve flapper a 400 Hz signal is superimposed on the error signal at the "Dither" input of the output amplifier.

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### C. Monitoring Channel

This channel is made up of three cards :

- a monitoring amplifier
- a comparator demodulator
- a monitoring output amplifier

#### (1) Monitoring amplifier

The monitoring channel is provided with the following inputs :

- force order and feedback inputs identical with those of the functional channel.
- A TEST input which causes the triggering of the monitoring channel.

In addition, this card comprises a circuit which compares the rudder pedal deflection with a function of calibrated air speed.

When the deflection becomes greater by 400 mV than the speed function, a logic command is generated which controls the load multiplication for the two control and monitoring channels.

NOTE : There is no bias input on the monitoring amplifier.

#### (2) Comparator demodulator

R

The AC variation ( $\epsilon$ ) voltage, developed by the monitoring amplifier, is summed separately with two AC voltages proportional to the desired triggering thresholds ( $\pm$  threshold). The result of each summing is demodulated : polarity of voltage from either channel of the demodulator is negative if variation ( $\epsilon$ ) is greater than the triggering threshold during a period of time greater than the monitoring timing.

#### (3) Monitoring output amplifier

If a variation greater than the triggering threshold has been detected, or if a failure of the associated ADC occurs, the supply of the electrovalve and the engage switch holding coil is cut off.

To avoid disconnection in the event of a temporary 115 VAC power supply loss.

- The comparator is inhibited if the 115 VAC loss occurs on the three axes (pitch, yaw, roll) of the

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# Concorde

## MAINTENANCE MANUAL

R computer considered.  
R - The magnetically held engage switch is supplied with  
R a stand by voltage from the 115 volt monitoring card.  
R Inhibit duration is 1.25 second.

### R D. 115 Volt Monitoring Card

R This card is common to the three axes (roll, yaw, pitch).  
R It comprises :

- R - A regulated DC power supply, which, from the 28 volt  
R validity of the ADC, enables the monitoring output ampli-  
R fiers and the magnetically held engage switch to be  
R supplied in the event of loss of 115 VAC.
- R - A circuit which generates a signal inhibiting the moni-  
R toring comparators in the event of loss of the 115 volt  
R supplies on the three axes.  
R Inhibit duration (1.25 second) is controlled by a mono-  
R stable circuit.

R In addition, this card comprises a circuit designed to  
R supply the trim deflection sensor on functional side  
R (Ref. 27-32-00, Description and Operation).

### R E. General Power Supply

R A transformer supplies the following outputs from the 115 V  
R 400 Hz power supply :

- R - supply of the load detector functional measuring circuit  
R (10 V RMS).
- R - supply of the load detector monitoring measuring circuit  
R (10 V RMS).
- R - supply of the various potentiometers generating force  
R orders (symmetrical windings 2 x 26 volts RMS : Ref +  
R and Ref -).
- R - supply of electrical channels : two symmetrical windings  
R supply a diode bridge followed by two LC filters. These  
R circuits deliver the two + 16 V and - 16 V voltages which  
R are the stabilized power supplies.

## R 9. Controls and Indicating R (Ref. Fig. 009 )

### R A. Controls and Indicating of the two Artificial Feel Systems

R Each artificial feel system is activated by the engagement  
R of the magnetically held YAW switch, integral with each  
R ARTIFICIAL FEEL engage switch unit No.1 and No.2, located  
R on the overhead panel.  
R This switch remains engaged if the monitoring channel does

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## MAINTENANCE MANUAL

R not detect a fault of the control channel.  
R When detecting a fault :  
R - the supply to the switch engagement holding coil is cut-  
R out.  
R - the supply to the electrovalve is cut-out.  
R - the supply to the servo valve is cut-out.  
R - the engagement switch disengages and indicates OFF.  
R - the gong sounds and the FEEL warning light illuminates  
R on the master warning panel. However, these two warnings  
R are only activated when, both systems 1 and 2 being  
R engaged, both monitoring channels detect a fault.

### R B. Test

R At Flight Engineer's station, two ARTIFICIAL FEEL push  
R buttons : TEST 1 and TEST 2 enable the indicating system  
R of system No.1 and No.2 to be checked.  
R When the engagement switches of a system are engaged, action  
R on the corresponding test push button causes the switch  
R to disengage.

### 10. Electrical Supply

	SERVICE	BUSBAR		C/B PANEL
R	Computer No.1 (1C236)	No.2 ESSENTIAL	115 VAC 6X	2-213
R	YAW stage power supply			
R	Computer No.2 (2C236)	B AVIONICS	115 VAC 11X	13-216
R	YAW stage power supply			

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## MAINTENANCE MANUAL

### ARTIFICIAL FEEL - TROUBLE SHOOTING

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN 24-00-00, SERVICING.

#### 1. General

The following information is intended to enable faults found in flight or on the ground to be quickly rectified.

This information is given in the form of fault analysis synoptic charts.

The defect can be isolated with the aid of the Trouble Shooting procedures and traced through OK and NOT OK paths to the appropriate charts or other specified rectification action as many be necessary.

If a defect occurs perform the appropriate rectification action, then repeat the operation at which the defect was encountered to ensure the operation is OK.

Bracketed numbers in the procedure and charts indicate items on the component identification table (at the end of section)

The table provides information, including component location, required for rectification.

The electrical wiring is assumed to be serviceable. However if the component fault is not found, check the wiring in accordance with the Wiring Diagram Manual (22-23-00).

The system consists of two channels.

Trouble shooting procedure described is for channel 1, trouble shooting procedure for channel 2 is indicated between brackets.

EFFECTIVITY: ALL

R

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## MAINTENANCE MANUAL

### 2. Prepare

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Test-Set - Artificial Feel Jack and Multimeter	TE3098000
or	
Adapter - Rudder Pedal Effort Measurement and Spring Scale 0.50 daN (0-112,4 lbf.)	TE2011-102
Electrical Ground Power Unit	
Circuit Breaker Safety Clips	

- B. Take the precautions described in the previous WARNING paragraph.
- C. Carry out Prepare paragraph described in 27-22-00, Adjustment/Test, paragraph 2, operational test.
- D. Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).

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R

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### 3. Trouble Shooting

\*\*\*\*\*  
 \* On ADC control panel (centre console) place ADC1 \*  
 \* (ADC2) switch in ON position, then place ADC1 \*  
 \* (ADC2) Test switch in position 1. After 30 seconds\*  
 \* approximately blue TEST indicator light must illu-\*  
 \* minate. Press then release amber ADC1 (ADC2) warn-\*  
 \* ing light ; it must go off. \*  
 \* On overhead panel, on ARTIFICIAL FEEL No.1 \*  
 \* (ARTIFICIAL FEEL No.2) unit, engage YAW switch ; \*  
 \* YAW switch remains engaged. \*

\*\*\*\*\*

OK	NOT OK--	Disconnection of yaw Artificial Feel No.1 (No.2) (YAW switch does not engage) Ref. Chart 101
----	----------	--

\*\*\*\*\*  
 \* Deflect Captain's or First Officer's rudder pedals\*  
 \* and check that deflection is carried out normally \*  
 \* (without vibrations) \*

\*\*\*\*\*

OK	NOT OK--	Pressure pulsations on the jack causing light vibrations of rudder pedals for deflections without trim Ref. Chart 102
----	----------	--

\*\*\*\*\*  
 \* Deflect Captain's or First Officer's rudder pedals\*  
 \* and check that after 10.6 plus or minus 0.7 de- \*  
 \* grees, read on ICOVOL indicator (First Officer's \*  
 \* instrument panel) the load necessary to apply in- \*  
 \* creases suddenly. \*

\*\*\*\*\*

OK	NOT OK--	Loss of load increase at the level of the second threshold of Artificial Feel. Ref. Chart 103
----	----------	---

\*\*\*\*\*  
 \* On Flight Engineer's panel 29-214, press ARTIFI- \*  
 \* CIAL FEEL TEST 1 (TEST 2) push button. \*  
 \* On overhead panel, on ARTIFICIAL FEEL No.1 unit \*  
 \* (ARTIFICIAL FEEL No.2) YAW switch disengages \*

\*\*\*\*\*

OK	NOT OK
----	--------

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R

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## MAINTENANCE MANUAL

OK	NOT OK--	Test No.1 (No.2) inconclusive (YAW switch does not disengage) Ref. Chart 104
----	----------	---

\*\*\*\*\*  
\* On overhead panel, on ARTIFICIAL FEEL No.2 unit \*  
\* (ARTIFICIAL FEEL No.1) engage YAW switch : switch \*  
\* disengages. \*  
\* FEEL warning light illuminates on master warning \*  
\* panel and gong sounds. \*  
\*\*\*\*\*

OK	NOT OK--	FEEL warning light does not illuminate and gong does not sound upon loss of both Artificial Feel systems. Ref. Chart 105
----	----------	---

\*\*\*\*\*  
\* On ADC control panel (centre console), place ADC1 \*  
\* (ADC2) TEST switch in NORM position. Amber ADC1 \*  
\* (ADC2) warning light must illuminate. \*  
\* On overhead panel, on ARTIFICIAL FEEL No.1 unit \*  
\* (ARTIFICIAL FEEL No.2) YAW switch disengages \*  
\*\*\*\*\*

OK	NOT OK--	Artificial Feel does not disconnect when an ADC failure occurs. Replace Artificial Feel computer No.1 1C235 [1] (No.2 2C235 [2])
----	----------	---

\*\*\*\*\*  
\* On ADC control panel (centre console), press then \*  
\* release amber ADC1 (ADC2) warning light ; it must \*  
\* go off. \*  
\* On overhead panel, on ARTIFICIAL FEEL No.1 \*  
\* (ARTIFICIAL FEEL No.2) unit engage YAW switch. \*  
\* On circuit breaker panel 2-213 (13-216), trip and \*  
\* set during a time smaller than 1 second circuit \*  
\* breaker YAW ART FEEL COMP 1 SUP (2 SUP) 1C242 \*  
\* (2C242) Map Ref. E2 (G 16) \*  
\* On overhead panel, on ARTIFICIAL FEEL No.1 \*  
\* (ARTIFICIAL FEEL No.2) unit, YAW switch remains \*  
\* engaged. \*  
\*\*\*\*\*

OK	NOT OK
----	--------

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# Concorde

## MAINTENANCE MANUAL

OK	NOT OK--	Disconnection of Artificial Feel due to loss of supply during a time smaller than 1 second. Replace Artificial Feel computer No.1 1C235 [1] (No.2 2C235 [2])
----	----------	---

\*\*\*\*\*  
\* Carry out Prepare paragraph and tests described \*  
\* in 27-22-00, Adjustment/Test, paragraph 3 or 4 \*  
\* (depending on tools and equipment available). \*  
\* Results of tests are conclusive \*  
\*\*\*\*\*

OK	NOT OK--	Functional channel failure causing an error on jack load smaller than the triggering threshold of the comparison channel Ref. Chart 105
----	----------	--

\*\*\*\*\*  
\* End of YAW Artificial Feel trouble shooting \*  
\*\*\*\*\*

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## MAINTENANCE MANUAL

*****		
* DISCONNECTION OF YAW ARTIFICIAL	*	GROUND EQUIPMENT REQUIRED
* FEEL No.1 (No.2) (YAW SWITCH DOES	*	
* NOT ENGAGE)	*	DESCRIPTION PART NO.
*****		
		MULTIMETER

\*\*\*\*\*  
\* Replace Artificial Feel computer No.1 1C235 [1] \*  
\* (No.2 2C235 [2]) \*  
\* On overhead panel, on ARTIFICIAL FEEL No.1 unit \*  
\* (ARTIFICIAL FEEL No.2) engage YAW switch : it \*  
\* disengages \*

\*\*\*\*\*

		-----	
YES	NO----	Replaced Artificial Feel computer was faulty	
		-----	

\*\*\*\*\*  
\* Replace Artificial Feel No.1 unit 1C236 \*  
\* [3] (No.2 2C236 [4]) \*  
\* On overhead panel, on ARTIFICIAL FEEL No.1 unit \*  
\* (ARTIFICIAL FEEL No.2) engage YAW switch : this \*  
\* switch disengages \*

\*\*\*\*\*

		-----	
YES	NO----	Replaced Artificial Feel unit was faulty	
		-----	

\*\*\*\*\*  
\* Replace AIR DATA COMPUTER 1 1F71 [5] (ADC 2 \*  
\* 2F71 [6]) \*  
\* On ADC control panel (centre console), place ADC1 \*  
\* (ADC2) switch in ON position, then place ADC1 \*  
\* (ADC2) TEST switch in position 1. After 30 seconds \*  
\* approximately, blue TEST indicator light must \*  
\* illuminate. Press and release amber ADC1 (ADC2) \*  
\* warning light ; this light must go off. \*  
\* On overhead panel, on ARTIFICIAL FEEL No.1 \*  
\* (ARTIFICIAL FEEL No.2) unit, engage YAW switch ; \*  
\* switch disengages. \*

\*\*\*\*\*

		-----	
YES	NO----	Replaced ADC was faulty	
		-----	

Chart 101 (Sheet 1 of 2)

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## MAINTENANCE MANUAL

||  
YES  
||

\*\*\*\*\*  
\* Connect a voltmeter between pins 20 and 21 of test\*  
\* connector P 23 on front face of Artificial Feel \*  
\* computer No.1 (No.2) 1C235 (2C235) \*  
\* AC voltage read on voltmeter is : \*  
\*\*\*\*\*

 26V	 0V----	----- Replace circuit breaker YAW ART FEEL, COMP 1 SUP 1C242 [7] (COMP 2 SUP 2C242 [8]) -----
 -----	-----	----- Replace Blue jack 1C238 [9] (Green 2C238 [10]) -----

Chart 101 (Sheet 2 of 2)

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## MAINTENANCE MANUAL

*****		-----	
* PRESSURE PULSATIONS ON THE JACK	*	GROUND EQUIPMENT REQUIRED	
* CAUSING VIBRATIONS OF THE RUDDER	*	-----	
* PEDALS FOR DEFLECTIONS WITHOUT TRIM	*	DESCRIPTION	PART NO.
*****		-----	
		-	-
		-----	

\*\*\*\*\*  
\* Replace Artificial Feel computer No.1 1C235 [1] \*  
\* (No.2 2C235 [2]) \*  
\* On overhead panel, on ARTIFICIAL FEEL No.1 \*  
\* (ARTIFICIAL FEEL No.2) unit, engage YAW switch. \*  
\* Deflect Captain's or First Officer's rudder pedals \*  
\* and check that deflection is carried out normally \*  
\* (without vibrations) \*  
\*\*\*\*\*

		-----	
YES	NO----	Replace blue jack 1C238 [9] (Green 2C238 [10])	
		-----	
		Replaced Artificial Feel computer was faulty	
		-----	

Chart 102 (Sheet 1 of 1)

EFFECTIVITY: ALL

R

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# Concorde

## MAINTENANCE MANUAL

*****		
* LOSS OF LOAD INCREASE AT THE LEVEL	*	GROUND EQUIPMENT REQUIRED
* OF THE SECOND THRESHOLD OF	*	
* ARTIFICIAL FEEL	*	DESCRIPTION PART NO.
*****		
		MULTIMETER

\*\*\*\*\*  
\* Connect a voltmeter between pins 6 and 2 of test \*  
\* connector P23 located on front face of Artificial \*  
\* Feel computer No.1 (No.2) 1C235 (2C235) AC voltage\*  
\* read on voltmeter when no deflection is exerted on\*  
\* rudder pedals is 13 volts approximately. \*  
\*\*\*\*\*

		-----	
YES	NO----	Replace deflection sensor C246 [13]	
		-----	

\*\*\*\*\*  
\* Connect a voltmeter between pins 7 and 2 of test \*  
\* connector P23 located on front face of Artificial \*  
\* Feel computer No.1 (No.2) 1C235 (2C235). \*  
\* AC voltage read on voltmeter is 7.5 volts approx. \*  
\*\*\*\*\*

		-----	
YES	NO----	Replace Air Data Computer 1 1F71 [5]	
		(ADC2 2F71 [6])	
		-----	
		-----	
		Replace Artificial Feel computer No.1 1C235	
		[1] (No.2 2C235 [2])	
		-----	

Chart 103 (Sheet 1 of 1)

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

*****	
* TEST No.1 (No.2) INCONCLUSIVE (YAW * * SWITCH DOES NOT DISENGAGE) *	GROUND EQUIPMENT REQUIRED
*****	
	DESCRIPTION PART NO.
	- -
*****	

\*\*\*\*\*  
 \* On circuit breaker panel 2-213 (13-216) check that\*  
 \* circuit breaker ROLL ART FEEL COMP 1 SUP 1C243 \*  
 \* (COMP 2 SUP 2C243) Map Ref. E3 (E 17) is set. \*  
 \* On overhead panel, on ARTIFICIAL FEEL No.1 unit \*  
 \* (ARTIFICIAL FEEL No.2) engage ROLL and YAW \*  
 \* switches. \*  
 \* On Flight Engineer's panel 29-214, press \*  
 \* ARTIFICIAL FEEL TEST 1 (TEST 2) push button. \*  
 \* On overhead panel, on ARTIFICIAL FEEL No.1 \*  
 \* (ARTIFICIAL FEEL No.2) unit, ROLL switch disenga- \*  
 \* ges. \*  
 \*\*\*\*\*

		Replace Artificial Feel test push button 1C245
YES	NO----	[11] (2C245 [12])
		Replace Artificial Feel computer No.1 1C235
	-----	[1] (No.2 2C235 [2])

Chart 104 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

```
*****
* FEEL WARNING LIGHT DOES NOT * | GROUND EQUIPMENT REQUIRED |
* ILLUMINATE AND GONG DOES NOT SOUND * |-----|
* UPON LOSS OF BOTH ARTIFICIAL FEEL * | DESCRIPTION PART NO. |
* SYSTEMS * |-----|
***** | MULTIMETER |
```

```
*****
* On circuit breaker panel 2-213 (13-216), check *
* that circuit breaker ROLL ART FEEL COMP 1 SUP *
* 1C243 (COMP 2 SUP 2C243) Map Ref. E3 (G17) is set *
* On overhead panel, on ARTIFICIAL FEEL No.1 and *
* No.2 units engage ROLL switches (ROLL switch *
* No.2 (No.1) disengages) *
* On Flight Engineer's panel 29-214, press *
* ARTIFICIAL FEEL TEST 1 (TEST 2) push button. *
* FEEL warning light illuminates on master warning *
* panel and gong sounds. *
```

\*\*\*\*\*

```
||
YES NO----| Ref. 33-15-00, Trouble Shooting |
||
```

```
*****
* On overhead panel, remove ARTIFICIAL FEEL *
* No.1 unit [3] 1C236, then on this unit check *
* continuity between pins 44 and 43 then 30 and 33 *
* (YAW switch indicates OFF). There is continuity *
```

\*\*\*\*\*

```
||
YES NO----| Replace ARTIFICIAL FEEL No.1 unit [3] 1C236 |
||
```

```
*****
* On overhead panel, remove ARTIFICIAL FEEL *
* No.2 unit [4] 2C236, then on this unit check *
* continuity between pins 44 and 43 then 30 and 33 *
* (YAW switch indicates OFF). There is continuity. *
```

\*\*\*\*\*

```
||
YES NO----| Replace ARTIFICIAL FEEL No.2 unit [4] 2C236 |
||
|-----| Ref : 33-15-00, Trouble Shooting |
|-----|
```

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## MAINTENANCE MANUAL

*****	
* FAILURE OF THE FUNCTIONAL CHANNEL *	GROUND EQUIPMENT REQUIRED
* CAUSING AN ERROR ON THE JACK LOAD *	
* SMALLER THAN THE TRIGGERING *	DESCRIPTION PART NO.
* THRESHOLD OF THE COMPARISON CHANNEL *	
*****	
	TEST SET
	ARTIFICIAL FEEL
	JACK- TE3098000
	VOLTMETER- -
	OR
	ADAPTER - RUDDER TE2011-102
	PEDAL EFFORT
	MESUREMENT
	SPRING SCALE
	0 - 50 daN (0-112.4 lbf.)

\*\*\*\*\*  
\* Replace Artificial Feel computer No.1 [1] 1C235 \*  
\* (No.2 [2] 2C235) \*  
\* Repeat tests which led to the fault : results of \*  
\* tests are conclusive. \*  
\*\*\*\*\*

		-----
YES	NO---	Replace blue jack 1C238 [9] (Green 2C238 [10])
		-----
	-----	Replaced Artificial Feel computer was faulty.

Chart 106 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[1] Artificial feel computer No.1	215BS	6-215	1C235	Electronics rack LH	27-32-44 R/I	27-22-01
[2] Artificial feel computer No.2	216BS	6-215	2C235	Electronics rack RH	27-32-44 R/I	27-22-01
[3] Artificial feel engage switch unit 1		4-211	1C236	Overhead panel	27-32-41 R/I	27-22-01
[4] Artificial feel engage switch unit 2		4-211	2C236	Overhead panel	27-32-41 R/I	27-22-01
[5] Air data computer 1	215BS	6-215	1F71	Electronics rack LH	34-00-00 R/I	27-22-01
[6] Air data computer 2	216BS	6-216	2F71	Electronics rack RH	34-00-00 R/I	27-22-01
[7] Circuit breaker 115 VAC		2-213	1C242	Map Ref. E2	24-50-00 R/I	27-22-01
[8] Circuit breaker 115 VAC		13-216	2C242	Map Ref. G16	24-50-00 R/I	27-22-01
[9] Blue artificial feel jack	121DB	121	1C238	Under cabin floor	27-24-13 R/I	27-22-01
[10] Green artificial feel jack	121DB	121	2C238	Under cabin floor	27-24-11 R/I	27-22-01
[11] Press to test push-button		29-214	1C245	Flight Engineer's panel		27-22-01

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## MAINTENANCE MANUAL

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[12] Press to test push-button		29-214	2C245	Flight panel		27-22-01
[13] Deflection sensor	121AB	121	C246	Under cabin floor	27-22-11 R/I	27-22-01

Component Identification  
Table 101

#### 4. Close-Up

- A. Carry out Close-Up operations described in 27-22-00, Adjustment/Test paragraph 3 or 4 : Functional Test.

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## MAINTENANCE MANUAL

### ARTIFICIAL FEEL - ADJUSTMENT/TEST

WARNING: MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE: DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED: DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The purpose of the following tests is to:

- A. Check the correct operation of the Artificial Feel No.1 and No.2 control and monitor channels.
  - (1) Pressure test and check of the deflection limits.
  - (2) Disconnection due to overpressure (test function).
  - (3) Disconnection due to underpressure.
  - (4) Disconnection due to Air Data Computer failure.
  - (5) Functional test of jack electrovalve.
- B. Check the loads delivered by Artificial Feel systems No.1 and No.2:
  - (1) By means of equipment TE3098000.
  - (2) When equipment TE3098000 is not available.

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## MAINTENANCE MANUAL

### 2. Operational Test

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical ground power unit	-
Circuit breaker safety clips	-
Simulator - pressure sensors	87-209-455

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Aircraft must be in ground configuration, shock absorbers compressed.
- (3) Trip, safety and tag the following circuit breaker:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
STICK SHAKER SUP	1-213	W 513	P15

- (4) Check that the following circuit breakers are set:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW A SYS SUP	1-213	G 292	M17
ADC 1 28 V SUP		1F 74	P12
1ST PLT ADC INST SUP	2-213	1F 75	B 3
ADC 1 26 V SUP		1F 78	A 2
YAW ART FEEL COMP 1 SUP		1C 242	E 2
ADC 1 115 V SUP		1F 73	F 3
RH UC WEIGHT SW B SYS SUP	3-213	G 294	B 9
ADC 2 28 V SUP	5-213	2F 74	F12
2ND PLT ADC INST SUP	13-216	2F 75	A14
ADC 2 26 V SUP		2F 78	F14
ADC 2 115 V SUP		2F 73	F15
YAW ART FEEL COMP 2 SUP		2C 242	G16

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## MAINTENANCE MANUAL

- (5) Remove safety clip and tag and set the following circuit breaker:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
NAV INST BUS 13XS	13-216	X 345	G 4

- (6) On ADC control panel, (centre console) check that:
- ADC1 and ADC2 switches are in OFF position,
  - ADC1 and ADC2 TEST selector switches are in NORM position.
- (7) Carry out Prepare paragraph operations of Procedure to set Flight Controls in Mechanical Mode (Ref. 27-00-00, Servicing).
- (8) On Captain's and First Officer's airspeed indicators (respectively located on Captain's and First Officer's instrument panels) make certain that mode selector knobs are positioned with N markers visible (Normal).
- (9) Connect pressure sensor simulator to front face of ADC1 (1F71) (on shelf 6-215).  
On simulator, make certain that:
- SIMUL-SENSOR switch is in SENSOR position,
  - ALTITUDE COARSE potentiometer is set to 1013,
  - AIRSPEED COARSE potentiometer is set to 4.

NOTE: During the following tests, take only aural and visual warnings or indicators which are mentioned into account.

### C. Pressure Test and Check of the Deflection Limits

- (1) Carry out Procedure to set Flight Controls in Mechanical Mode (Ref. 27-00-00, Servicing).

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## MAINTENANCE MANUAL

- (2) Deflect rudder pedals to obtain rudder deflection of approximately 20° to the right and to the left.

NOTE: Check rudder deflection value on ICOVOL indicator (Flight Control Surface Position Indicator) (First Officer's instrument panel).

Load applied to rudder pedals must be progressive.

- (3) On ADC control panel (centre console).

(a) Place ADC1 and ADC2 switches in ON position.

(b) Place ADC1 and ADC2 TEST selector switches in position 2.

b1) Amber ADC1 and ADC2 warning lights must illuminate.

b2) After approximately one minute (if aircraft nose is in down position) Blue TEST indicator lights must illuminate.

b3) Press then release amber ADC1 and ADC2 warning lights. They must go off.

- (4) On overhead panel, on ARTIFICIAL FEEL No.1 engage switch unit engage YAW switch. It must remain engaged.

- (5) Deflect rudder pedals to obtain a rudder deflection of approximately 20° to the right and to the left.

NOTE: Check rudder deflection value on ICOVOL indicator (First Officer's instrument panel).

(a) Between 0 and 7.7 degrees plus or minus 0.7 degrees, the load applied to rudder pedals must be progressive, and for an identical deflection, greater than during operation (2).

(b) At 7.7 degrees plus or minus 0.7 degrees load must increase suddenly.

(c) Beyond this threshold, load must increase progressively.

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## MAINTENANCE MANUAL

- (d) When returning to 0 degree position, the load increase met in (b) must disappear at approximately 7 degrees.
- (6) On overhead panel:
  - (a) On ARTIFICIAL FEEL No.1 engage switch unit, disengage YAW switch.
  - (b) On ARTIFICIAL FEEL No.2 engage switch unit, engage YAW switch. It must remain engaged.
- (7) Repeat operation (5). Results must be identical.
- (8) On ADC control panel, (centre console).
  - (a) Place ADC1 and ADC2 TEST selector switches in NORM position.
  - (b) Place ADC1 and ADC2 switches in OFF position.
  - (c) On ARTIFICIAL FEEL No.2 engage switch unit (on overhead panel) YAW switch must disengage.
- (9) Shut down pressurization of Blue and Green hydraulic systems (Ref. 29-12-00 and 29-11-00, Servicing).
- (10) On Flight Control Unit (overhead panel) place GREEN INVERTER and BLUE INVERTER switches in PWR OFF position.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### D. Disconnection Due to Overpressure (Test Function)

- (1) On ADC control panel, (centre console), place ADC1 and ADC2 switches in ON position.  
If amber ADC1 and ADC2 warning lights illuminate press then release them. They must go off.
- (2) On overhead panel, on ARTIFICIAL FEEL No.1 and ARTIFICIAL FEEL No.2 engage switch units, engage YAW switches. They must remain engaged.
- (3) On Flight Engineer's panel 29-214, press then release each ARTIFICIAL FEEL TEST 1 and TEST 2 push-button.
  - (a) When the first push-button is pressed, YAW switch on ARTIFICIAL FEEL No.1 engage switch unit must disengage.
  - (b) When the second push-button is pressed:
    - Gong must sound,
    - On overhead panel, on master warning panel, FEEL warning light must illuminate,
    - YAW switch on ARTIFICIAL FEEL No.2 engage switch unit must disengage.
- (4) On ADC control panel, (centre console), place ADC1 and ADC2 switches in OFF position.
- (5) On overhead panel, on master warning panel, press and release FEEL warning light.
  - It must go off.

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## MAINTENANCE MANUAL

### E. Disconnection Due to Underpressure - Test (No Hydraulic Systems Pressurized).

- (1) On ADC control panel, (centre console).
  - (a) Place ADC1 switch in ON position.
  - (b) If required, press then release amber ADC1 warning light. This light must go off.
- (2) On pressure sensor simulator:
  - (a) Place SIMUL-SENSOR switch in SIMUL position.
  - (b) Slowly adjust AIRSPEED potentiometer so as to read 400 kts on Captain's instrument panel airspeed indicator (approximately 284 on AIRSPEED potentiometer).
- (3) On ADC control panel (centre console), if required, press and release amber ADC1 warning light. This light must go off.
- (4) On overhead panel, on ARTIFICIAL FEEL No.1 engage switch unit, YAW switch falls as soon as it is engaged.
- (5) On pressure sensor simulator.
  - (a) Reduce value of AIRSPEED potentiometer to 4.
  - (b) Place SIMUL-SENSOR switch in SENSOR position.
- (6) On ADC control panel (centre console), place ADC1 switch in OFF position.
- (7) Disconnect pressure sensor simulator from ADC1 and, on shelf 6-216, connect simulator to front face of ADC2.
- (8) On ADC control panel (centre console).
  - (a) Place ADC2 switch in ON position.
  - (b) If required, press and release amber ADC2 warning light. This light must go off.

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- (9) On pressure sensor simulator.
  - (a) Place SIMUL-SENSOR switch in SIMUL position.
  - (b) Slowly adjust AIRSPEED potentiometer, so as to read 400 kts on First Officer's instrument panel airspeed indicator (approximately 284 on AIRSPEED potentiometer).
- (10) On ADC control panel (centre console), if necessary, press and release amber ADC2 warning light. This light must go off.
- (11) At overhead panel, on ARTIFICIAL FEEL No.2 engage switch unit check that YAW switch falls as soon as it is engaged.
- (12) At overhead panel, on master warning panel, press, if necessary, and release FEEL warning light. This light must go off.
- (13) On pressure sensor simulator.
  - (a) Reduce value of AIRSPEED potentiometer to 4.
  - (b) Place SIMUL-SENSOR switch in SENSOR position.
- (14) On ADC control panel (centre console), place ADC2 switch in OFF position.
- (15) Disconnect pressure sensor simulator from ADC2.

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## MAINTENANCE MANUAL

### F. Disconnection Due to ADC Failure - Test

- (1) On ADC control panel, (centre console), place ADC1 and ADC2 switches in ON position.  
If amber ADC1 and ADC2 warning lights illuminate, press then release them. They must go off.
- (2) On overhead panel, on ARTIFICIAL FEEL No.1 and ARTIFICIAL FEEL No.2 engage switch units, engage YAW switches. They must remain engaged.
- (3) On ADC control panel, place ADC1 and ADC2 switches in OFF position.  
  
On overhead panel, on ARTIFICIAL FEEL No.1 and ARTIFICIAL FEEL No.2 engage switch units, YAW switches must disengage.  
  
- When the second switch disengages, gong must sound and FEEL warning light, on master warning panel, must illuminate.
- (4) On overhead panel, on master warning panel, press and release FEEL warning light.  
  
- It must go off.

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## MAINTENANCE MANUAL

### G. Functional Test of Jack Electrovalve

- RB (1) Function test in accordance with 27-32-44, Adjustment/Test,  
RB para.2.D.(2).  
RB

### H. Close-Up

- (1) Remove safety clip and tag and reset the following circuit breaker:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
STICK SHAKER SUP	1-213	W 513	P15

- (2) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).
- (3) On overhead panel, on Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position.
- (4) Trip, safety and tag the following circuit breakers:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT & NAV BUS 14XS	2-213	X 355	H 2
NAV INST BUS 13XS	13-216	X 345	G 4

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## MAINTENANCE MANUAL

### 3. Functional Test, using Equipment TE3098000

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Protractor - elevon and rudder	TE2012000
Test set - artificial feel jack	TE3098000
Jig - neutral setting - rudder	E920112000
Access platform - 36 ft 11 in (11.25 mm)	-
Electrical ground power unit	-
Circuit breaker safety clips	-
Ground service telephone	-
Voltmeter, DC: 0.5 V range, 0.1% accuracy	-

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Trip, safety and tag the following circuit breakers:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
STICK SHAKER SUP	1-213	W 513	P15
YAW ART FEEL COMP 1 SUP	2-213	1C 242	E 2
ROLL ART FEEL COMP 1 SUP		1C 243	E 3
PITCH ART FEEL COMP 1 SUP		1C 244	E 4
YAW ART FEEL COMP 2 SUP	13-216	2C 242	G16
ROLL ART FEEL COMP 2 SUP		2C 243	G17
PITCH ART FEEL COMP 2 SUP		2C 244	G18

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- (3) Make certain that the following circuit breakers are set:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW "A" SYS SUP ADC 1 28 V SUP	1-213	G 292 1F 74	M17 P12
ADC 1 26 V SUP 1ST PLT ADC INST SUP ADC 1 115 V SUP	2-213	1F 78 1F 75 1F 73	A 2 B 3 E 3
RH UC WEIGHT SW "B" SYS SUP	3-213	G 294	B 9
ADC 2 28 V SUP	5-213	2F 74	F12
2ND PLT ADC INST SUP ADC 2 26 V SUP ADC 2 115 V SUP	13-216	2F 75 2F 78 2F 73	A14 F14 F15

- (4) Remove safety clip and tag and set the following circuit breaker:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
NAV. INST. BUS 13XS	13-216	X 345	G4

- (5) On shelf 6-215:

- (a) Unlock and remove Artificial Feel computer No.1 (1C 235) (Ref. 27-32-44, Removal/Installation).
- (b) Connect tool TE3098000 in place of the computer.
- (c) Connect computer (1C 235) to equipment TE3098000.

NOTE: Refer to the operational handbook to operate equipment TE3098000.

- (6) On front face of equipment TE3098000, make certain that M-A switches are in position A.
- (7) On ADC control panel (centre console), check that ADC1 and ADC2 switches are in OFF position and corresponding TEST selector switches are in NORM position.
- (8) Set flight controls in mechanical mode (Ref. 27-00-00, Servicing).

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- (9) Check rudder neutral position by means of equipment E920112000.
- (10) Install protractor TE2012000 on rudders and set to zero.

### C. Test

- (1) Remove safety clip and tag and reset the following circuit breaker:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
YAW ART FEEL COMP 1 SUP	2-213	1C 242	E 2

- (2) On shelf 6-215, on the front face of equipment TE3098000, connect voltmeter to SORTIE terminals of DIRECTION channel and place the relevant switch in position M.

NOTE: If required, adjust voltmeter zero position.

- (3) At centre console, on ADC control panel, place ADC1 switch in ON position.

The ADC1 warning light may illuminate.

- (4) If required, press and release ADC1 warning light to extinguish it.
- (5) On overhead panel, on ARTIFICIAL FEEL No.1 engage switch unit, engage YAW switch.
- (6) With rudders in Neutral position, (check with protractor), check that the voltage read on voltmeter connected to equipment TE3098000 is 0 plus 0.20 V.
- (7) On ADC control panel (centre console), place ADC1 TEST selector switch in position 1.
  - (a) ADC1 warning light must illuminate.
  - (b) After approximately 30 seconds, Blue TEST indicator light must illuminate.
- (8) With rudders still in Neutral position (check with protractor), check that the voltage read on voltmeter connected to equipment TE3098000 is 2.67 plus or minus 0.76 V.

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- (9) At centre console, operate yaw trim control to achieve a 10.6 degrees plus or minus 0.7 degrees deflection to the right, then to the left (use protractor).

During this operation, the voltage read on voltmeter connected to equipment TE3098000 must be constantly equal to 2.67 plus or minus 0.76 V.

- (10) Repeat operation (9) with a deflection greater than 10.6 degrees plus or minus 0.7 degrees.

The voltage read on voltmeter connected to equipment TE3098000 must be 3.94 plus or minus 0.89 V.

- (11) On overhead panel, on ARTIFICIAL FEEL No.1 engage switch unit, disengage YAW switch.

- (12) At centre console on ADC control panel:

- (a) Place ADC1 TEST selector switch in NORM position.
- (b) Place ADC1 switch in OFF position.

- (13) At centre console, return yaw trim control to 0 position.

- (14) Trip, safety and tag the following circuit breaker:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
YAW ART FEEL COMP 1 SUP	2-213	1C 242	E2

- (15) On shelf 6-215:

- (a) On equipment TE3098000, DIRECTION channel, place M-A switch in position A.
- (b) Disconnect voltmeter.
- (c) Disconnect Artificial Feel computer No.1 (1C 235) from equipment TE3098000.
- (d) Remove equipment TE3098000.
- (e) Install and lock Artificial Feel computer No.1 on shelf (Ref. 27-32-44, Removal/Installation).

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- (16) On shelf 6-216:
- (a) Unlock and remove Artificial Feel computer No.2 (2C 235) (Ref. 27-32-44, Removal/Installation).
  - (b) Connect equipment TE3098000 in place of the computer.
  - (c) Connect computer (2C 235) to equipment TE3098000.
  - (d) Connect the voltmeter to SORTIE terminals of DIRECTION channel.
- (17) On equipment TE3098000 make certain that M-A switches are in position A.
- (18) Remove safety clip and tag and reset the following circuit breaker:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
YAW ART FEEL COMP 2 SUP	13-216	2C 242	G16

- (19) Repeat operations from paragraph (2) to (13) inclusive, for ARTIFICIAL FEEL No.2 and ADC2 systems. Results must be identical.
- (20) Trip, safety and tag the following circuit breaker:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
YAW ART FEEL COMP 2 SUP	13-216	2C 242	G16

- (21) On shelf 6-216:
- (a) On equipment TE3098000, DIRECTION channel, place M-A switch in position A.
  - (b) Disconnect voltmeter.
  - (c) Disconnect Artificial Feel computer No.2 (2C 235) from equipment TE3098000.
  - (d) Remove equipment TE3098000.
  - (e) Install Artificial Feel computer No.2 (2C 235) and lock (Ref. 27-32-44, Removal/Installation).

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (22) Remove protractor from rudders.
- (23) Carry out test (27-32-44, Adjustment/Test).

### D. Close-Up

- (1) Carry out Close-Up operations of Procedure to set Flight Controls in Mechanical Mode (Ref. 27-00-00, Servicing).
- (2) Remove safety clips and tags and reset the circuit breakers.
- (3) Trip, safety and tag the following circuit breaker:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
NAV INST BUS 13XS	13-216	X 345	G 4

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EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### 4. Functional Test Without Equipment TE3098000

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Adapter - rudder pedal effort measurement	TE2011-102
Electrical ground power unit	-
Spring scale: 0 - 50 daN (0 - 112.4 lbf)	-
Circuit breaker safety clips	-

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) On LH rudder pedal, install adapter TE2011-102. Attach spring scale to the adapter.
- (3) Make certain that the following circuit breakers are set:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW A SYS SUP ADC 1 28 V SUP	1-213	G 292 1F 74	M17 P12
ADC 1 26 V SUP 1ST PLT ADC INST SUP YAW ART FEEL COMP 1 SUP ADC 1 115 V SUP	2-213	1F 78 1F 75 1C 242 1F 73	A 2 B 3 E 2 F 3
RH U/C WEIGHT SW B SYS SUP	3-213	G 294	B 9
ADC 2 28 V SUP	5-213	2F 74	F12
2ND PLT ADC INST SUP ADC 2 26 V SUP ADC 2 115 V SUP YAW ART FEEL COMP 2 SUP	13-216	2F 75 2F 78 2F 73 2C 242	A14 F14 F15 G16

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (4) Remove safety clip and tag and set the following circuit breaker:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
NAV INST BUS 13XS	13-216	X 345	G 4

- (5) Trip, safety and tag the following circuit breaker:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
STICK SHAKER SUP	1-213	W 513	P15

- (6) On ADC control panel (centre console), make certain that ADC1 and ADC2 switches are in OFF position and ADC1 and ADC2 TEST selector switches are in NORM position.
- (7) Carry out Procedure to set Flight Controls in Mechanical Mode (Ref. 27-00-00, Servicing).
- (8) Make certain that trim controls are set to zero.
- (9) Make certain that, on overhead panel, on ARTIFICIAL FEEL No.1 and No.2 engage switch units, YAW switches are not engaged.

NOTE: During test, do not take aural or visual warnings which are not mentioned into account.

### C. Test

- (1) Pull spring scale attached to adapter TE2011-102, which is installed on LH rudder pedal, until a rudder deflection of 2 degrees is read on ICOVOL indicator.

NOTE: Force on spring scale must be exerted progressively and continuously.

- Spring scale must read F 1 = 12.5 daN (28.1 lbf) approx.

- (2) Continue to exert force on spring scale until a rudder deflection of 5 degrees is obtained (Ref. NOTE above).

- Spring scale must read F 2 = 16.1 daN (36.19 lbf) approx.

- (3) Release force on spring scale.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (4) Calculate resistance as per formula:  $\frac{F2 - F1}{5 - 2}$
- This mechanical resistance must be between 0.99 daN (2.225 lbf) for each degree of rudder deflection and 1.21 daN (2.72 lbf) for each degree of rudder deflection.
- (5) On ADC control panel (centre console), place ADC1 switch in ON position. (If ADC1 warning light illuminates, press and release it. It must go off).
- (6) On overhead panel, on ARTIFICIAL FEEL No.1 engage switch unit engage YAW switch.
- This switch must remain engaged.
- (7) Pull again spring scale until a rudder deflection of 2 degrees is obtained (Ref. NOTE above).
- Spring scale must read F 3 = F 1 plus or minus 0.6 daN (1.35 lbf).
- (8) Continue to pull spring scale until a rudder deflection of 5 degrees is obtained.
- Spring scale must read F 4 = F 2 plus or minus 0.6 daN (1.35 lbf).
- (9) Release force on spring scale.
- (10) On ADC control panel (centre console), place ADC1 TEST selector switch in position 1.
- Amber ADC1 warning light must illuminate,
  - YAW switch on ARTIFICIAL FEEL No.1 engage switch unit must disengage,
  - After approximately 30 seconds, blue ADC1 TEST indicator light must illuminate.
- (11) Press and release ADC1 warning light.
- This warning light must illuminate.
- (12) On overhead panel, on ARTIFICIAL FEEL No.1 engage switch unit engage YAW switch.
- This switch must remain engaged.

EFFECTIVITY: ALL

# *Concorde*

## MAINTENANCE MANUAL

- (13) Pull spring scale until a rudder deflection of 2 degrees is obtained (Ref. NOTE above).
  - Spring scale must read F 5 = 18.9 daN (42.49 lbf) approx.
- (14) Continue to pull spring scale until a rudder deflection of 5 degrees is obtained (Ref. NOTE above).
  - Spring scale must read F 6 = 32.7 daN (73.51 lbf) approx.
- (15) Continue to pull spring scale until a rudder deflection of 10.6 plus or minus 0.7 degrees is obtained. For this value check that force increases suddenly.
- (16) Release spring scale.
- (17) Calculate resistance as per formula: 
$$\frac{F6 - F5}{5 - 2}$$
  - This mechanical resistance must be between 3.95 daN (8.88 lbf) for each degree of rudder deflection and 4.81 daN (10.81 lbf) for each degree of rudder deflection.
- (18) On overhead panel on ARTIFICIAL FEEL No.1 engage switch unit, disengage YAW switch.
- (19) On ADC control panel (centre console), place ADC1 TEST selector switch in NORM position, then place ADC1 switch in OFF position.
- (20) Repeat operations (1) to (19) above, replacing ADC1 and ARTIFICIAL FEEL No.1 by ADC2 and ARTIFICIAL FEEL No.2.
  - Results must be identical.

### D. Close-Up

- (1) Carry out close-up operations of Procedure to set Flight Controls in Mechanical Mode (Ref. 27-00-00, Servicing).
- (2) Remove spring scale and adapter TE2011-102.
- (3) Remove safety clip and tag and set the following circuit breaker:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
STICK SHAKER SUP	1-213	W 513	P15

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (4) Trip, safety and tag the following circuit breaker:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
NAV INST BUS 13XS	13-216	X 345	G 4

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EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### YAW DEFLECTION SENSOR - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The yaw deflection sensor transmits the deflection angle of the yaw axis to the artificial feel computer.

#### 2. Yaw Deflection Sensor

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pin - Yaw Shaft	D925357000
Rigging Pin - Yaw Potentiometer	E920002000
Circuit Breaker Safety Clips	
Access Platform 3.672 m (12 ft.)	
Lockwire dia. 1 mm (0.041 in.) Corrosion Resistant Steel	

##### B. Prepare

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
YAW ART FEEL COMP 1 SUP	2-213	1C 242	E 2
YAW ART FEEL COMP 2 SUP	13-216	2C 242	G16
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

- (3) Make certain that yaw trim control is in zero position.
- (4) Open access door 151DB and depressurize the Green, Blue and Yellow hydraulic systems.

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED DISPLAY A WARNING NOTICE ON THIS UNIT, PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (5) Open access panels 113DB and 121AB, and insert rigging pin in yaw torque tube.

### C. Remove

- (1) Disconnect electrical connectors from sensor.
- (2) Remove link (1). Remove cotters and remove nuts (2) ; remove washers (3) and bolts (5) complete with washers (4).
- (3) Remove sensor unit (9). Remove bolts (8), remove washers (7) and recover sensor unit (9) and shim plate (6).

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### D. Preparation of Replacement Component

### E. Install

- (1) Make certain that electrical zero adjustment of sensor unit has been carried out on a test bench.
- (2) Install shim plate (6), and sensor unit (9).
- (3) Install washers (7) and tighten bolts (8).
- (4) Insert rigging pin in sensor unit. Install link (1) on sensor unit using bolt (5), washers (4) and (3) and nut (2). Tighten nut and safety with cotter.
- (5) Adjust link (1) to length and connect it to torque tube (1) using bolt (5), washers (4) and (3), and nut (2). Tighten nut and safety with cotter. Safety the locknuts on adjustable link (1), using lockwire.
- (6) Make certain that the yaw potentiometer rigging pin can be freely removed.
- (7) Remove rigging pins.
- (8) Connect electrical connectors to sensor.
- (9) Remove safety clips and tags and set the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
YAW ART FEEL COMP 1 SUP	2-213	1C 242	E 2
YAW ART FEEL COMP 2 SUP	13-216	2C 242	G16
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

### F. Test

- (1) Carry out an operational test (Ref. 27-22-00, Adjustment/Test paragraph 2 C).
- (2) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

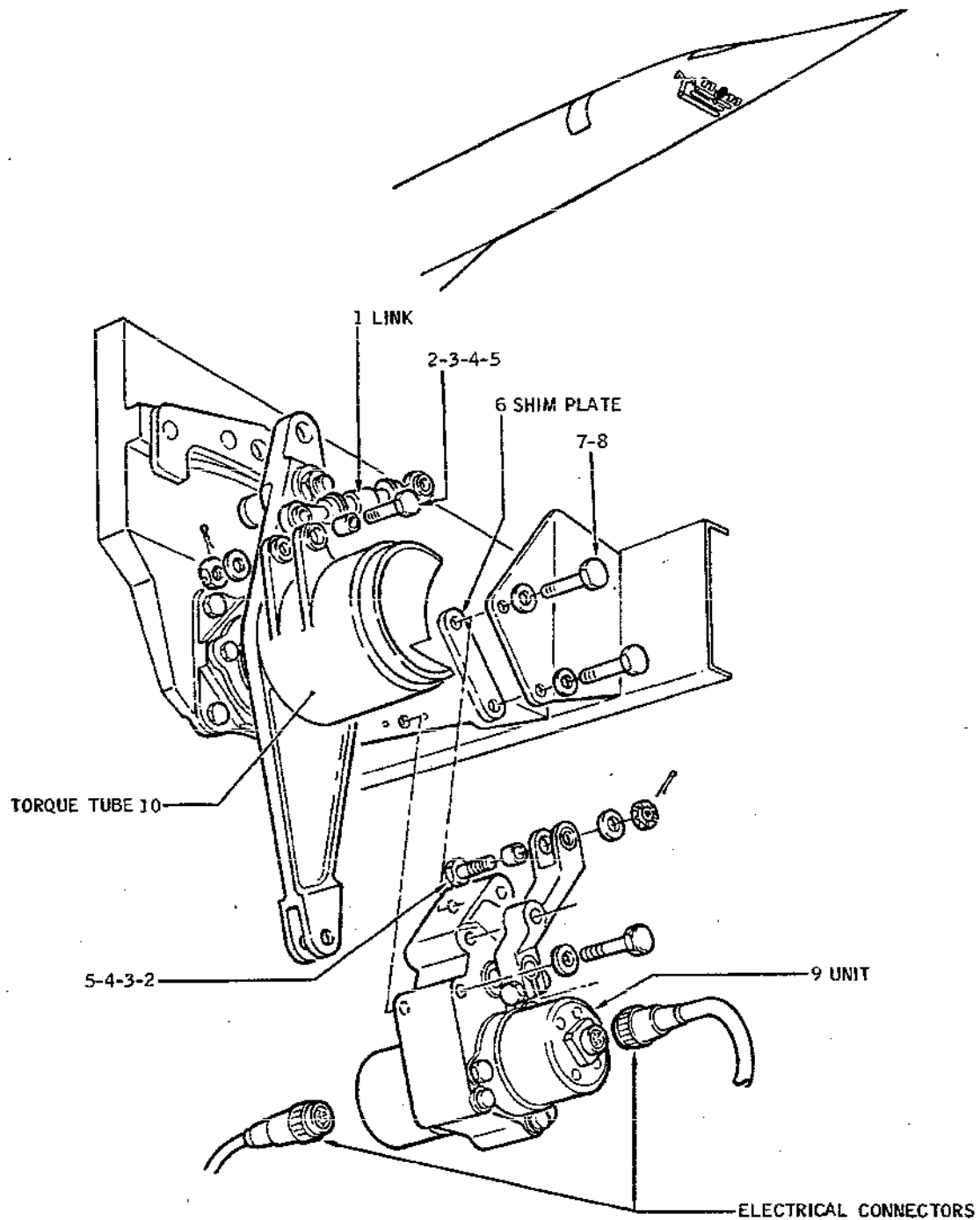
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Yaw Deflection Sensor  
Figure 401

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## MAINTENANCE MANUAL

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access doors and panels 121AB, 113DB, 151DB.
- (3) Remove warning notices.
- (4) Remove access platform.

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

### SPRING ROD - REMOVAL/INSTALLATION

- WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.
- MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.
- BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.
- BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.
- MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The spring rod constitutes the artificial feel at low speeds.

#### 2. Spring Rod

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins - Synchro Pack	D925252000
Rigging Pins - Set - Integral Trim - Pitch/Roll/Yaw	D921277000
Access Platforms 3.672 m (12 ft.)	
Circuit Breaker Safety Clips	
Lockwire, Dia 0.8 mm (0.032 in.) Corrosion Resistant Steel.	

##### B. Prepare

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Open access door 151DB and depressurize the Green, Blue and Yellow hydraulic systems.

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (3) Trip, safety and tag the following circuit breaker

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

- (4) Remove access panels 121DB and 121FB.
- (5) Insert rigging pin D925252002 in resolvers.
- (6) Insert rigging pin D921277000 in yaw integral trim assembly.
- (7) Remove floor panels 211HF and 213AF.
- (8) Cut lockwire and loosen clamp attaching spring rod boot to housing, disengage boot from housing. Remove integral trim assembly upper protective housing.

### C. Remove

- (1) Remove cotter (1).
- (2) Remove nut (2) and retain washers (3) and (4) for reinstallation.
- (3) Remove bolt (5).

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (4) Remove cotter (12).
- (5) Remove nut (11) and retain washers (10) and (9) for reinstallation.
- (6) Support spring rod (7) and remove bolt (8).
- (7) Remove spring rod (7).

### D. Install

- (1) Position spring rod (7) and adjust it to length if necessary.  
Torque locknut (6) to : 1.45 plus or minus 0.083 m.daN (124 plus or minus 7 lbf.in.).  
If length adjustment is necessary, the adjustment must be such that installation can be effected without strain or tension.

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NOTE : Position rod so that screw on gaiter  
aft clamp (14) is located downward.

- (2) Install bolt assembly (8) connecting aft end attachment fitting of spring rod to chassis structure.  
Install washers (10) and (9), and nut (11).  
Torque to between 0.30 and 0.36 m.daN (27 and 32 lbf.in.). Safety with cotter.
- (3) Install bolt assembly (5) connecting forward end attachment fitting of spring rod to lever. Install washers (3) and (4), and nut (2).  
Torque to between 0.500 and 0.558 m.daN (45 and 50 lbf.in.). Safety with cotter.
- (4) Remove rigging pin D921277000 from integral trim assembly.
- (5) Remove rigging pin D925252002 from resolvers.

### E. Test

- (1) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (2) Fully deflect rudder pedals then release to neutral. Check that rudder pedals deflect freely and that rudders return to neutral.

EFFECTIVITY: ALL

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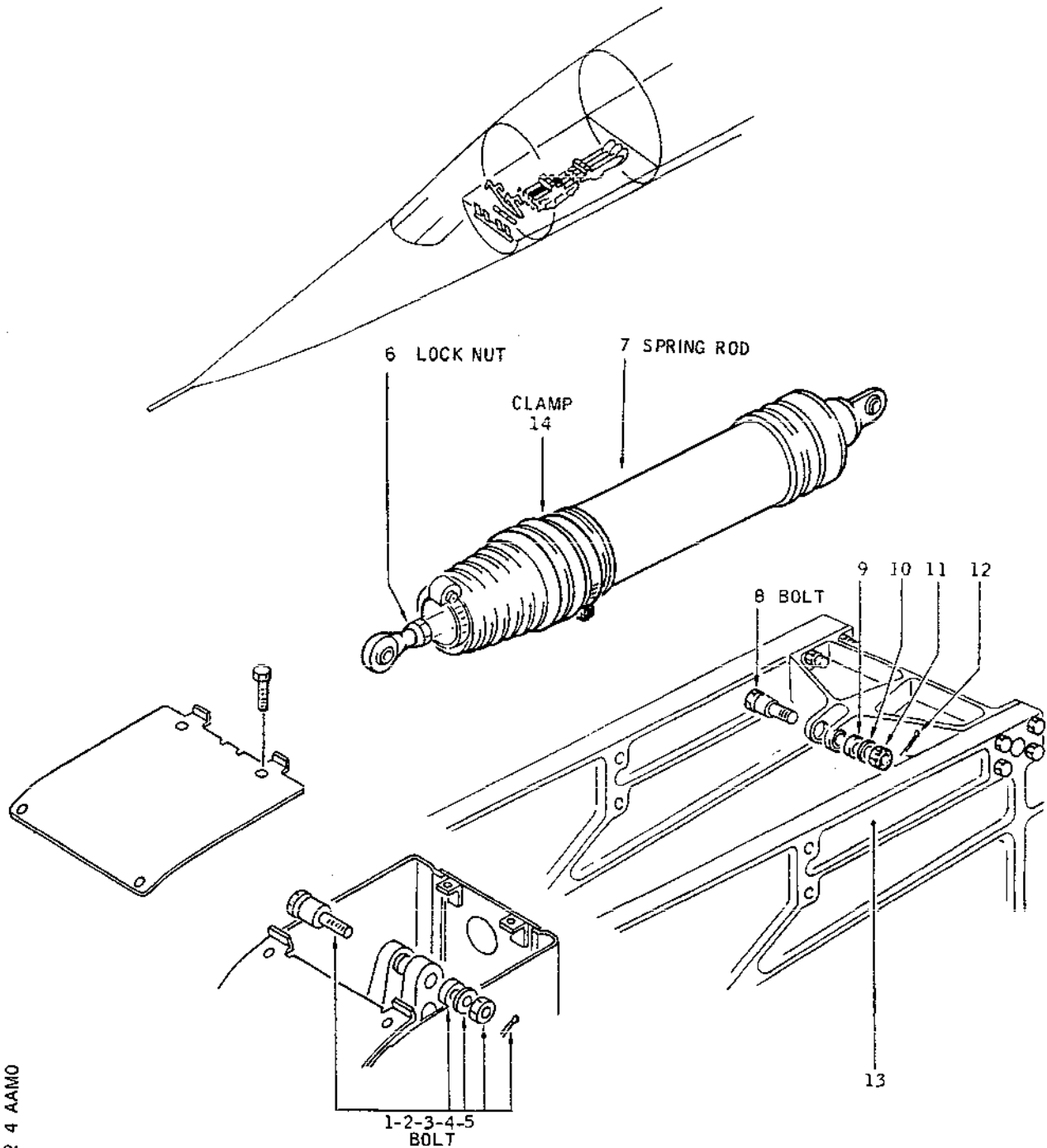
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Spring Rod  
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## **MAINTENANCE MANUAL**

- (3) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
- (4) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### **G. Close-Up**

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Install integral trim assembly upper housing. Engage spring rod boot on housing, tighten attachment clamp and safety with lockwire as per 20-21-13.
- (3) Remove safety clip and tag and reset circuit breaker M626, panel 15-216, Map Ref. F 22.
- (4) Install floor panels 211HF and 213AF.
- (5) Remove warning notices.
- (6) Close access doors and panels 121DB, 121FB, 151DB.

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## MAINTENANCE MANUAL

### SPRING ROD - INSPECTION/CHECK

#### 1. General

The purpose of the following procedure is to check the yaw control Artificial Feel spring rod.

#### 2. Spring Rod

##### A. Equipment and Materials

##### B. Prepare

- (1) Remove floor panels 211HF and 213AF.
- (2) Remove integral trim assembly upper cover plate (9).

##### C. Check

- (1) At rod end/integral trim assembly attachment.
  - (a) Check that attaching bolt is not ruptured by applying force to rod.
  - (b) Check that total play (hinge play at (1) plus rod internal play, plus hinge play at (3)) is less than 0.15 mm (0.0059 in.)
  - (c) Check that nut is correctly tightened and safetied with cotter pin.
  - (d) Check rod end for cracks and signs of corrosion.
- (2) Rod protective boot (2)
  - (a) Check that boot is not torn, pierced or worn.
  - (b) Check that clamp attaching boot to integral trim assembly casing is correctly installed and tightened.
  - (c) Check that clamp (6) attaching boot (2) to rod body is correctly tightened and safetied.
- (3) At rod end/structure attachment (3) :
  - (a) Check that bolt is not ruptured by applying force to rod.
  - (b) Check that nut is correctly tightened and safe-

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

tied.

(c) Check rod end for cracks and signs of corrosion.

(4) Check that end fittings (4) are correctly tightened and safetied with lockwire.

(5) On spring clips (5)

(a) Check that spigot is inserted in housing.

(b) Check lockwire for correct condition.

(6) Check that adjusting nut (8) is correctly tightened and safetied.

(7) Using lockwire, check through safety aperture (7) that threaded end is tightened within limits.

(8) Check rod body for cracks, scores or signs of corrosion (Ref. Fig. 601 )

### D. Test

### E. Close-Up

(1) Install integral trim assembly upper cover plate (9).

(2) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(3) Close floor panels 211HF and 213AF.

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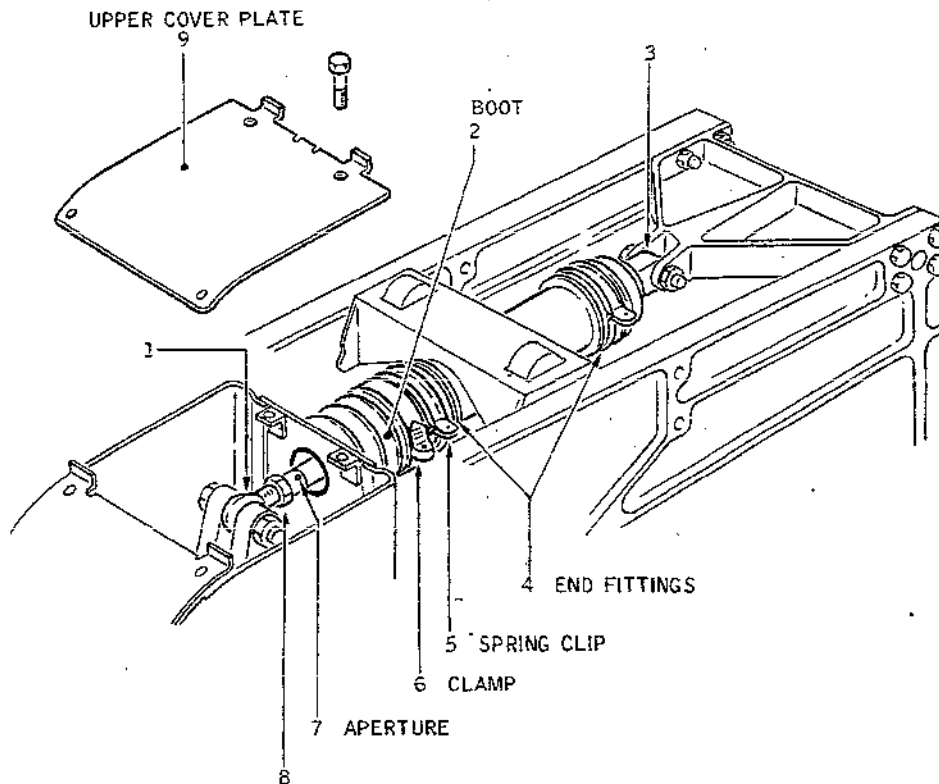
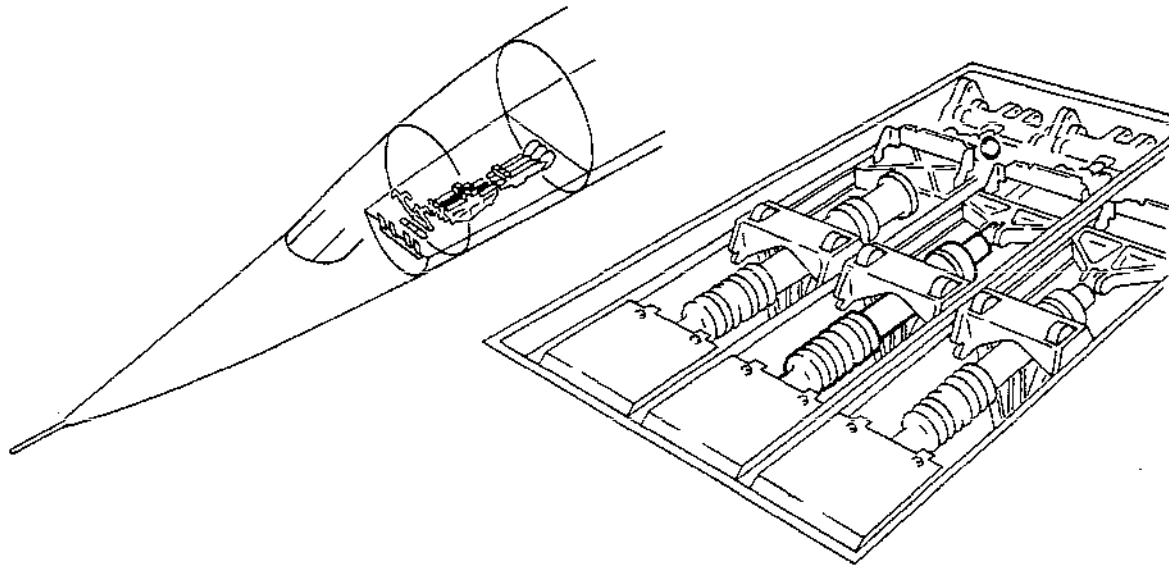
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Spring Rod  
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**END OF THIS  
SECTION**

**NEXT**

# Concorde

## MAINTENANCE MANUAL

### ARTIFICIAL FEEL JACK ROCKER ARM - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The Artificial Feel jack rocker arm transmits to the mechanical control, loads exerted by the Blue and Green Artificial Feel Jacks.

#### 2. Artificial Feel Jack Rocker Arm

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins - Synchro Pack	D925252000
Circuit Breaker Safety Clips	
Access Platform 3.672 m (12 ft)	
Lockwire - Dia. 1 mm (0.041 in.) Corrosion Resistant Steel	
Warning Notices	

##### B. Prepare

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- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
YAW ART FEEL COMP 2 SUP	13-216	2C 42	G16
YAW ART FEEL COMP 1 SUP	2-213	1C 242	E 2
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

- (3) Make certain that yaw Flight controls and trim controls are set to zero.
- (4) Remove access panels 121DB and 121FB, and immobilize yaw resolvers with rigging pin D925252002.
- (5) Open access door 151DB under fuselage, and depressurize Blue, Green and Yellow hydraulic systems.

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (6) Open floor panel 213AF and 213BF.
- (7) Remove Artificial Feel spring rod (Ref. 27-22-12, Removal/Installation).

C. Remove  
(Ref. Fig.401 and 402)

- (1) Disconnect Blue Artificial Feel Jack from rocker arm (Ref. 27-24-11, Removal/Installation, Paragraph C).

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (2) Disconnect Green Artificial Feel Jack from rocker arm (Ref. 27-24-13, Removal/Installation, Paragraph C).
- (3) Disconnect rocker arm from integral trim assembly (Ref. 27-23-12, Removal/Installation).
- (4) Remove mounting (1) attachments.  
For each bolt, remove cotter pin and nut (5).  
Remove bolt (6) and washer (7).
- (5) Lift to disengage mounting/rocker arm assembly.
- (6) Remove mounting (1).
  - (a) Remove cotter pin, remove nut (2), bolt (3) and washer (4).
  - (b) Remove mounting (1) from support arms (8).
- (7) Remove spacer (21)
  - (a) Unsafety and remove nut (10), remove bolt (18) and washer (9).
  - (b) Remove spacer (21).
- (8) Remove cotter pin, remove nut (11) and washers (12).
- (9) Remove nut (13) and bolt (17).
- (10) Remove support arm (8) from rocker arm then remove shackle (15) connecting rocker arm to integral trim assembly.
- (11) Separate the two side plates (14) and (16) of the rocker arm; remove washers (19) and rollers (20).

### D. Preparation of Replacement Component

- (1) Install washers (19) and rollers (20) between the two side plates (14) and (16) of the rocker arm.
- (2) Install support arms (8) and shackle (15) on rocker arm.
- (3) Install bolt (17) and tighten nut (13).  
Torque to between 240 and 260 lbf.in. (2.711 and 2.937 m.daN).
- (4) Install washer (12) and tighten nut (11).  
Torque to between 140 and 145 lbf.in. (1.581 and

EFFECTIVITY: ALL

R

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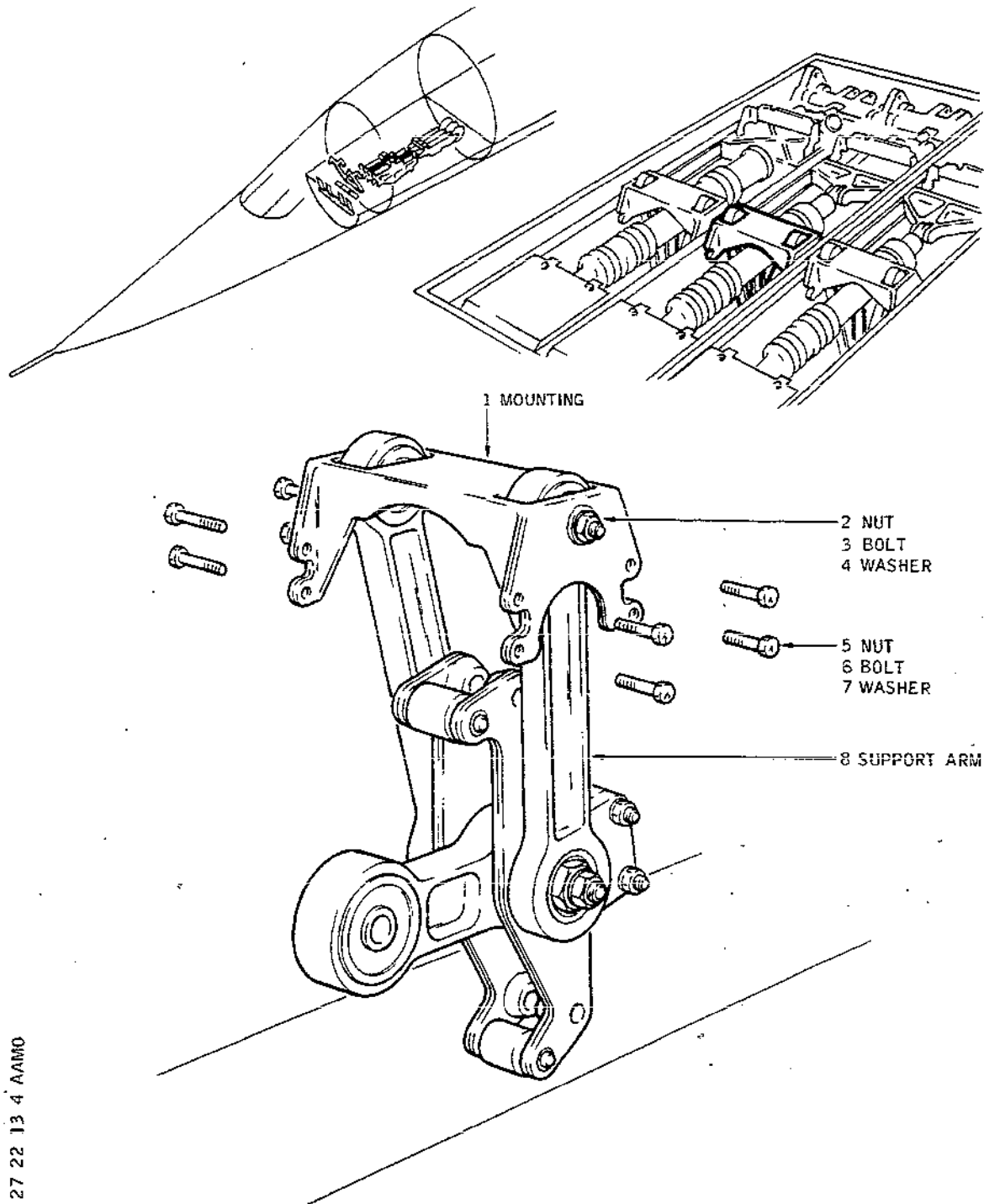
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# Concorde

## MAINTENANCE MANUAL



Rocker Arm/Mounting Assembly  
Figure 401

EFFECTIVITY: ALL

R

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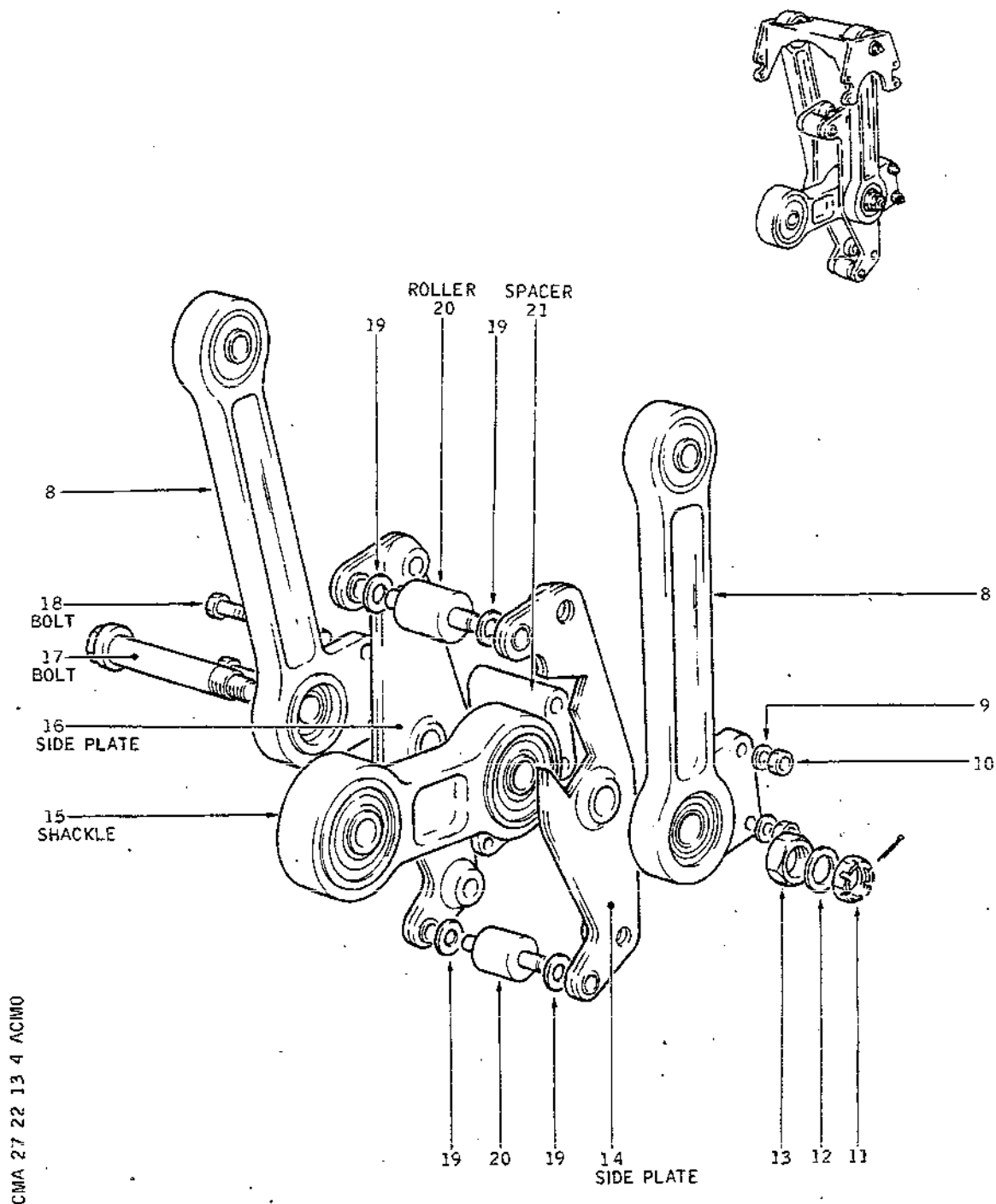
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## MAINTENANCE MANUAL



Rocker Arm  
Figure 402

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

1.638 m.daN).

Safety with cotter pin.

- (5) Safety head of bolt (17) and nut (13) with lockwire as per 20-21-13.
- (6) Install spacer (21), bolts (18), washers (9) and nuts (10). Safety with cotter pin.
- (7) Attach mounting (1) to rocker arm.
- (8) Install bolts (3), washers (4) and nuts (2). Tighten nuts (2). Safety with cotter pin.
- (9) Check that rocker arm pivots freely about its axis. Check that rollers rotate freely.

### E. Install

- (1) Position rocker arm/mounting assembly on chassis.
- (2) Install bolts (6), washers (7) and tighten nuts (5). Safety nuts with cotter pin.
- (3) Attach shackle to integral trim assembly (Ref. 27-23-12, Removal/Installation).
- (4) Check that minimum clearance A between upper roller and chassis is 2 mm (0.0787 in.) (Ref. Fig. 403 )
- (5) Connect Green Artificial Feel Jack to rocker arm (Ref. 27-34-13, Removal/Installation, Paragraph C).
- (6) Connect Blue Artificial Feel jack to rocker arm (Ref. 27-24-11, Removal/Installation, Paragraph C).
- (7) Install Artificial Feel spring rod. (Ref. 27-22-12, Removal/Installation).
- (8) Remove rigging pin E925252002 from yaw resolvers.

### F. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Remove safety clips and tags and set circuit breakers.
- (3) Remove warning notices.

EFFECTIVITY: ALL

R

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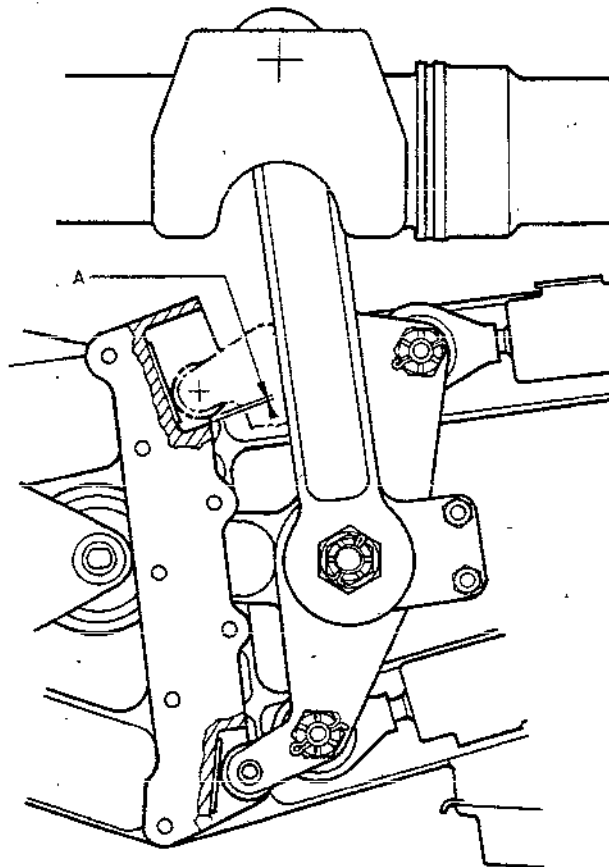
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## MAINTENANCE MANUAL



CMA 27 22 13 4 AEMO

Measurement of Clearance A  
Figure 403

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (4) Close access doors and panels 121DB, 121FB, 151DB and floor panels 213AF and 213BF.
- (5) Remove access platforms.

EFFECTIVITY: ALL

R

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## MAINTENANCE MANUAL

### TRIM CONTROL - DESCRIPTION AND OPERATION

#### 1. General (Ref. Fig. 001 )

The control wheel is mounted in the flight compartment on the centre console.

The number of turns of the wheel is limited by a system of washers, one washer turning the next at each revolution of the wheel until the last washer engages the end-stop.

R A graduated drum moves in front of a fixed pointer and indicates the rudder deflection relative to a new neutral point of the artificial feel.

R The wheel transmits its movement by means of universal joints, sprockets, bevel gears and chains.

The unit is hinged on the artificial feel system chassis and is provided with a worm screw driven by the transmission system.

The worm screw engages a toothed quadrant attached to one end of the input lever and the mechanical control rods are attached to the other end.

The unit is shaped like a bell-crank lever the two arms of which are attached to the artificial feel system (spring rod and jacks).

EFFECTIVITY: ALL

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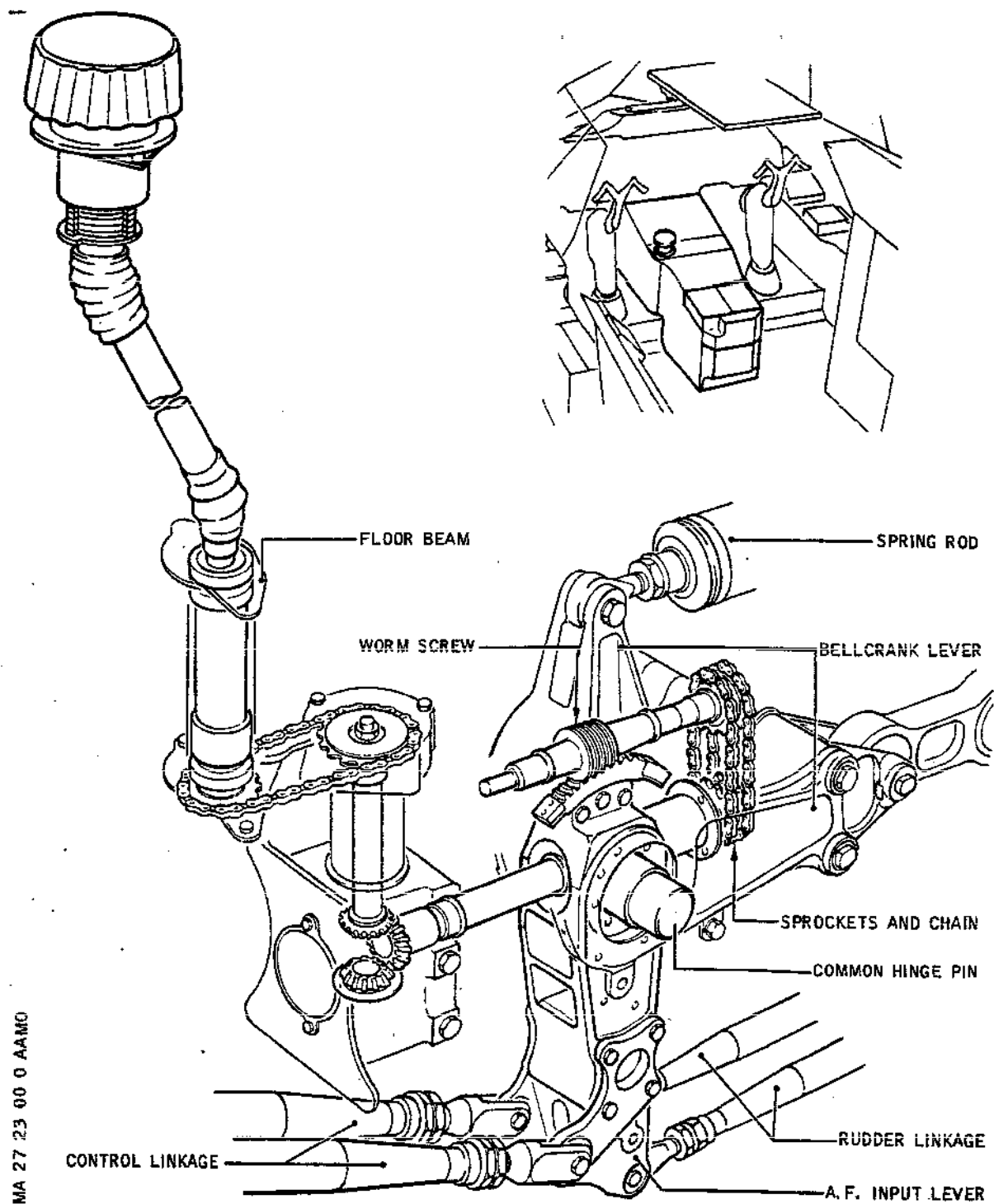
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## MAINTENANCE MANUAL



ICMA 27 23 00 0 AAMO

Trim Controls  
Figure 001

R

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# *Concorde*

## MAINTENANCE MANUAL

### 2. Functional Description (Ref. Fig.002 and 003)

The rotation of the trim control wheel turns the worm screw which moves the unit relative to the input lever.

The trim control offers two possibilities:

- A. To cancel the reaction of the artificial feel system, when the rudder control is operated and held by the pilot, and thus move the neutral point of the control.
- B. To move the rudders. This mode is only to be used under extreme emergency. The inertia and friction of the rudder control system being less than the threshold of the artificial feel system, trim action alone will move the control without entailing any reaction from the artificial feel system.

EFFECTIVITY: ALL

R

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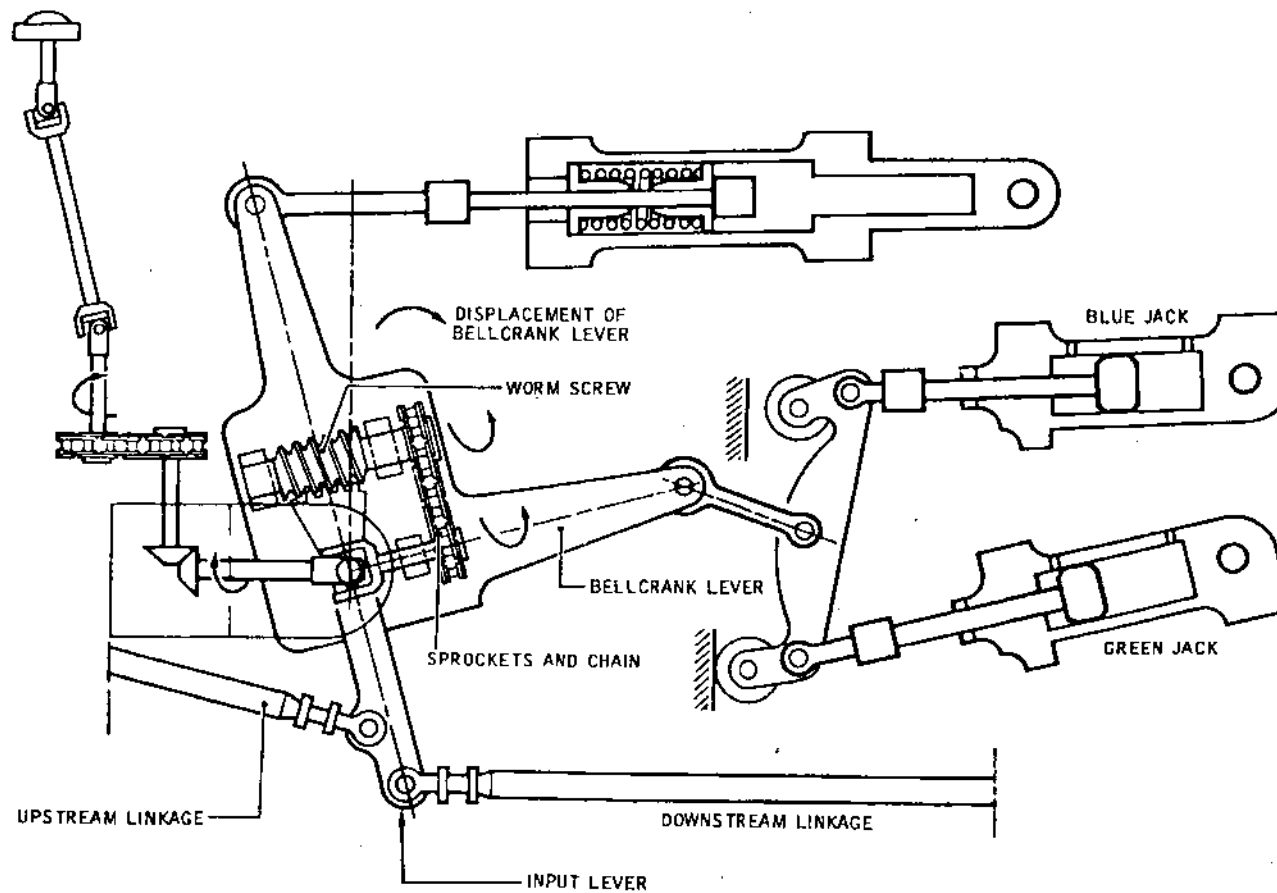


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## MAINTENANCE MANUAL

CMA 27 23 00 0 ACM0

CONFIGURATION  
INPUT LEVER FIXED  
BELLCRANK LEVER MOVING



Artificial Feel Cancellation  
Figure 002

R

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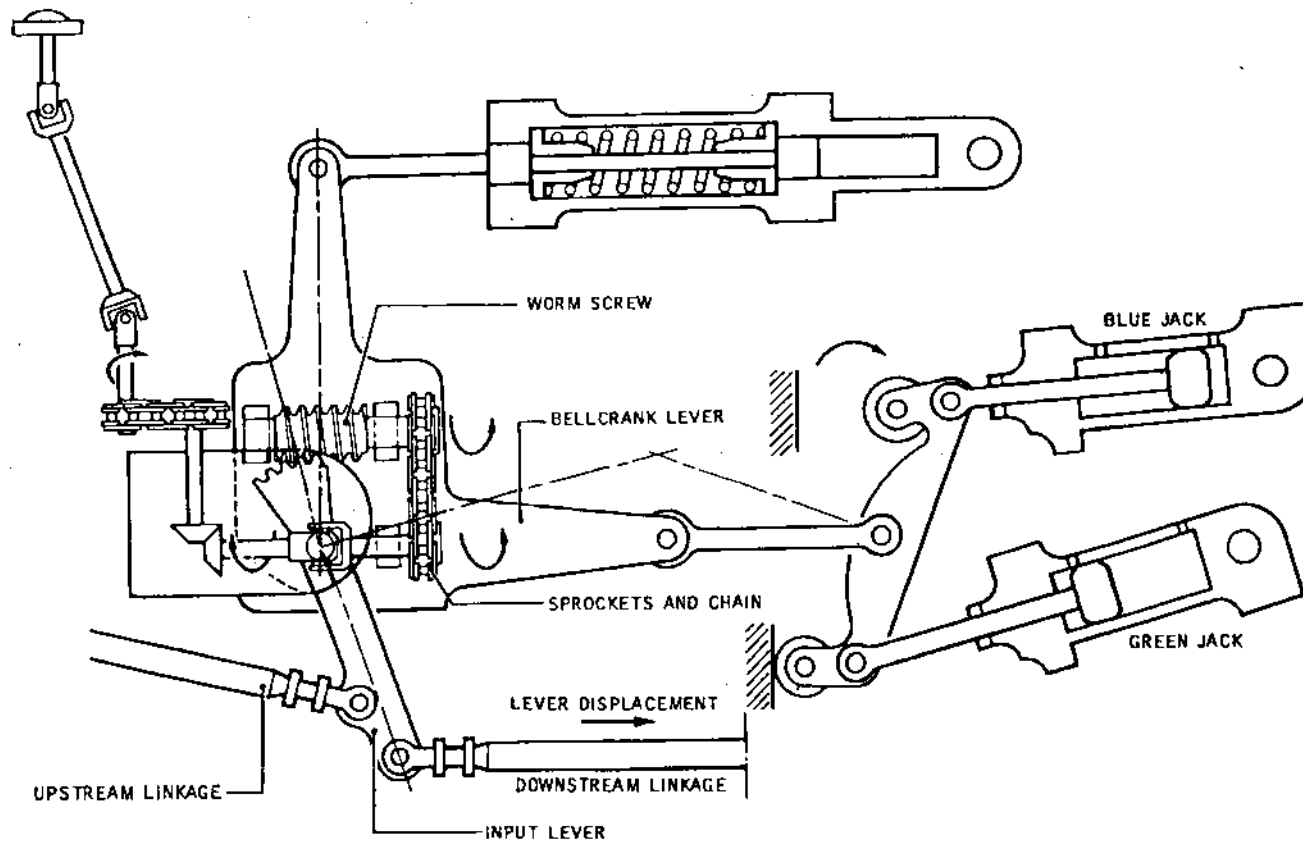
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# Concorde

## MAINTENANCE MANUAL

CMA 27 23 00 0 AEM0

CONFIGURATION  
BELLCRANK LEVER FIXED  
INPUT LEVER MOVING



Flying by Trim Controls  
Figure 003

R

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

### TRIM CONTROL - TROUBLE SHOOTING

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The following information is intended to enable faults found in Yaw trim control operation to be quickly rectified.

This trouble shooting deals with the following faults :

- Trim linkage
- Operating loads
- Play in control

The faults can be isolated with the aid of the trouble shooting procedures and traced through OK and NOT OK paths to the appropriate charts or other specified rectification action as may be necessary.

If a defect occurs perform the appropriate rectification action, then repeat the operation at which the defect was encountered to ensure the operation is OK.

Bracketed numbers in the procedure and charts indicate items on the component identification Table (Ref. Table 101).

The table provides information necessary to locate components.

#### 2. Yaw Trim

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## MAINTENANCE MANUAL

### A. General

Flight Controls (electrical channels and linkage) are assumed to operate correctly, to be free of excessive play and to be within neutral tolerances.

### B. Prepare

#### (1) Equipment and Materials

DESCRIPTION	PART NO.
Protractor, Elevons and Rudder	TE2012
Rigging Template - Integral Trim	D921250000
Access Platform 3.672 m (12 ft.) 11.252 m (36 ft. 11 in.)	
(2) Take the precautions described in the previous WARNING paragraph.	
(3) Set Flight Controls in Blue electrical mode (Ref. 27-00-00, Servicing).	

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### C. Trouble Shooting

\*\*\*\*\*  
\* Check that Artificial Feel systems are not engaged\*  
\* On Flight Control Unit, place RUDDER switch in \*  
\* BLUE position. \*  
\* Open access door 121DB. \*  
\* Position Yaw trim knob so as to install equipment \*  
\* D921250000 on integral trim assembly. \*  
\* Trim graduated scale must read 0 degrees, plus or \*  
\* minus 0.2 degree. \*  
\*\*\*\*\*

OK	NOT OK-	Incorrect reading on graduated scale or excessive play in control. Chart 101
----	---------	---

\*\*\*\*\*  
\* Install equipment TE2012 (protractor) on rudder. \*  
\* Remove equipment D921250000. Rotate trim knob in \*  
\* clockwise direction until it reaches stop. Repeat \*  
\* the same operation in counterclockwise direction. \*  
\* Rudder must deflect plus or minus 20 degrees, plus \*  
\* 1 degree, minus 0 degree. Trim graduated scale \*  
\* must read 21 degrees, plus or minus 0.2 degree in \*  
\* clockwise direction, and - 21 degrees plus or \*  
\* minus 0.2 degrees. \*  
B\* Torque required to move control knob shall be \*  
B\* 8±3 lbf in. \*

OK	NOT OK-	Deflection range is incorrect. Chart 102
----	---------	---

	NOT OK-	Aircraft on ground, no in-flight loads being applied, trim knob operating load is excessive. Chart 103
--	---------	---

Trim operates correctly

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

*****		-----	
* INCORRECT READING ON GRADUATED	*	GROUND EQUIPMENT REQUIRED	
* SCALE OR EXCESSIVE PLAY IN CONTROL.	*	-----	
* GRADUATED SCALE FOLLOWS CORRECTLY	*	DESCRIPTION	PART NO.
* ROTATION OF CONTROL KNOB.	*	-----	
*****		COMPARATOR -	
		SPRING SCALE -	
		ASSEMBLY TOOLS -	
		TRIM CONTROL	
		GEARBOX	D925184000
		-----	

OK

NOT OK-

Excessive play at graduated scale driving mechanism. Graduated scale can be manually displaced by a value greater than 0.9 mm (0.0354 in.).  
Replace trim gear box assembly [1].

\*\*\*\*\*  
\* Immobilize trim control tube at floor level. \*  
\* Remove trim knob (cover, cotter pin, nut, knob \*  
\* dial). Install equipment D927272100. \*  
\* Using a comparator attached to casing, measure \*  
\* play at datum mark on equipment arm. \*  
\* Play is equal to or less than 0.75 mm \*  
\* (0.02953 in.) \*  
\*\*\*\*\*

OK

NOT OK-

Replace trim gear box assembly and associated tube above floor [2].

\*\*\*\*\*  
\* Check tension of chain underneath floor. \*  
\* Chain deflection should be between 5 and 7.5 mm \*  
\* (0.196 and 0.295 in.) for a tension of 1.4 to \*  
\* 2.5 daN (10.32 and 18.43 lbf.ft.). \*  
\*\*\*\*\*

OK

NOT OK

Chart 101 (Sheet 1 of 2)

R EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

After adjustment of chain tension (Ref. Procedure 27-23-12, Removal/Installation, paragraph 2) check play at pitch trim knob.

\*\*\*\*\*  
\* Replace integral trim \*  
\* assembly [3]. \*  
\*\*\*\*\*

\*\*\*\*\*  
\* Shut down pressurization of hydraulic systems \*  
\* (Ref. 27-00-00, Servicing, Procedure to set Flight \*  
\* Controls in electrical mode). \*  
\* Remove comparator and equipment D927272000. \*  
\*\*\*\*\*

Chart 101 (Sheet 2 of 2)

R EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

*****	
* DEFLECTION RANGE IS INCORRECT.	*   GROUND EQUIPMENT REQUIRED
*****	
	DESCRIPTION PART No.
	-----
	COMPARATOR -
	SPRING SCALE -
	-----

\*\*\*\*\*  
\* Disconnect the four rods from integral trim \*  
\* assembly lower lever (Ref. 27-23-12, Removal/ \*  
\* Installation). \*  
\* Attach a comparator to lower lever at 200 mm \*  
\* (7.87 in.) from lever fulcrum. Apply a 10 daN \*  
\* (22.5 lbf.) load to trim lever. Permissible play \*  
\* measured at comparator is 0.34 mm (0.0134 in.). \*  
\*\*\*\*\*

		-----
OK	NOT OK-	Ref. Chart 102, sheet 2.
		-----

\*\*\*\*\*  
\* Connect the four rods to integral trim assembly \*  
\* (Ref. 27-23-12, Removal/Installation). \*  
\* Measure deflection of integral trim assembly \*  
\* lower lever at 200 mm (7.87 in.) from lever \*  
\* fulcrum. \*  
\* When trim knob is fully rotated deflection is \*  
\* between 44.4 and 46.6 mm (1.748 and 1.834 in.). \*  
\*\*\*\*\*

NOT OK-	Check that there is no friction or jamming, then remove trim gearbox assembly [1] in centre console.
	-----
	Deflection range is incorrect.
NOT OK-	Replace integral trim assembly [3].
	-----

Chart 102 (Sheet 1 of 2)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* Apply a 10 daN (22.5 lbf.) load to control rod \*  
\* attachment point. Using a comparator attached to \*  
\* structure, measure play at rigging point at \*  
\* 157 mm (6.18 in.) from trim fulcrum. Play is equal \*  
\* to or less than 0.08 mm (0.0031 in.). \*  
\*\*\*\*\*

OK	NOT OK-	Check ends of spring rod, then replace spring rod [2].
----	---------	--

\*\*\*\*\*  
\* Replace integral trim assembly [3]. \*  
\*\*\*\*\*

\*\*\*\*\*  
\* Shut down pressurization of hydraulic systems \*  
\* (Ref. 27-00-00, Servicing, Procedure to set Flight \*  
\* Controls in electrical mode). \*  
\* Remove comparator. \*  
\*\*\*\*\*

Chart 102 (Sheet 2 of 2)

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

*****		
* AIRCRAFT ON GROUND, NO IN-FLIGHT	*	GROUND EQUIPMENT REQUIRED
* LOAD BEING APPLIED, TRIM KNOB	*	-----
* OPERATING LOAD IS EXCESSIVE.	*	DESCRIPTION PART No.
*****		
		SPRING SCALE -
-----		

\*\*\*\*\*  
\* Check tension of integral trim assembly input \*  
\* control chain. With a 1.4 to 2.5 daN (3.147 to \*  
\* 5.620 lbf.) load applied to the chain, deflection \*  
\* is between 5 and 7.5 mm (0.196 and 0.295 in.). \*  
\*\*\*\*\*

-----		
		Adjust tension of chain. Ref. procedure detai-
OK	NOT OK-	led in 27-23-12, Removal/Installation,
		Paragraph E (9).
-----		

\*\*\*\*\*  
\* Disconnect trim control chain, on control pinion \*  
\* side. Using a spring scale, pull chain. Load is \*  
\* less than or equal to 2 daN (4.49 lbf.). \*  
\*\*\*\*\*

-----		
OK	NOT OK-	Replace integral trim assembly [3].
-----		

\*\*\*\*\*  
\* If load is abnormal check mechanism between \*  
\* control knob and control pinion under floor. \*  
\*\*\*\*\*

\*\*\*\*\*  
\* Shut down pressurization of hydraulic systems \*  
\* (Ref. 27-00-00, Servicing, Procedure to set Flight \*  
\* Controls in electrical mode). \*  
\* Connect control chain to control pinion side. \*  
\*\*\*\*\*

Chart 103 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[1] Trim gear-box assembly in centre console		122		Centre console	27-23-11 R/I	
[2] Spring rod		122		Under floor	27-22-12 R/I	
[3] Integral trim assembly	121DB	122		Under floor	27-23-12 R/I	

Component Identification  
Table 101

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### TRIM CONTROL - ADJUSTMENT/TEST

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. Operational Test

##### A. General

The purpose of the test is to check the Flight controls operation by means of trim.

##### B. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Access Platform 4.470 m (14 ft. 8 in.)	
--	--

Electrical Ground Power Unit	
------------------------------	--

##### C. Prepare

(1) Take the precautions described in the previous WARNING paragraph.

(2) On overhead panel :

- Make certain that ARTIFICIAL FEEL No.1 and ARTIFICIAL FEEL No.2 engage switches are in OFF position.

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## MAINTENANCE MANUAL

- On SERVO CONTROLS unit check that selector switches are in NORMAL position.
- On RELAY JACK unit place switch in NORMAL position.
- On Flight Control Unit make certain that RUDDER switch is in MECH position.

(3) Check that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RELAY JACK HYD SEL IND & SUP	1-213	C 281	N17
PFC IND		C 287	N18
PFC & RELAY JACK "A"		C 285	P16
SYS CONT			
YELL/GRN GRN FAIL			
PFC & RELAY JACK "A"		C 286	P17
SYS CONT			
YELL/BLUE BLUE FAIL			
PFC & RELAY JACK "A"		C 288	P18
SYS CONT			
YELL L/LEVEL			
FLT CONT POSN IND CONT		C 83	R11
FLT CONT POSN IND 26 V 400 Hz SUP	2-213	C 84	B 4
PFC & RELAY JACK "B"	3-213	C 282	A 8
SYS CONT			
YELL L/LEVEL			
PFC & RELAY JACK "B"		C 283	A 9
SYS CONT			
YELL/GRN GRN FAIL			
PFC & RELAY JACK "B"		C 284	A10
SYS CONT			
YELL/BLUE BLUE FAIL			

- (4) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing)
- (5) On overhead panel place BLUE INVERTER and GREEN INVERTER switches in OFF INV position.
- (6) On ICOVOL indicator (Flight Control Surface Position indicator) check that the 2 magnetic indicators corresponding to rudders display M.
- (7) Set Flight Controls in electrical mode (Ref. 27-00-00,

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## MAINTENANCE MANUAL

Servicing).

- (8) Check that yaw trim control is set to zero.
- (9) Check that yaw Flight control is at neutral.

### D. Test

- (1) Turn yaw trim knob to the left up to 20° graduation
  - On ICOVOL indicator check that position of rudders is - 20°
- (2) Turn yaw trim knob to the right up to 20° graduation
  - On ICOVOL indicator check that position of rudders is + 20°
- (3) Bring back trim control to position zero.
  - On ICOVOL indicator check that rudders are in neutral position.

### E. Close-Up

- (1) On overhead panel, place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position.
- (2) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in electrical mode).
- (3) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

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## MAINTENANCE MANUAL

### 2. System Test

#### A. General

The purpose of the test is to check that displacement values of trim controls correspond with control surface deflections

#### B. Equipment and Materials

DESCRIPTION	PART NO.
Protractor - Elevon and Rudder	TE2012000
Rigging Pins - Synchro Pack	D925252000
Rigging Pins - Set - Integral Trim	D921277000
Access Platform 4.47 m (14 ft. 8 in.) 11.25 m (36 ft. 11 in.)	
Electrical Ground Power Unit	

#### C. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) On overhead panel
  - Make certain that ARTIFICIAL FEEL No.1 and ARTIFICIAL FEEL No.2 engage switches are in OFF position.
  - On SERVO CONTROLS unit check that selector switches are in NORMAL position.
  - On RELAY JACK unit place switch in NORMAL position.
  - On Flight Control Unit make certain that RUDDER switch is in MECH position.
- (3) Check that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RELAY JACK HYD SEL IND & SUP	1-213	C 281	N17
PFC IND		C 287	N18
PFC & RELAY JACK "A" SYS.		C 285	P16
CONT YELL/GRN GRN FAIL			
PFC & RELAY JACK "A" SYS		C 286	P17

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
CONT YELL/BLUE BLUE FAIL PFC & RELAY JACK "A" SYS		C 288	P18
CONT YELL L/LEVEL FLT CONT POSN IND CONT		C 83	R11
FLT CONT POSN IND 26 V 400 Hz SUP	2-213	C 84	B 4
PFC & RELAY JACK "B" SYS CONT YELL L/LEVEL	3-213	C 282	A 8
PFC & RELAY JACK "B" SYS CONT YELL/GRN GRN FAIL		C 283	A 9
PFC & RELAY JACK "B" SYS CONT YELL/BLUE BLUE FAIL		C 284	A10

- (4) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing)
- (5) On overhead panel, place BLUE INVERTER and GREEN INVERTER switches in ON position.
- (6) On ICOVOL indicator, check that the 2 magnetic indicators corresponding to rudders display M.
- (7) Set Flight Controls in Blue electrical mode (Ref. 27-00-00, Servicing).
- (8) Check that yaw trim control is set to zero.
- (9) Check that yaw flight control is at neutral.
- (10) Make certain that rigging pin D921277000 inserts easily in integral trim assembly and pin D925252002 in synchro pack. Leave the latter inserted in synchro pack and remove former from trim assembly.
- (11) Set up protractor equipment TE2012000 on rudders. Adjust protractors to zero. Remove pin D925252002 from synchro pack.

### D. Mechanical Mode Test

- (1) Turn trim knob by successive 2° stages through graduated scale :

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- zero to left turn and return to zero
- zero to right turn and return to zero.

NOTE : Trim value setting must be made precisely.

(2) For each stage, check that scale graduations correspond with position of rudders (See table).  
(Ref. Fig. 501 )

(3) Check that artificial feel jacks do not move during operations.

### E. BLUE Electrical Mode Test

- (1) On Flight Control Unit place RUDDER switch in BLUE position.  
Press RESET push-button.  
Check that magnetic indicators on ICOVOL indicator display B.
- (2) Repeat procedure described in paragraph 2.D "Mechanical Mode Test".

### F. GREEN Electrical Mode Test

- (1) On Flight Control Unit place RUDDER switch in GREEN position.  
On ICOVOL indicator, check that magnetic indicators display G.
- (2) Repeat procedure described in paragraph 2.D "Mechanical Mode Test".

### G. Close-Up

- (1) On Flight Control Unit place RUDDER switch in MECH position.
- (2) On overhead panel, place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position.
- (3) Shut down pressurization of hydraulic system  
(Ref. 27-00-00, Servicing, Procedure to set Flight Controls in electrical mode).
- (4) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).
- (5) Remove measuring equipment TE2012000.

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LEFT TURN				
TRIM	TRIM SCALE ROTATION ANGLE	RUDDER DEFLECTION		
		MIN	THEORETICAL	MAX
0	0	- 0.05	0	+ 0.05
2	11	1.90	1.99	2.10
4	21.875	3.85	3.97	4.10
6	32.875	5.75	5.96	6.15
8	43.875	7.75	7.96	8.15
10	54.750	9.75	9.96	10.25
12	67.750	11.65	11.98	12.25
14	76.750	13.65	14.02	14.35
16	87.750	15.65	16.06	16.45
18	98.750	17.65	18.10	18.50
20	109.625	19.65	20.13	20.55

RIGHT TURN				
TRIM	TRIM SCALE ROTATION ANGLE	RUDDER DEFLECTION		
		MIN	THEORETICAL	MAX
0	0	- 0.05	0	+ 0.05
2	11	1.90	1.99	2.10
4	21.875	3.80	3.93	4.05
6	32.875	5.75	5.92	6.10
8	43.875	7.70	7.90	8.10
10	54.750	9.60	9.86	10.10
12	65.750	11.55	11.85	12.15
14	76.750	13.50	13.85	14.20
16	87.750	15.50	15.86	16.25
18	98.750	17.45	17.84	18.25
20	109.625	19.40	19.83	20.25

Cross-Reference Table - Yaw  
Figure 501

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(6) Close access doors, remove access platforms.

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### 3. System Load Application Test

#### A. General

The purpose of the test is to make certain that trim control operation is normal.

#### B. Equipment and Materials

---

##### DESCRIPTION

##### PART NO.

---

Hand Equipment - Effort Measurement,  
Trim Controls

TE3019400

Access Platform 4.47 m (14 ft. 8 in.)  
3.96 m (13 ft.)

Electrical Ground Power Unit

#### C. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) On overhead panel
  - make certain that ARTIFICIAL FEEL No.1 and ARTIFICIAL FEEL No.2 engage switches are in OFF position.
  - on SERVO CONTROLS unit, check that selector switches are in NORMAL position.
  - on RELAY JACK unit, place switch in NORMAL position.
  - on FLIGHT CONTROL unit, make certain that RUDDER switch is in MECH position.
- (3) Make certain that the following circuit breakers are set :

---

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RELAY JACK HYD SEL IND & SUP	1-213	C 281	N17
PFC IND		C 287	N18
PFC & RELAY JACK "A" SYS		C 285	P16
CONT YELL/GRN GRN FAIL			
PFC & RELAY JACK "A" SYS		C 286	P17
CONT YELL/BLUE BLUE FAIL			
PFC & RELAY JACK "A" SYS		C 288	P18

---

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
CONT YELL L/LEVEL FLT CONT POSN IND CONT		C 83	R11
FLT CONT POSN IND 26V 400 HZ SUP	2-213	C 84	B 4
PFC & RELAY JACK "B" SYS CONT YELL L/LEVEL	3-213	C 282	A 8
PFC & RELAY JACK "B" SYS CONT YELL/GRN FRN FAIL		C 283	A 9
PFC & RELAY JACK "B" SYS CONT YELL/BLUE BLUE FAIL		C 284	A10
(4) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).			
(5) On overhead panel, place BLUE INVERTER and GREEN INVERTER switches in ON position.			
(6) Check that ICOVOL magnetic indicators associated with rudders indicate M.			
(7) Set flight controls in electrical mode (Ref. 27-00-00, Servicing).			
(8) Make certain that yaw trim control is set to zero.			
(9) Check that yaw flight control is at neutral.			
B B B (10)	Set up equipment TE 3019400 for measurement of the load on trim control. Alternatively a torque wrench and 7/16 AF socket may be used.		

### D. Load measurement

- (1) Using a spring scale, pull slowly and evenly on the cord wound round the measuring equipment pulley.
- (2) Carry out the following trim operations :
  - From neutral to left turn and back to neutral
  - From neutral to right turn and back to neutral
- B  
B (3) In each case, the torque required to move the control knob shall be  $8 \pm 3$  lbf.in.

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### E. Close-Up

- (1) On overhead panel, place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position.
- (2) Shut down pressurization of hydraulic system (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in electrical mode).
- (3) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).
- (4) Remove equipment TE3019400.
- (5) Remove access platform.

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## MAINTENANCE MANUAL

### TRIM GEARBOX ASSEMBLY IN CENTRE CONSOLE - REMOVAL/INSTALLATION

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

Gearbox assembly in centre console controls yaw trim through control knob.

#### 2. Gear Box Assy in Centre Console

##### A. Equipment and Materials

---

##### DESCRIPTION

##### PART NO.

---

Rigging Pins - Set - Integral Trim - D921277000  
Pitch/Roll/Yaw

Lockwire (Dia. 1 mm) (0.041 in.)  
Corrosion Resistant Steel

Special Products (Ref. 20-30-00,  
No.51)

Access Platform 3.672 m (12 ft.)

Circuit Breaker Safety Clips

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### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Check that roll, pitch and yaw trim controls are set to zero.
- (3) Remove access panel 121DB, immobilize roll, pitch and trim controls with rigging pins D921277000.
- (4) Open access door 151DB, depressurize Blue, Yellow and Green hydraulic systems.

**WARNING :** DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (5) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP-REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

### C. Remove

- (1) Yaw control knob (30).

Remove cover (1); remove cotter pin (2), and nut (32), remove washer (31), knob (30) and dial (29).

- (2) Pitch control wheel (21).

Remove cover (18), remove cotter pin (19) and nut (17); remove washer (20). Remove wheel (21) and ratchet mechanism (22).

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### (3) Roll control knob (7).

Remove cover (3), cotter pin (5), and nut (4) ; remove washer (6), knob (7) and dial (8).

### (4) Electro-luminescent panel (9).

After removing the roll and yaw control knobs and their dials, remove screws (28), retain washers for reinstallation and remove electro-luminescent panel (9)

### (5) Trim gear box assembly (27).

- (a) Remove screws (15), retain washers for reinstallation of side panel (16).
- (b) On side panel (25), remove plugs (23), remove screws (24), retain washers for reinstallation and remove side panel (25).
- (c) Remove screws (26) attaching trim gearbox assembly on centre console ; retain washers for reinstallation.
- (d) Remove spring pins (12), disconnect the three torque tubes (13) from universal joints (14), then from gearbox assembly.
- (e) Remove gearbox assembly (27) by pulling it upwards.
- (f) Remove nuts (11) and electro-luminescent panel (10).

## D. Preparation of Replacement Component

## E. Install

### (1) Trim gearbox assembly

**NOTE** : The electro-luminescent panel must undergo a functional check before being installed on the centre console.

- (a) Install electro-luminescent panel (10) on centre console, and secure with nuts (11).
- (b) Remove pitch control wheel (21) and ratchet mechanism (22) from gearbox assembly (27).
- (c) Install gearbox assembly (27) on centre console

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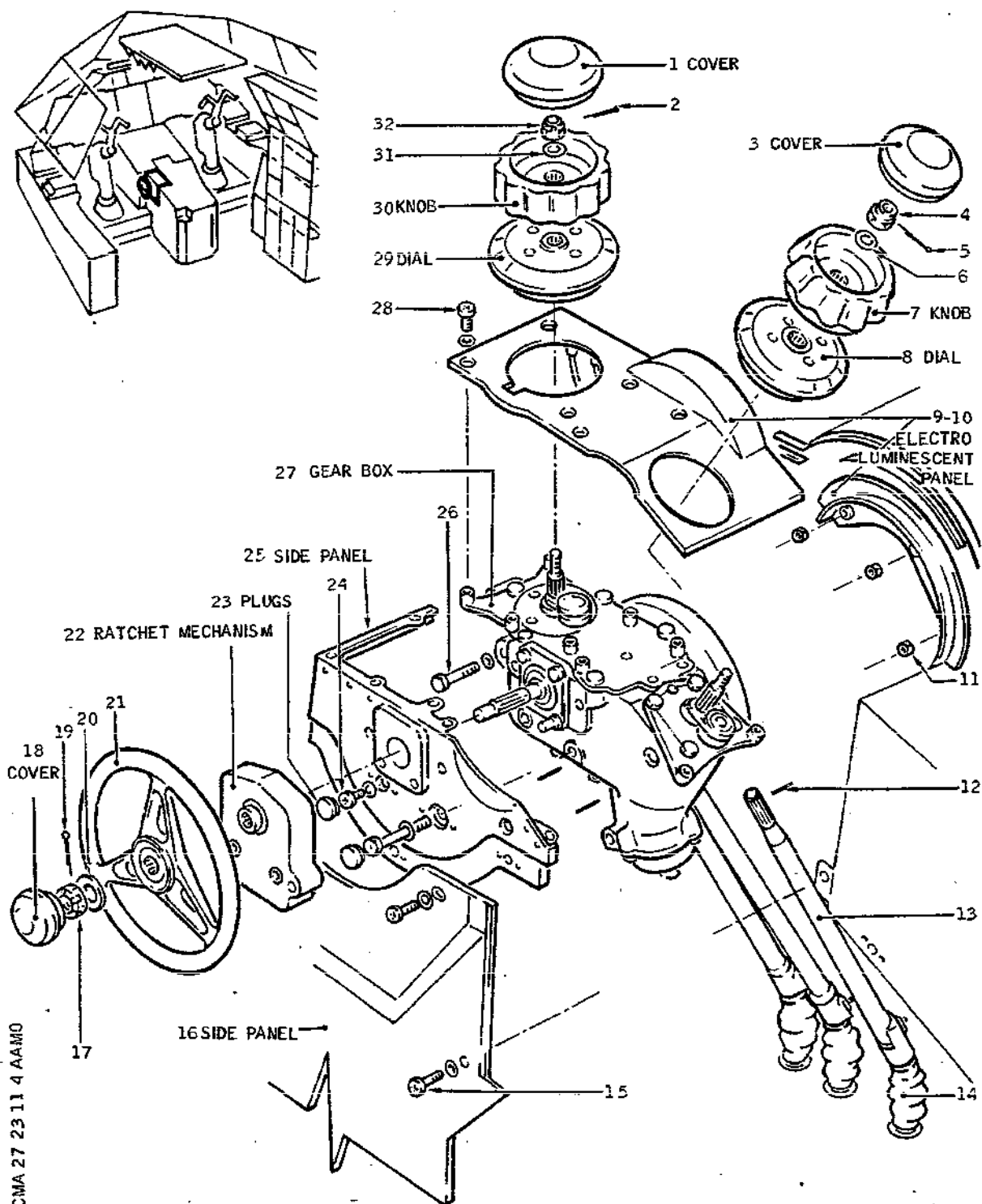
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Trim Gearbox Assembly  
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with screws (26).

Torque to between 0.450 and 0.565 m.daN  
(40 and 50 lbf.in.).

- (d) Install side panel (25) to gearbox assembly (27). Make certain that panel (25) is in contact with the gearbox assembly bosses, attach with screws (24) and install plugs (23).

### (2) Electro-luminescent panel (9)

NOTE : The electro-luminescent panel must undergo a functional check before being installed on the centre console.

- (a) Fully turn roll and yaw control knobs (7) and (30) to right or left then remove.
- (b) Remove roll and yaw dials (8) and (29).
- (c) Install electro-luminescent panel (9) on gearbox assembly (27). with screws (28).

### (3) Roll control knob (7)

- (a) The control knob having been turned fully to right or left before being removed ; install roll dial a half division beyond full travel. Apply light coat of product No.51 to gears and carefully mesh gear teeth. Check overtravel in the opposite direction and if necessary, remesh gear teeth to obtain equal amounts of overtravel in both directions.
- (b) Install roll control knob on its splined shaft. Install washer (6) and nut (4). Torque to between 0.450 and 0.565 m.daN (40 and 50 lbf.in.). Safety with cotter pin (5). Install cover (3).

CAUTION : FROM ITS NEUTRAL POSITION KNOB MUST BE ABLE TO ROTATE 4 REVS AND 283° MINIMUM IN BOTH DIRECTIONS.

### (4) Yaw control knob (30)

- (a) Control knob having been turned fully to right or left before being removed ; install yaw dial (29) a half division beyond full travel. Apply a light coat of product No.51 to gears and carefully mesh gear teeth.

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Check the overtravel in the opposite direction and if necessary remesh gear teeth to obtain equal amounts of overtravel in both directions.

- (b) Install yaw control knob (30) on its splined shaft. Install washer (31) and nut (32). Torque to between 0.450 and 0.565 m.daN (40 and 50 lbf.in.). Safety with cotter pin (2). Install cover (1).

CAUTION : FROM ITS NEUTRAL POSITION KNOB MUST BE ABLE TO ROTATE 4 REVS AND 287° MINIMUM IN BOTH DIRECTIONS.

### (5) Pitch control wheel (21)

Apply a light coat of product No.51 to splined shaft and install ratchet mechanism (22) and control wheel (21) on the splined shaft.  
Install washer (20) and nut (17).

Torque to between 0.450 and 0.565 m.daN (40 and 50 lbf.in.). Safety with cotter pin (19), install cover (18) on wheel.

CAUTION : FROM ITS NEUTRAL POSITION HANDWHEEL MUST BE ABLE TO ROTATE 2 REV 5 AND 199° MINIMUM AFT.

### (6) Torque tubes

- (a) Place pitch, roll and yaw trim controls in neutral position.
- (b) Apply a light coat of product No.51 to torque tube (13) splines.
- (c) Install pitch, roll and yaw torque tubes, one by one, as follows :
  - (c1) Engage torque tube to corresponding splined bore in gearbox assembly, taking care not to displace trim control from neutral position.
  - (c2) Engage the other end of torque tube in universal joint (14).  
If necessary, slightly rotate torque tube to align splines.
  - (c3) Install spring pin (12) and safety with lockwire (Ref. 20-21-13).

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- (7) Install side panel (16) with washers and screws (15).
- (8) Remove warning notices.
- (9) Remove rigging pins D921277000 from roll, pitch and yaw trim controls.
- (10) Remove safety clip and tag and reset the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

### F. Test

- (1) Carry out operational test (Ref. 27-23-00, Adjustment/Test).
- (2) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access doors and panels 121DB, 151DB.
- (3) Remove access platforms.

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## MAINTENANCE MANUAL

### INTEGRAL TRIM ASSEMBLY - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The integral trim assembly transmits the trim control movements to the yaw linkage control rods.

#### 2. Integral Trim Assembly

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins - Synchro Pack	D925252000
Rigging Pin - Set-Integral Trim Pitch/Roll/Yaw	D921277000
Rigging Pin - Yaw Shaft	D925357000
Rigging Template - Integral Trim	D921250000
Access Platform 3.672 m (12 ft.)	
Circuit Breaker Safety Clips	
Lockwire (dia. 1 m/m (0.041 in.))	

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DESCRIPTION

PART NO.

Corrosion Resistant Steel

General Lubricant (Ref. 20-30-00, No.51)

### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Make certain that roll, pitch and yaw trim controls are in zero position.
- (3) Open access panel 121FB and install rigging pin D925252002 in yaw synchro pack.  
Open panel 121DB to gain access to integral trim assembly.
- (4) Open access door 151DB and depressurize the Green, Blue and Yellow hydraulic systems.

**WARNING :** DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT, PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (5) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-213	M 626	F22

- (6) Open panels 113DB, 121AB, immobilize yaw torque tube with rigging pin D925357000.

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(7) Open floor panel 211HF.

(8) Remove panel 211CS.

### C. Remove

(1) Remove spring rod. (Ref. 27-22-12, Removal/Installation).

(2) Unsafety and unscrew the bolts attaching the protective casing. Remove casing.

(3) Remove cotter and unscrew nuts (14) ; remove washers (15) and (16) and bolts (17). Note the position of bolts and remove rods (13).

(4) Remove cotter and unscrew nut (1) ; remove washer (2) and bolt (3). Remove tension adjuster rod (4).

(5) Unscrew the bolts attaching housing (5). Disengage the chain from its sprocket.

(6) Unscrew lock-nut (12). Remove cotter and unscrew nut (10) ; remove washer (11). Unscrew lock-nut (12) and tilt the AF lever in order to remove bolt (9).

(7) Remove cotter and unscrew nuts (6) ; remove washers (7) and bolts (8). Remove the integral trim assembly and re-install bolts (8) in order to support the roll and pitch assemblies.

### D. Preparation of Replacement Component

### E. Install

(1) Remove bolts (8), position the integral trim assembly and install bolts (8) in their original locations. Install washers (7), tighten nuts (6) and safety with cotter.

(2) Tilt the AF lever and install bolt (9) ; tighten lock-nut (12). Torque to between 2.70 and 3 m.daN (240 and 260 lbf.in.).

(3) Install washer (11) and tighten nut (10). Torque to between 1.53 and 1.60 m.daN (140 and 145 lbf.in.). Safety nut (10) with cotter and lock-nut (12) with lockwire (Ref. 20-21-13).

(4) In Flight Compartment,

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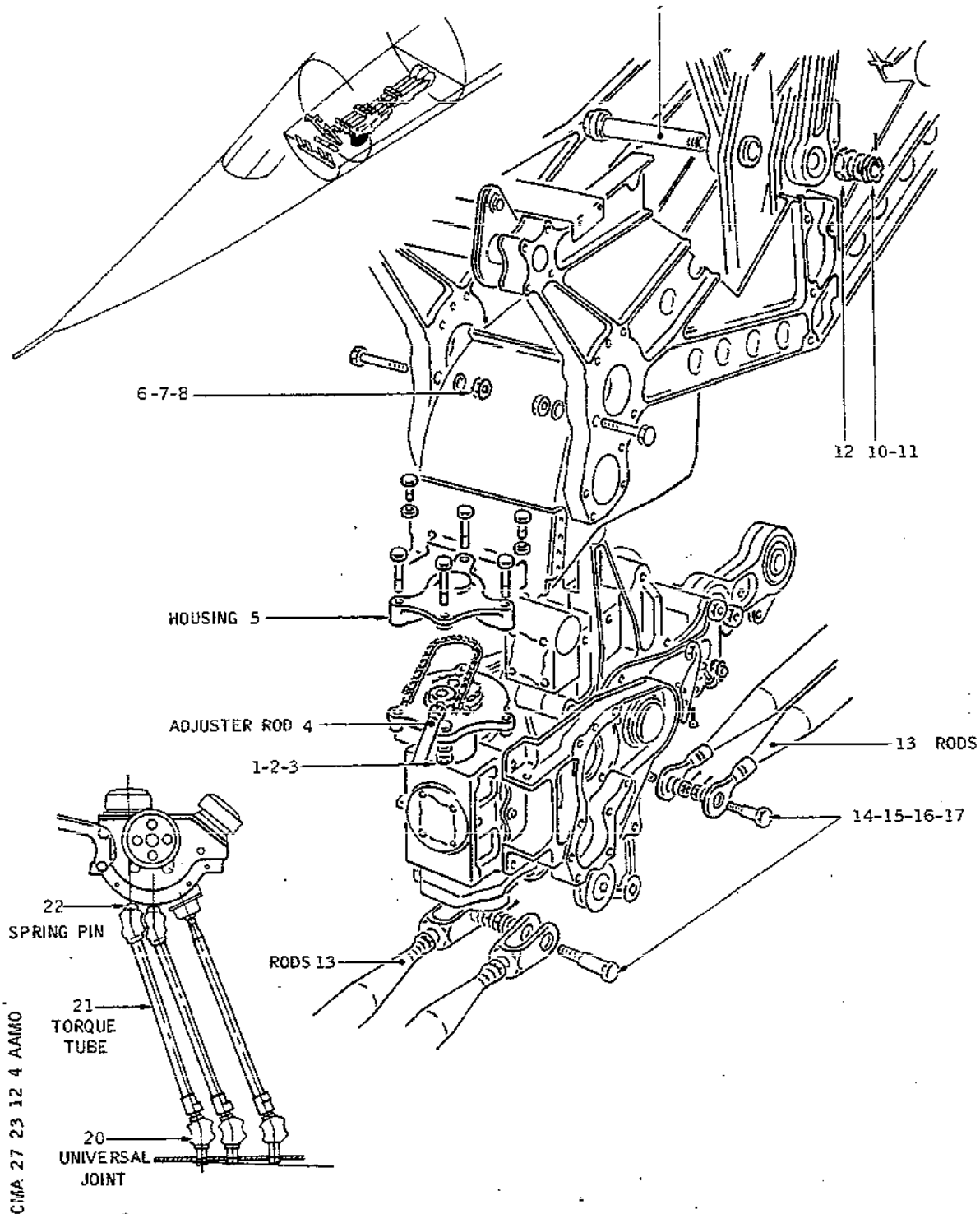
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Integral Trim Assembly  
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- (a) Cut lockwire and remove spring pin (22)
- (b) Separate torque tube (21) from universal joint (20) splined shaft by sliding it upwards ; maintain torque tube in this position.
- (5) Insert rigging pin D921277000 in integral trim assembly.
- (6) Engage chain on its sprocket.
- (7) Install housing (5).
- (8) Install tension adjuster rod (4) using bolt (3), washer (2) and nut (1). Tighten nut and safety with cotter.
- (9) Apply a load of 3 - 5 lb.f. (1.33 - 2.22 m.daN) to the middle of chain and measure deflection. Deflection of chain should be : 0.20 - 0.30 in. (5 - 7.6 mm). To adjust chain : unsafety and unscrew tension adjust rod lock-nuts : lengthen or shorten rod to obtain required tension. Tighten lock-nuts and bend back locking tabs.
- (10) In Flight Compartment :
  - (a) Rotate yaw trim knob until dial reads zero.
  - (b) Coat splines of tube and shaft with a light film of product No.51.
  - (c) Force fit torque tube (21) to universal joint (20) splined shaft. If required align splines by rotating slightly torque tube (21).
  - (d) Install spring pin (22), safety with lockwire (Ref. 20-21-13).
- (11) Install equipment D921250000 on yaw integral trim assembly.
- (12) Connect rods (13), install bolts (17), washers (15) and (16), tighten nuts (14). Torque to between 0.3 and 0.36 m.daN (27 and 32 lbf. in.).

NOTE : If rods (13) cannot be easily connected to integral trim assembly lower lever, adjust length of these rods as follows :

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- (a) Rods between torque tube and integral trim assembly lower lever :
  - (a1) Remove cotter pins and rod coupling clamps
  - (a2) Remove rod assigned to Captain's side and install it on First Officer's side. Adjust and tighten rod to length enabling pin to be easily removed and inserted on torque tube.  
Safety ends of rod with lockwire (Ref. 20-21-13).
  - (a3) Remove this rod and finally install it on Captain's side. Install bolt, special washer, flat washer, nut on eye end fittings. Safety with cotter pin.  
Torque to between :  
Torque tube side : 27 and 32 lbf. in. (0.30 and 0.36 m.daN)  
Integral trim assembly side : 45 and 90 lbf.in. (0.52 and 0.60 m.daN).
  - (a4) Install rod assigned to First Officer's side :  
Adjust and tighten rod to length enabling pin to be easily removed and inserted on torque tube. Safety ends of rod with lockwire (Ref. 20-21-13). Install bolt, special washer, flat washer, nut on eye end fittings.  
Apply the same tightening torque as for Captain's side rod.  
Safety with cotter pin.
  - (a5) Install safety attachments and coupling clamps.  
Torque to between 12 and 15 lbf.in. (0.15 and 0.18 m.daN). Safety with cotter pin.
- (b) Rods between integral trim assembly lower lever and synchro pack.
  - (b1) Remove cotter pins and rod coupling clamps.
  - (b2) Adjust length of rods so that attachment bolts can be inserted easily. Tighten and safety rod ends ; install bolt, special washer, flat washer, nut on eye end fittings. Safety with cotter pin. Torque to

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between 27 and 32 lbf.in. (0.30 and 0.35 m.daN).

- (b3) Install safety attachments and coupling clamps.  
Torque to between 12 and 15 lbf.in. (0.15 and 0.12 m.daN). Safety with cotter pin.

- (13) Install spring rod (Ref. 27-22-12, Removal/Installation).
- (14) Install protective casing. Safety bolts with lockwire (Ref. 20-21-13).
- (15) Remove equipment D921250000, and rigging pins D925252002, D925357000 and D921277000.

### F. Tests

- (1) Carry out an operational test (Ref. 27-23-00, Adjustment/Test).
- (2) With trim controls set to zero, immobilize yaw resolvers with rigging pin D925252002.
- (3) Make certain that rigging pins D925357000 and D921277000 can be easily inserted. If not, repeat removal/installation adjustments.
- (4) Remove rigging pins D925357000, D921277000 and D925252002.
- (5) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access doors and panels 211CS, 211HF, 121AB, 113DB, 151DB, 121DB, 121FB.
- (3) Remove warning notices.
- (4) Remove safety clips and tags and set the following circuit breaker ; M 626, panel 15-213, Map Ref. F22.
- (5) Remove access platforms.

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### HYDRAULIC SYSTEM - DESCRIPTION AND OPERATION

#### 1. General (Ref. Fig. 001 )

The flight controls use the three aircraft hydraulic systems : Blue, Green and Yellow.

R The power flight control units (PFCU) and relay jacks (RJ) are supplied in normal operation by the Blue and Green hydraulic systems.

The Yellow hydraulic system is used in emergency only to replace the Blue or Green systems in the event of a pressure drop.

R The supply is achieved through eight servo control selector valves four for the PFCU's and four for the RJ's.

R The two normally operating (Blue and Green) selector valves of the RJ's are equipped with pressure maintaining valves.

R Four low pressure switches are included in the system between the selector valves and the PFCU's.

The two artificial feel (AF) jacks are supplied, one by the Blue system and the other by the Green system.

A monitoring system enables possible hydraulic faults to be determined (Ref. 27-27-00) and takes the necessary remedial action.

EFFECTIVITY: ALL

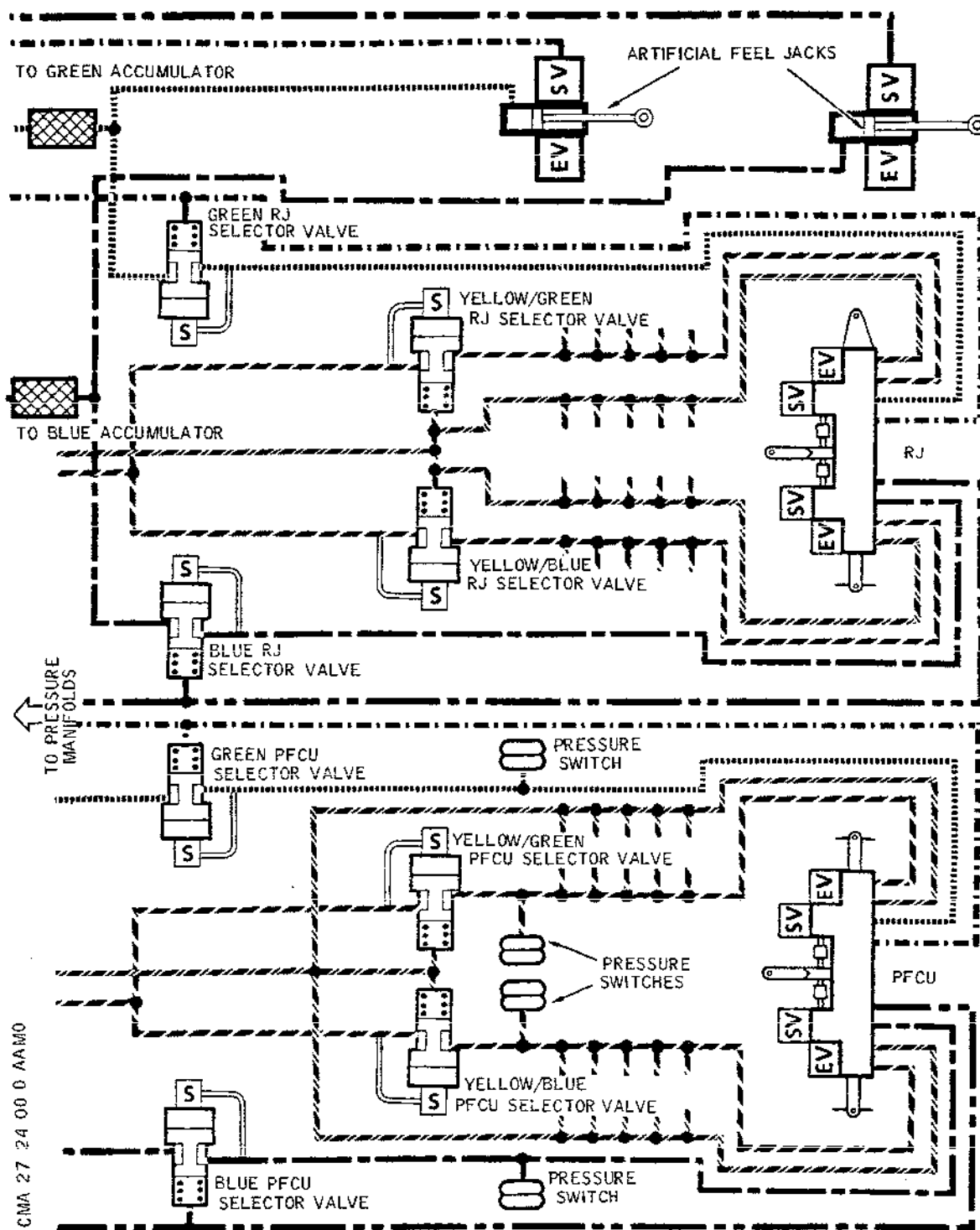
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## MAINTENANCE MANUAL



Hydraulic Supply  
Figure 001

R

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## MAINTENANCE MANUAL

### R 2. Selector Valves - PFCU Electro Hydraulic

R The PFCU selector valves ensure hydraulic pressure supply to the  
R PFCU and the return to the tank.  
R Each is a three-way, two-position selector valve.

#### R A. Normal Selector Valve (Blue or Green) (Ref. Fig. 002 )

R In the normal position, the solenoid is not energized.  
Pressure acts on the annular section of spool valve (D)  
which opens the supply port (A) to the system port (C).

R Energizing the solenoid causes spool valve (E) to displace,  
the hydraulic pressure and the spring thus displace spool  
valve (D) which opens the system port (C) to the tank  
return.

EFFECTIVITY: ALL

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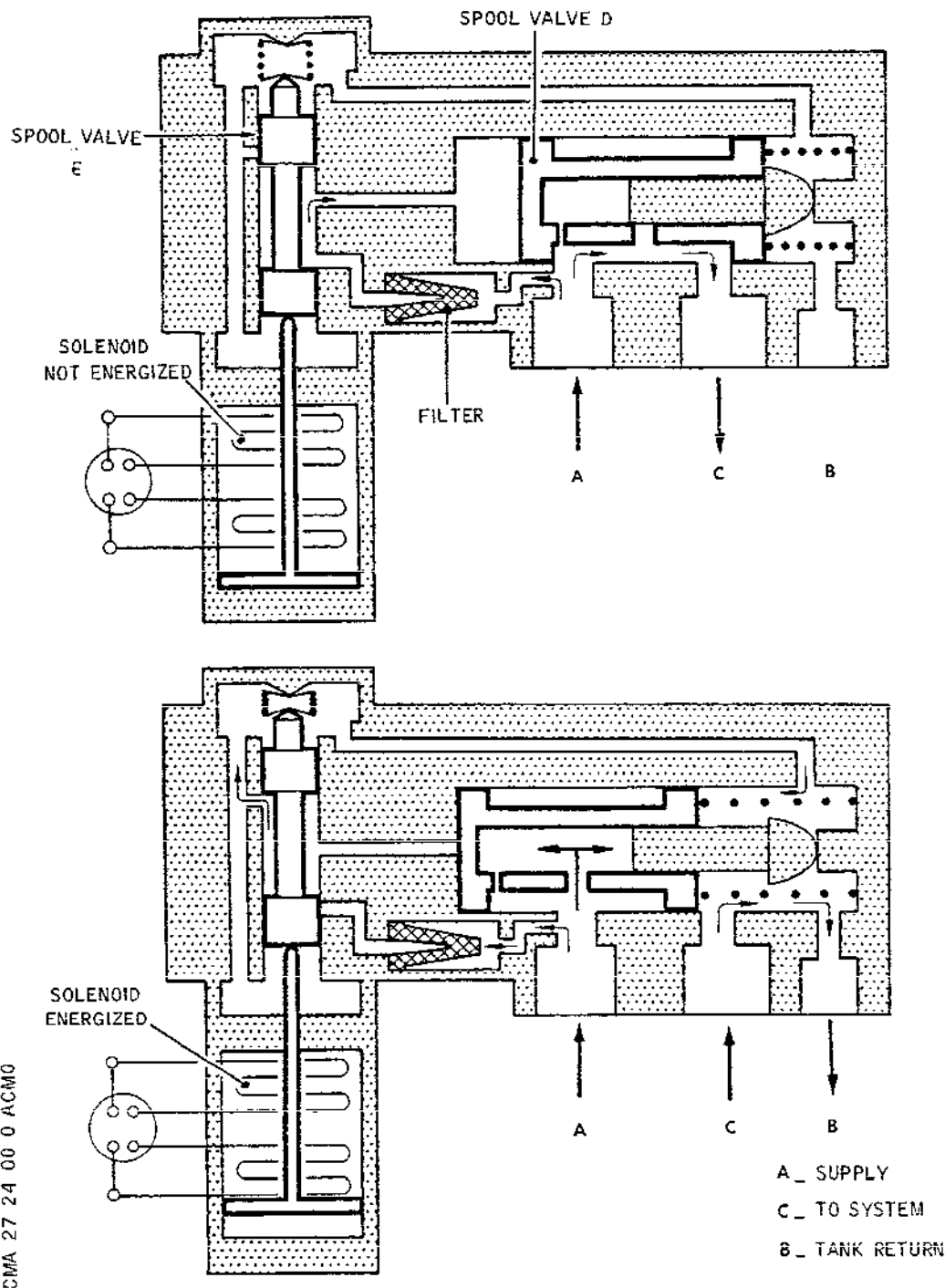
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## MAINTENANCE MANUAL



PFCU Selector Valve  
Figure 002

R

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## MAINTENANCE MANUAL

R        B.    Standby Selector Valve (Yellow/Blue or Yellow/Green)  
              (Ref. Fig. 003 )

R                In the normal position the solenoid is not energized.  
R        Spool valve (D) closes supply port (A) ; the system port (C)  
R                is open to the tank return (B).

R                When the solenoid is energized, it causes spool valve  
R        (E) to displace and opens supply port (A) to the system  
R                port (C).

EFFECTIVITY: ALL

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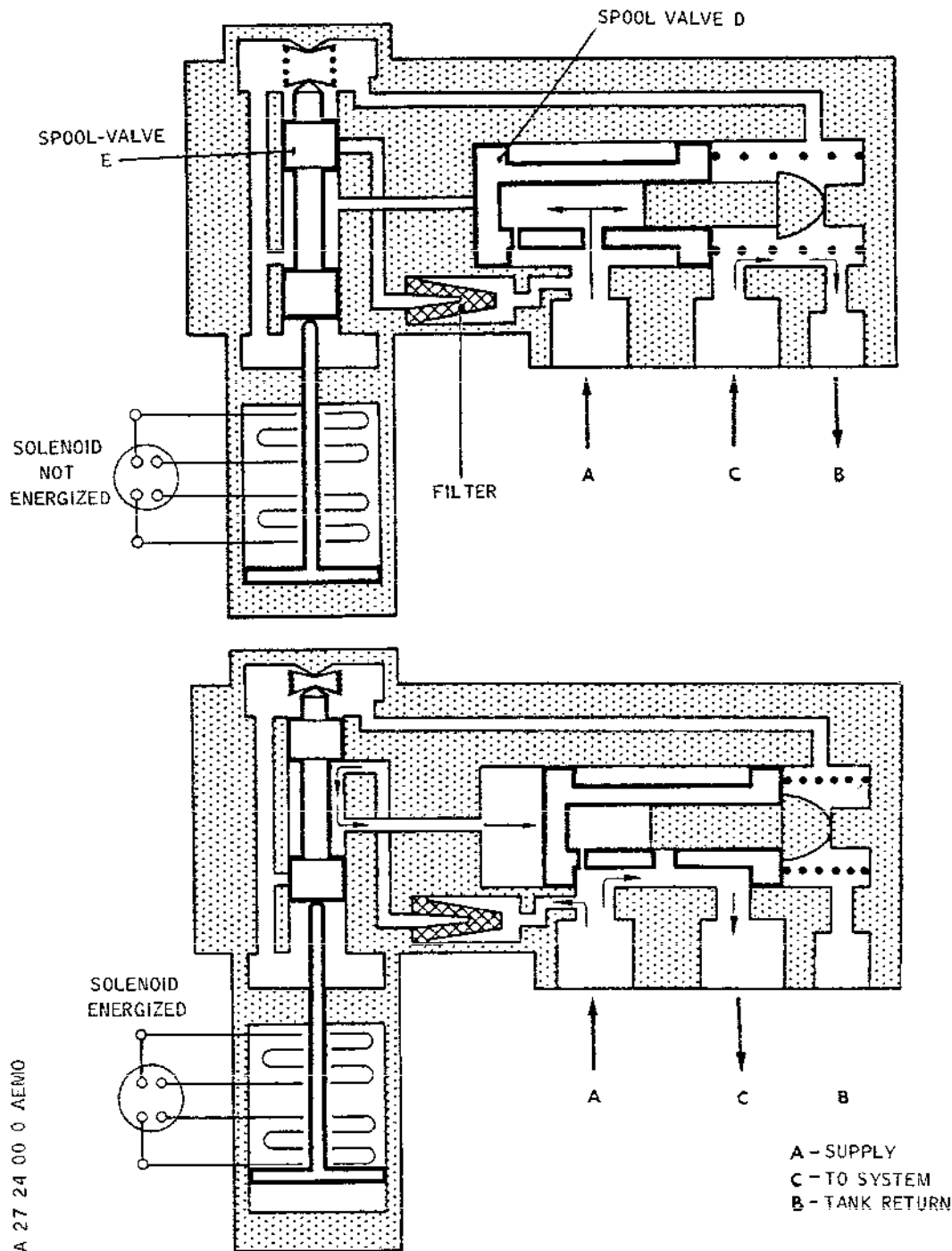
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## MAINTENANCE MANUAL



PFCU Standby Selector Valve  
Figure 003

R

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## MAINTENANCE MANUAL

### 3. Selector Valves - Relay Jack Electro-Hydraulic

The RJ selector valves ensure hydraulic pressure supply to the RJs and the return to the system tank.

Each is a three-way, two-position selector valve.

#### A. Normal Selector Valve (Blue or Green) (Ref. Fig. 004 )

In normal operation the solenoid is not energized. Pressure acts on the annular section of spool valve (D) which opens the supply port (A) to the system port (C). (C).

When the solenoid is energized, it shuts off access to the annular section of spool valve (D) and connects it to the tank return. The spool valve is displaced, closing supply port (A) and opening system port (C) to the tank return (B).

EFFECTIVITY: ALL

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R

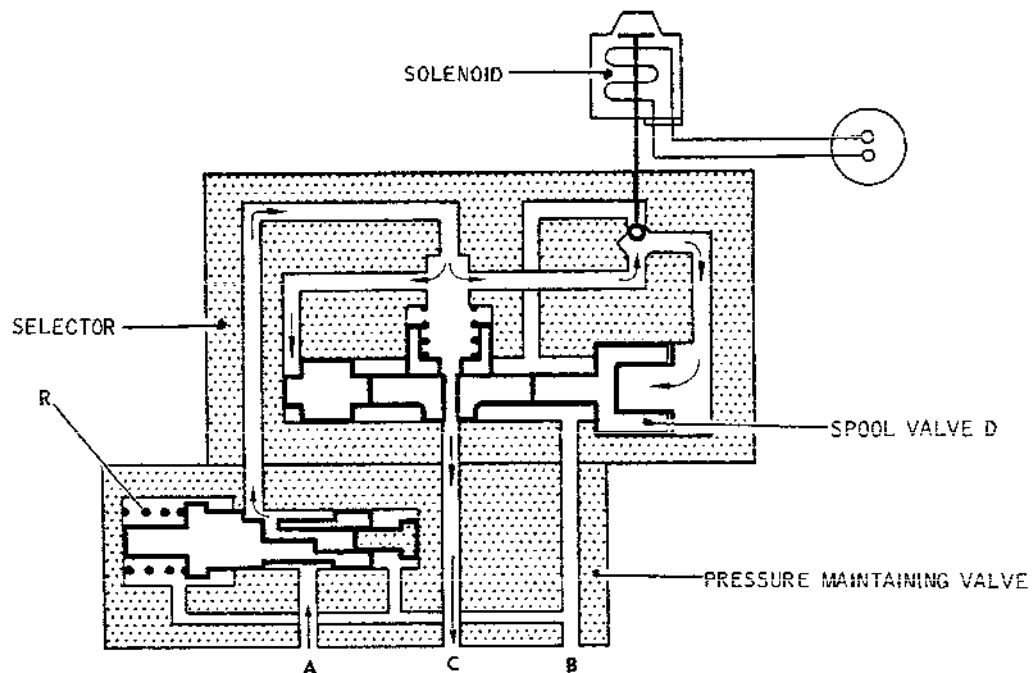
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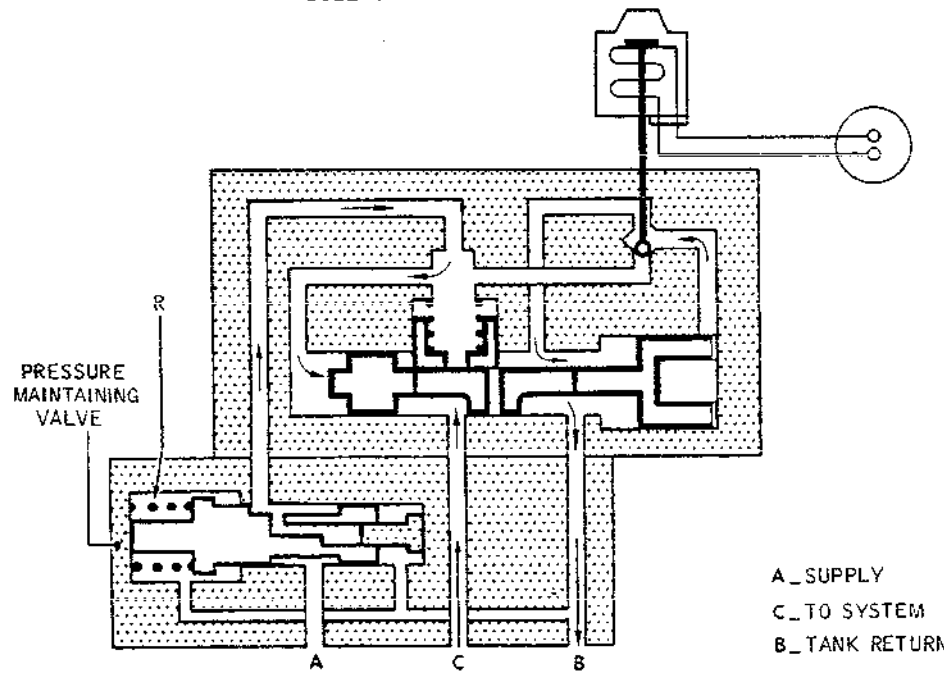
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## MAINTENANCE MANUAL



SOLENOID NOT ENERGIZED



SOLENOID ENERGIZED

A\_SUPPLY  
C\_TO SYSTEM  
B\_TANK RETURN

RJ Selector valve and Pressure Maintaining Valve  
Figure 004

EFFECTIVITY: ALL

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# *Concorde*

## MAINTENANCE MANUAL

- R B. Standby Selector Valve (Yellow/Blue - Yellow/Green)  
(Ref. Fig. 005 )

R In normal operation the solenoid is not energized, the  
pressure acts on the annular side of spool valve (D) ;  
system port (C) is open to the tank return (B).

R When the solenoid is energized, it shuts off access to the  
annular section of spool valve (D) and connects it to  
R the tank return. The spool valve is displaced and opens  
R supply port (A) to the system port (C).

#### 4. Valve - Pressure Maintaining

R The Pressure Maintaining valves are mounted directly on the  
normal Blue and Green RJ selector valves.

R A calibrated spring holds the spool valve closed until the  
pressure reaches 100 bars. At this pressure the spool valve is  
displaced and admits supply pressure to supply port (A) from the  
R associated selector valve.

EFFECTIVITY: ALL

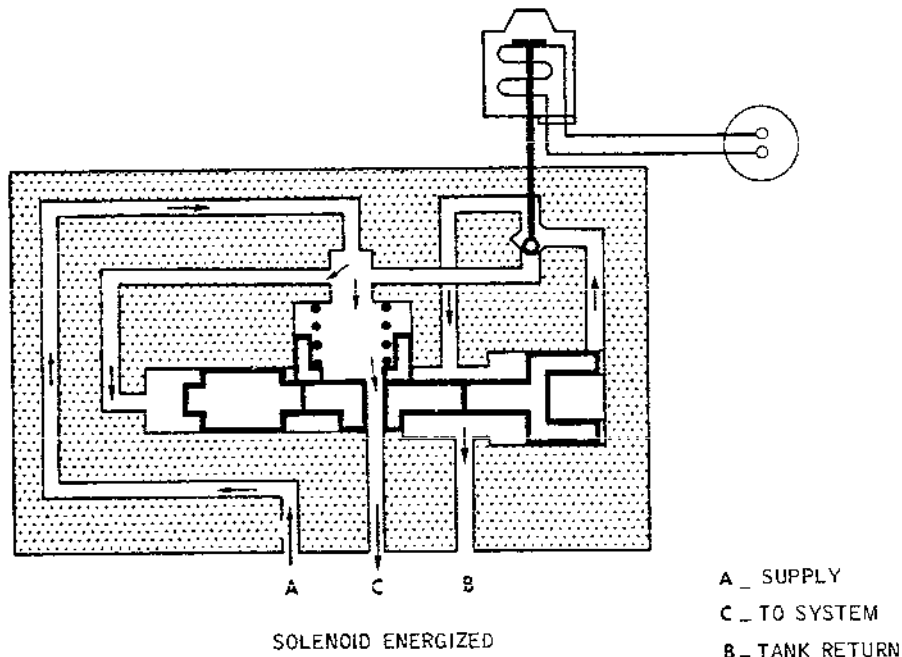
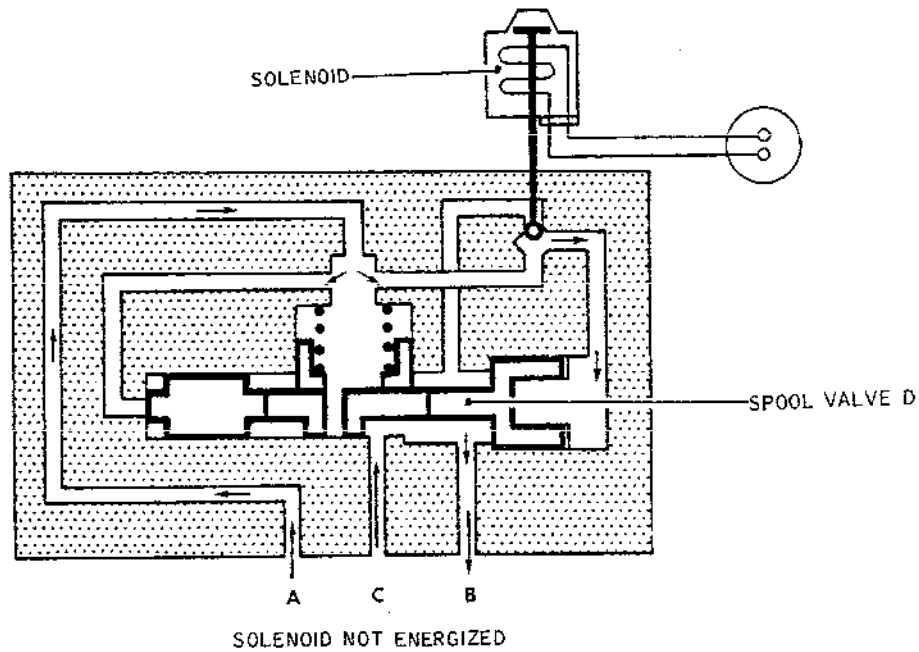
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## MAINTENANCE MANUAL



RJ Standby Selector Valve.  
Figure 005

R

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## MAINTENANCE MANUAL

### 5. Jack - Artificial Feel (Ref. Fig. 006, 007 and 008)

The artificial feel jack is part hydraulically and part electrically operated.

The hydraulic supply is achieved through two spool valves.

A load detector on the jack piston rod transmits an electrical signal to a comparator, proportional to the load applied to the piston rod.

R A double servo-valve regulates the hydraulic pressure.

An electro-valve controlled by the monitoring channel of the artificial feel hydraulically supplies the servo-valve.

R When no signals are received at the electro-valve, there is no hydraulic pressure in the servo-valve and the two chambers of the jack are connected to tank return.

R When the electro-valve is energized, hydraulic pressure is admitted to the servo-valve. This pressure is regulated according to the electrical signal from the control channel.

R The regulated pressure admitted to the front chamber of the jack maintains a load corresponding to the control channel signal. The rear chamber of the jack remains connected to tank return.

R When a fault occurs, the electro-valve is no longer energized and cuts-off the hydraulic supply. With no pressure in the servo-valve the two chambers of the jack are opened to the tank return. The rocker arm pivots and the Green jack takes over.

R Should both jacks fail, only the spring rod remains active. Its calibrated setting, calculated for approach conditions, permits rapid control surface movement which can be dangerous at high speeds. A reduction of speed is therefore necessary.

EFFECTIVITY: ALL

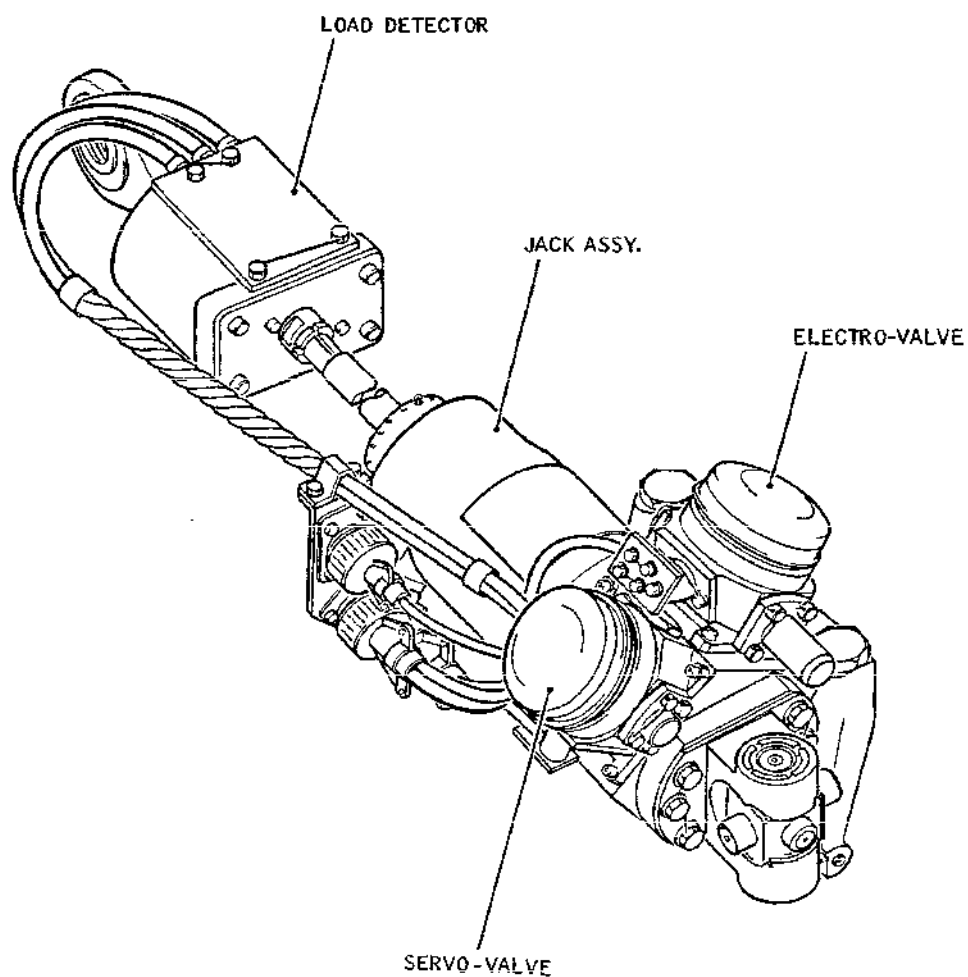
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## MAINTENANCE MANUAL



CMA 27 24 00 0 ALMO

Artificial Feel Jack  
Figure 006

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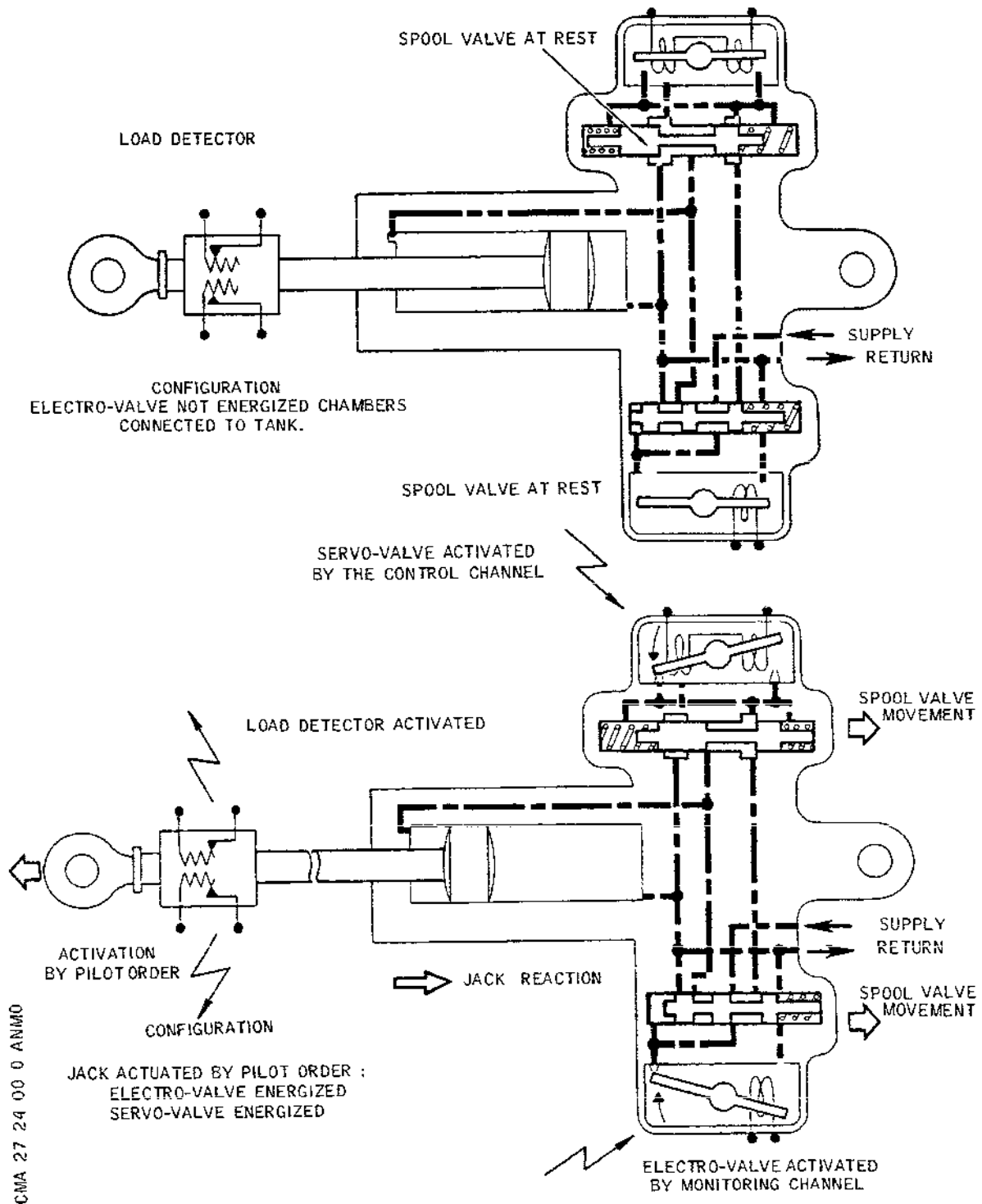
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## MAINTENANCE MANUAL



Artificial Feel Jack  
Figure 007

R

EFFECTIVITY: ALL

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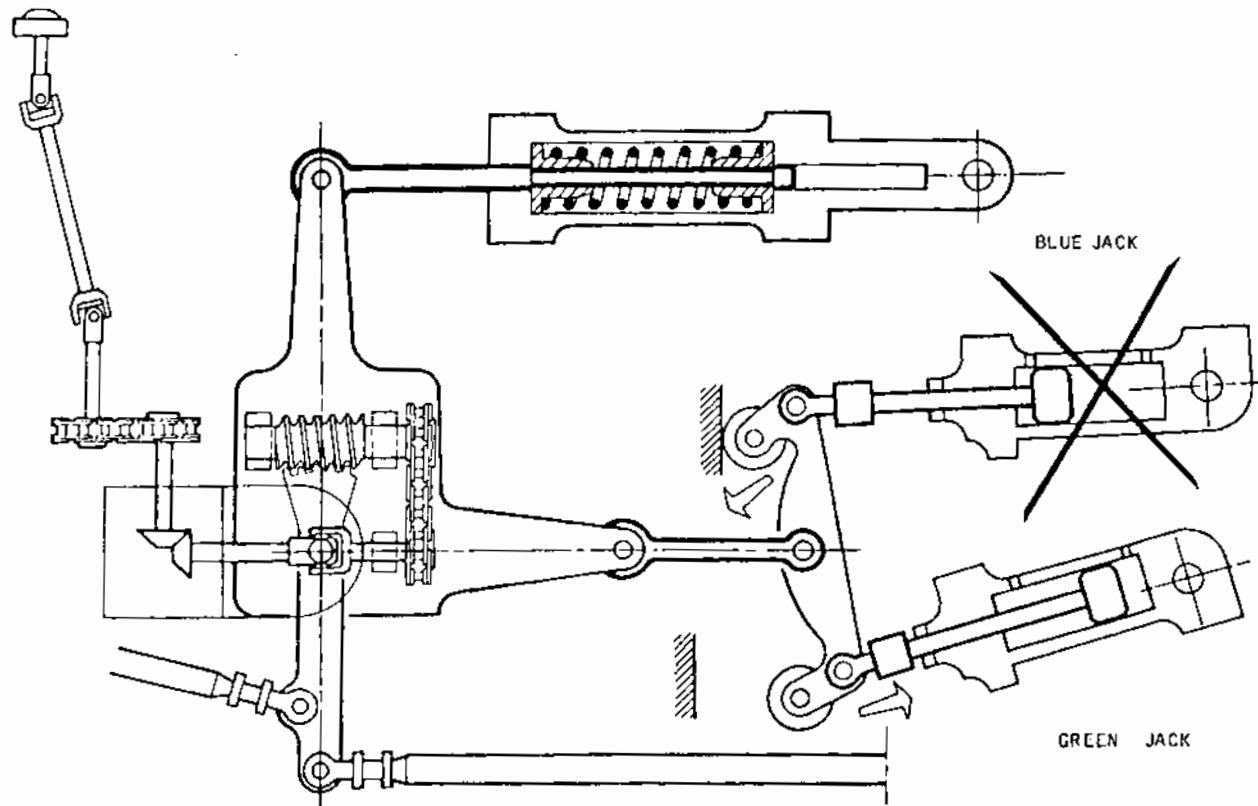
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MAINTENANCE MANUAL

CMA 27 24 00 0 AQMO



R

Artificial Feel - Blue Jack Failure  
Figure 008

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## MAINTENANCE MANUAL

### 6. Relay Jack (RJ) (Ref. Fig. 009 )

R The RJ consists of a mobile body, consisting of two cylinders,  
R moving on two pistons mounted in tandem.

The piston rod is connected to the structure and the RJ body to the control linkage.

The RJ's transmit pilot orders in manual flight, to the mechanical control linkage ; and in automatic flight to the mechanical control linkage and to the resolvers of the electrical controls.

In both cases, the displacement of the spool valves causes the RJ body to be displaced on the piston rods.

EFFECTIVITY: ALL

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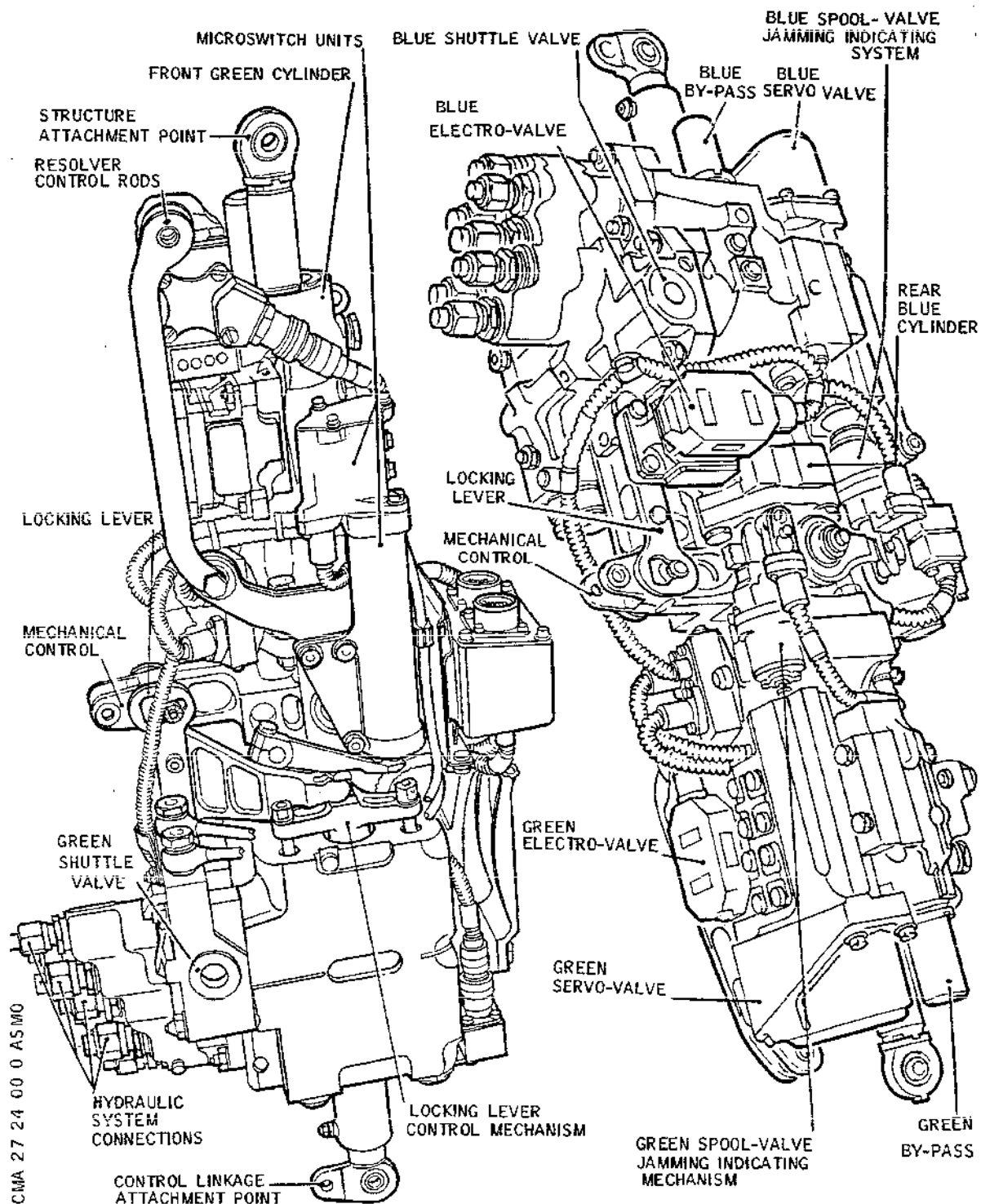
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## MAINTENANCE MANUAL



Relay Jack (RJ)  
Figure 009.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### A. Mechanical Control (Ref. Fig. 010 )

In manual control, the input lever is locked to the spool valves.

R Any movement of the lever displaces the two spool valves and hydraulic pressure is admitted to each cylinder through a by-pass valve.

R Under hydraulic pressure, the relay jack body moves in the same direction as the spool valve. When moving, the body

R cuts-off the hydraulic supply and sets the spool valve to the neutral position, which corresponds to the new position of the system.

EFFECTIVITY: ALL

BA

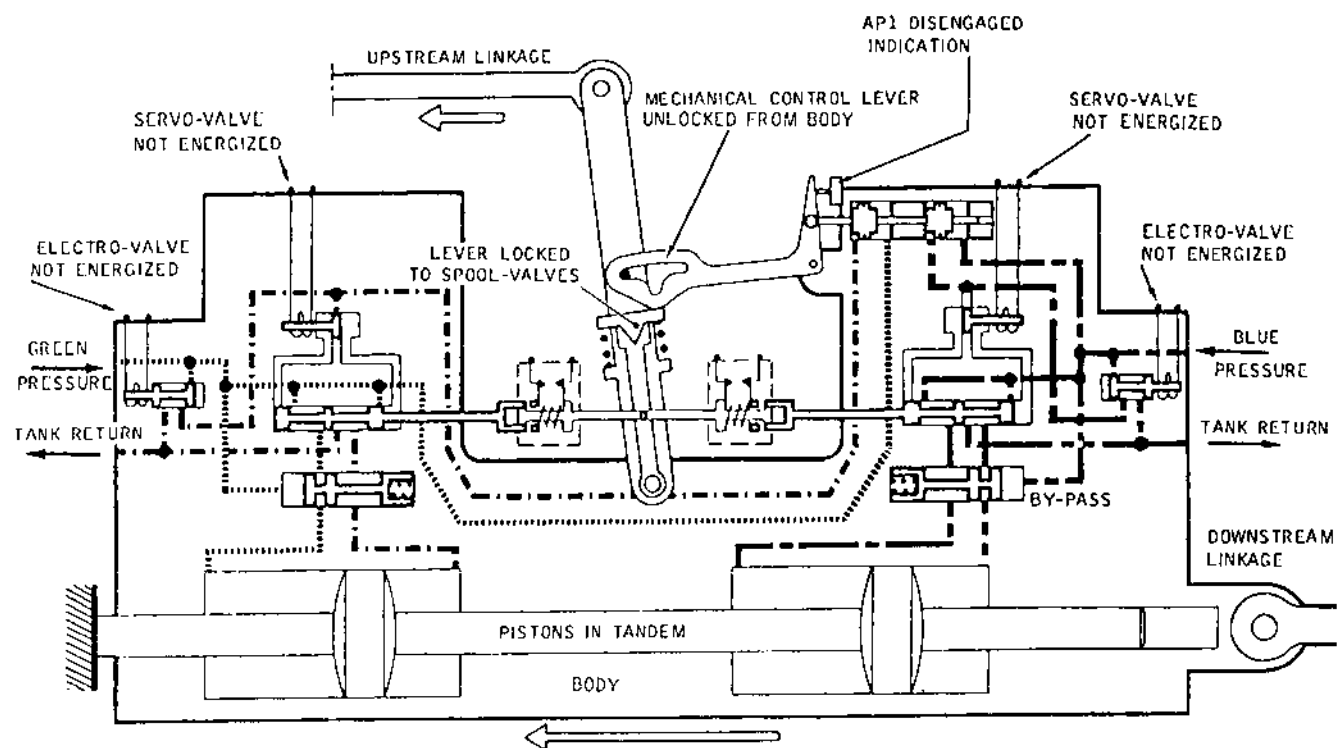
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## MAINTENANCE MANUAL

CMA 27 24 00 0 AUM0



R

RJ Mechanical Control  
Figure 010

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## MAINTENANCE MANUAL

### B. Electrical Control (Ref. Fig. 011 )

The electrical control is used by the auto-pilot system. In this configuration the input lever is disconnected from the spool valves and locked to the relay jack body. The No.1 AP commands are addressed to the Blue system servo-valve and the No.2 AP commands to the Green system servo-valve. With only one auto-pilot being active at any one time, only one servo valve operates. The monitoring system ensures the electrical supply to the electro-valve.

R The electro-valve hydraulic pressure locks the input lever to the relay jack body and supplies the servo valve. The relay jack body displaces driving the downstream linkage and the upstream linkage via the input lever.

R The displacement of the upstream linkage rotates the Captain's and First Officer's control column handwheels and drives the resolvers. The downstream linkage operates the PFCU input lever. (The input lever being unlocked from the spool valves in AP or in electrical mode).

EFFECTIVITY: ALL

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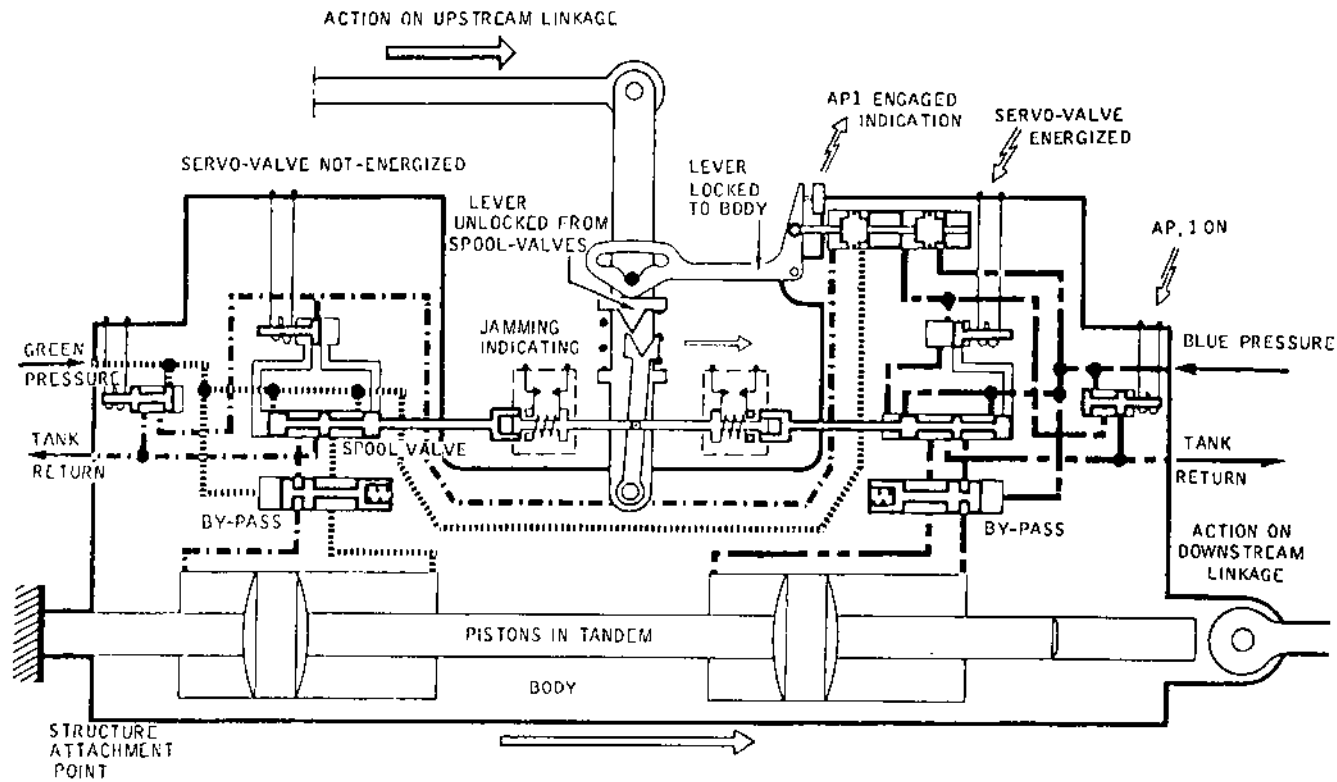
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## MAINTENANCE MANUAL

CMA 27 24 00 0 AWM0



R

RJ Electrical Control  
Figure 011

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### R 7. Power Flight Control Unit (PFCU) (Ref. Fig. 012 )

R The PFCU consists of a mobile body, consisting of two cylinders,  
R moving on two pistons mounted in tandem.

The piston rod is connected to the structure and the PFCU body to the control surface.

Displacement of the PFCU is achieved by hydraulic pressure admitted to the cylinders via the spool valves which move it to one side or other of the pistons.

The two spool valves are mechanically linked in order to synchronize the orders in the two cylinders.

The spool valves can be controlled in two ways :

- In mechanical mode
- In electrical mode

EFFECTIVITY: ALL

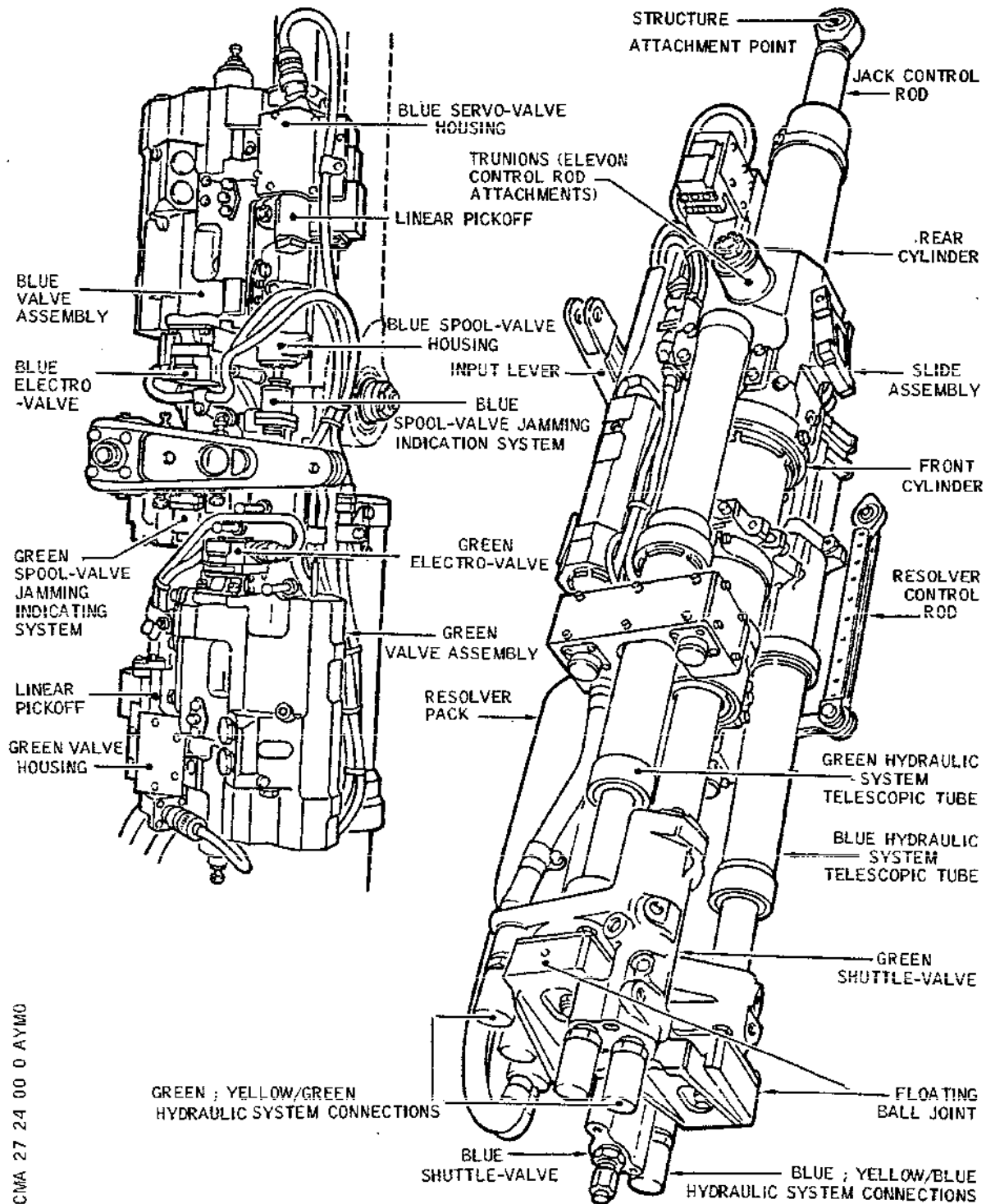
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## MAINTENANCE MANUAL



CMA 27 24 00 0 AYM0

Power Flight Control Unit (PFCU)  
Figure 012

R

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## MAINTENANCE MANUAL

### A. Mechanical Mode (Ref. Fig. 013 )

R The servo control unit input lever is engaged on the  
R mechanical interconnection of the two spool valves by the  
spring and the tank pressure.

R Any movement of the lever displaces the two spool valves.  
Hydraulic pressure is admitted into each cylinder through a  
by-pass valve, opened on pressurization.

R The body of the servo control unit travels in the same  
R direction as the spool valve, under the action of hydraulic  
R pressure ; when moving, the body cuts off the hydraulic  
pressure and sets the spool valve on a neutral position.  
This position corresponds to a new system position.

EFFECTIVITY: ALL

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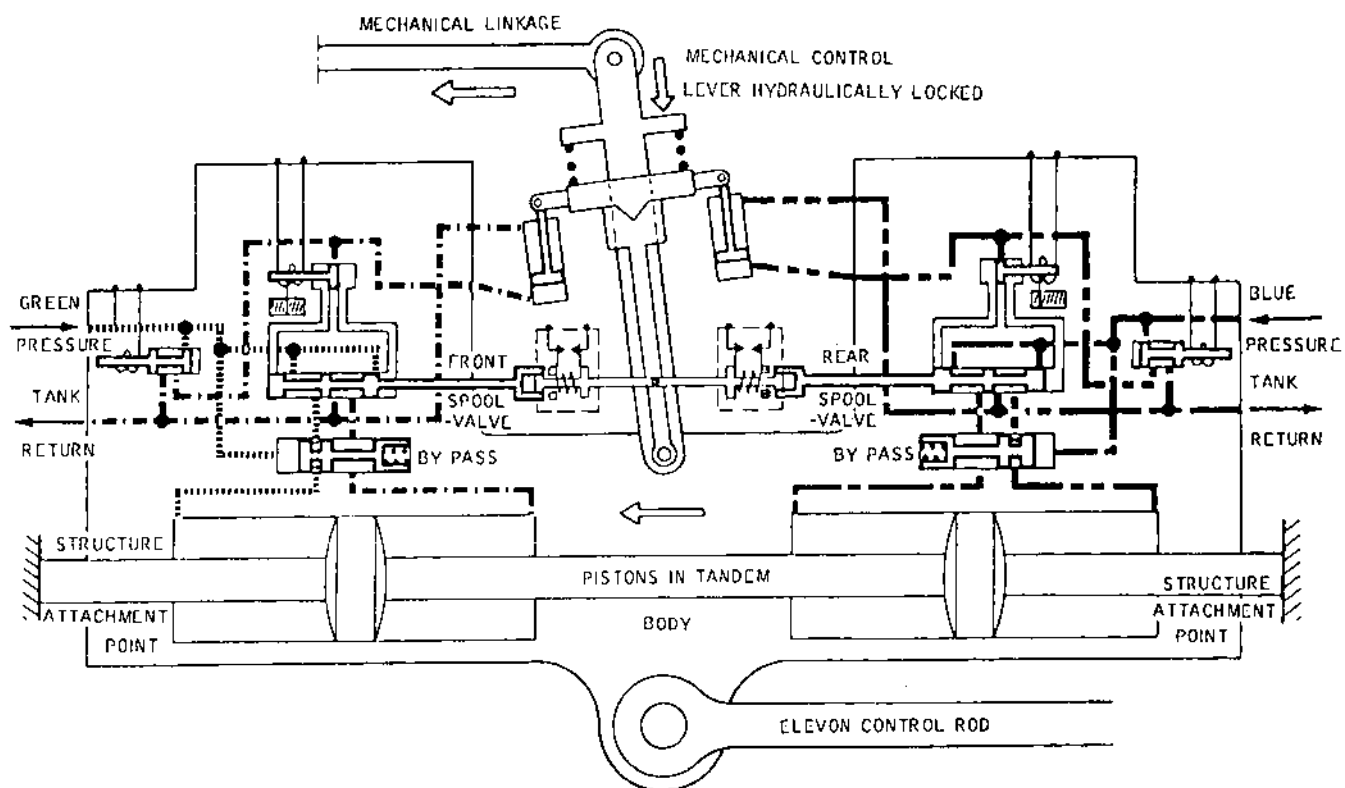
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## MAINTENANCE MANUAL

CMA 27 24 00 0 BAO



PFCU Mechanical Control  
Figure 013

R

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## MAINTENANCE MANUAL

### B. Electrical Mode (Ref. Fig. 014 )

The PFCU has two servo valves, one Blue and one Green, which receive signals from the flight control electrical channels. Each servo valve hydraulically controls the spool valve with which it is associated.

R Each servo valve is supplied by its associated electrovalve

In normal operation the Blue servo valve receives the signal from the Blue electrical control channel and the Blue electro valve is opened by the Blue monitoring channel.

The servo valve is hydraulically actuated and controls the spool valve with which it is associated. This spool valve mechanically drives the second spool valve, the whole assembly controlling the admission of pressure to the two cylinders.

Opening the electro-valve admits pressure to the mechanical lever locking actuator and unlocks the lever. This lever only follows the control orders for the spool valves without acting on them.

If the Blue channel fails the Blue electro valve is closed by the Blue monitoring channel and the Blue servo valve becomes inoperative. Reacting to the Green channel operation, the Green electro valve is simultaneously opened, activating the Green servo valve.

If the Green electrical channel fails, the monitoring system closes the green electro-valve. With the two electro valves closed, the spring locks the mechanical control lever and the operation continues in mechanical mode.

R

### C. PFCU Control Mechanical Follow Mode

During normal electrical control, the mechanical input lever is disengaged but moves to follow the electrical control orders. This prevents possible overloading of linkage resulting from positional variations between mechanical input and PFCU'S.

R

R

R

These variations can arise from :

- Normal difference in phase between mechanical linkage and the electrical control.
- The auto-stabilization not cutting in except in the electrical mode.
- A failure at servo control level

EFFECTIVITY: ALL

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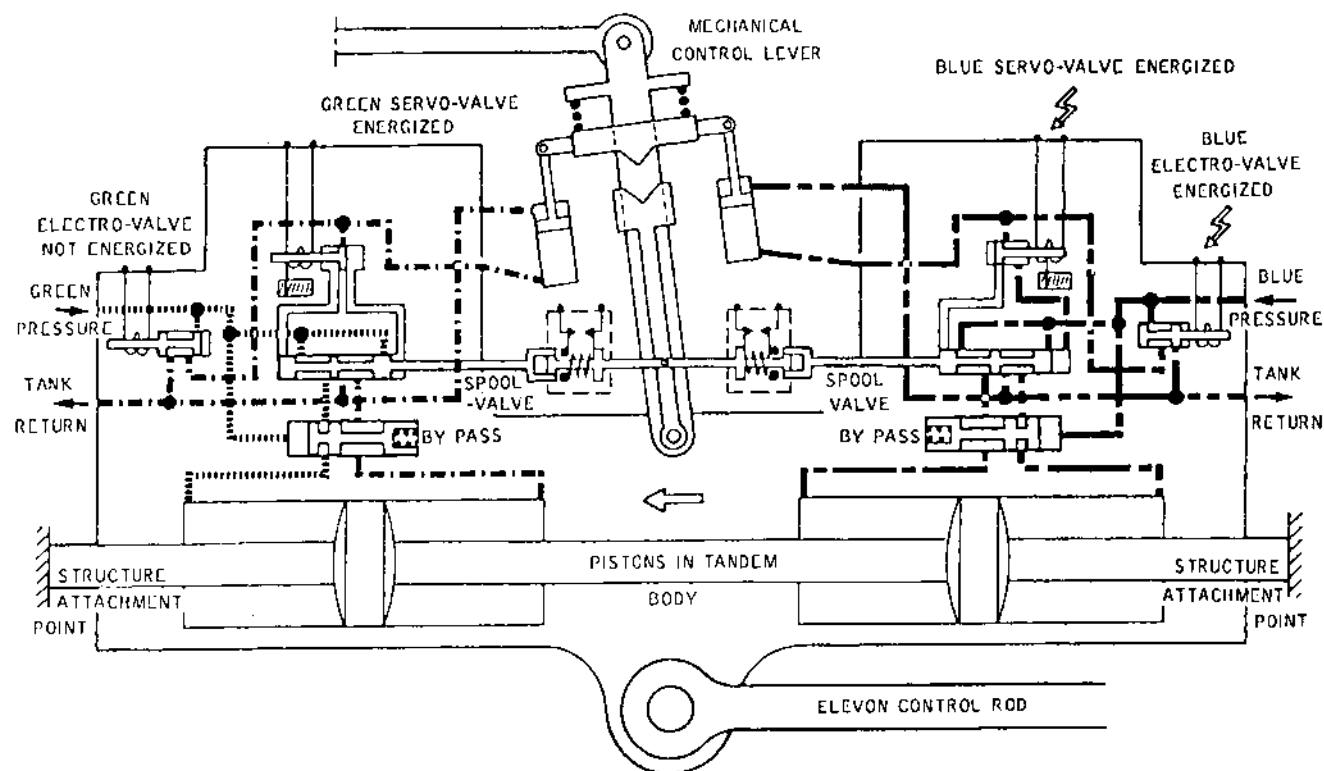
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## MAINTENANCE MANUAL

CMA 27 24 00 0 BCM0



R

PFCU Electrical Control  
Figure 014

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## MAINTENANCE MANUAL

The follow mode system provides 12° of travel each side of neutral.

R On the ground and in the absence of hydraulic pressure, a  
R spring locks the control input lever to the mechanical  
linkage of the two spool valves. The mechanical linkage  
is thus protected from the effects of ground gusts by the  
various load limiting components.

On the ground, in the absence of hydraulic pressure,  
chambers in the same cylinder are connected by the by-  
pass valve, whose construction is such that it creates a  
restriction and acts as a damper.

### 8. Monitoring and Indicating (Ref. Fig. 015 )

The indicators monitoring operation of the hydraulic system  
are mounted on the overhead panel.

The master warning panel comprises :

- R - a PFC warning light for the servo controls
- R - a FEEL warning light for the artificial feel jacks
- R - a HYD warning light for the hydraulic supplies
- R - a general aural warning gong.

R The SERVO CONTROLS unit comprises :

- R - Two caption lights ; BLUE JAM and GREEN JAM (PFCU valve jamming).
- A three position selector GREEN ONLY - NORMAL - BLUE ONLY.
- R - Four green indicator lights signalling the closing of the normal Green and Blue selector valves.
- R - Two low pressure caption lights : GREEN LOW PRESS and BLUE LOW PRESS.
- A three position selector YELLOW/GREEN - NORMAL - and YELLOW/BLUE.
- Four green indicator lights signalling the opening of the standby selector valves Yellow/Blue and Yellow/Green.
- R - Four test push-buttons, each of which checks the master warnings (PFC and gong) and the associated caption light.
- R - A push-button YELLOW LEVEL TEST. This push-button is used to simulate a Yellow tank low 1st level warning and causes the standby electro-hydraulic selector valves (PFCU and RJ) to close.

R The RELAY JACK unit comprises :

- R - A three position switch GREEN ONLY, NORM, BLUE ONLY
- R - Two test buttons BLUE and GREEN, each of which checks the master warnings (PFC and gong) and the associated caption
- R

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

light.

- R - Two caption lights BLUE JAM and GREEN JAM signalling relay jack spool valve jamming.

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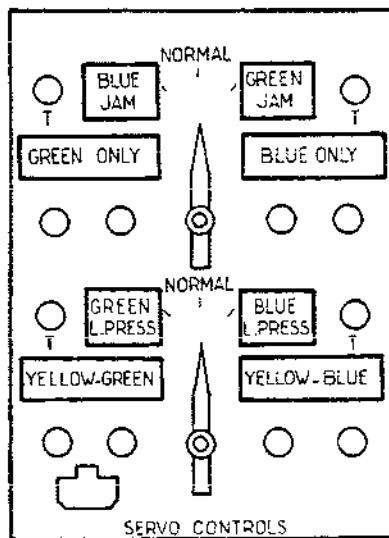
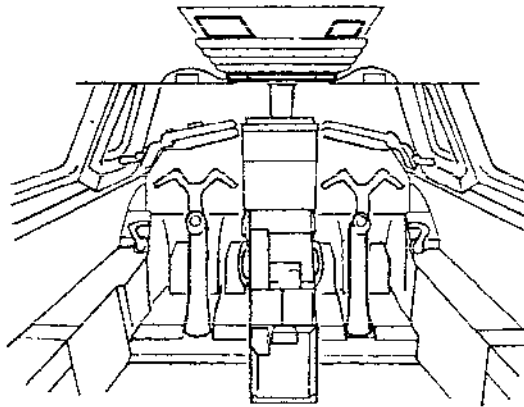
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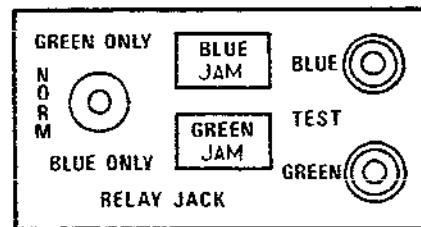


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## MAINTENANCE MANUAL

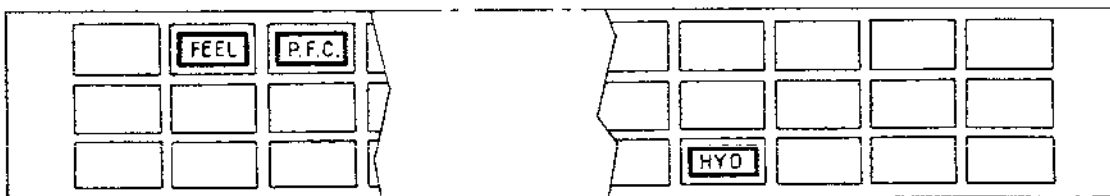


SERVO CONTROLS UNIT



RELAY JACKS UNIT

CMA 27 24 00 0 BEMO



Monitoring and Indicating  
Figure 015

R

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## MAINTENANCE MANUAL

### 9. Operation

#### A. Normal Operation (Ref. Fig. 016 )

R On SERVO CONTROLS unit, place the selectors in NORMAL  
R position.

R On RELAY JACK unit, place switch in NORMAL position.

All warning indicators are extinguished.

Blue and Green system hydraulic pressure supplies the various flight control components which react according to the pilot's movement of the controls.

EFFECTIVITY: ALL

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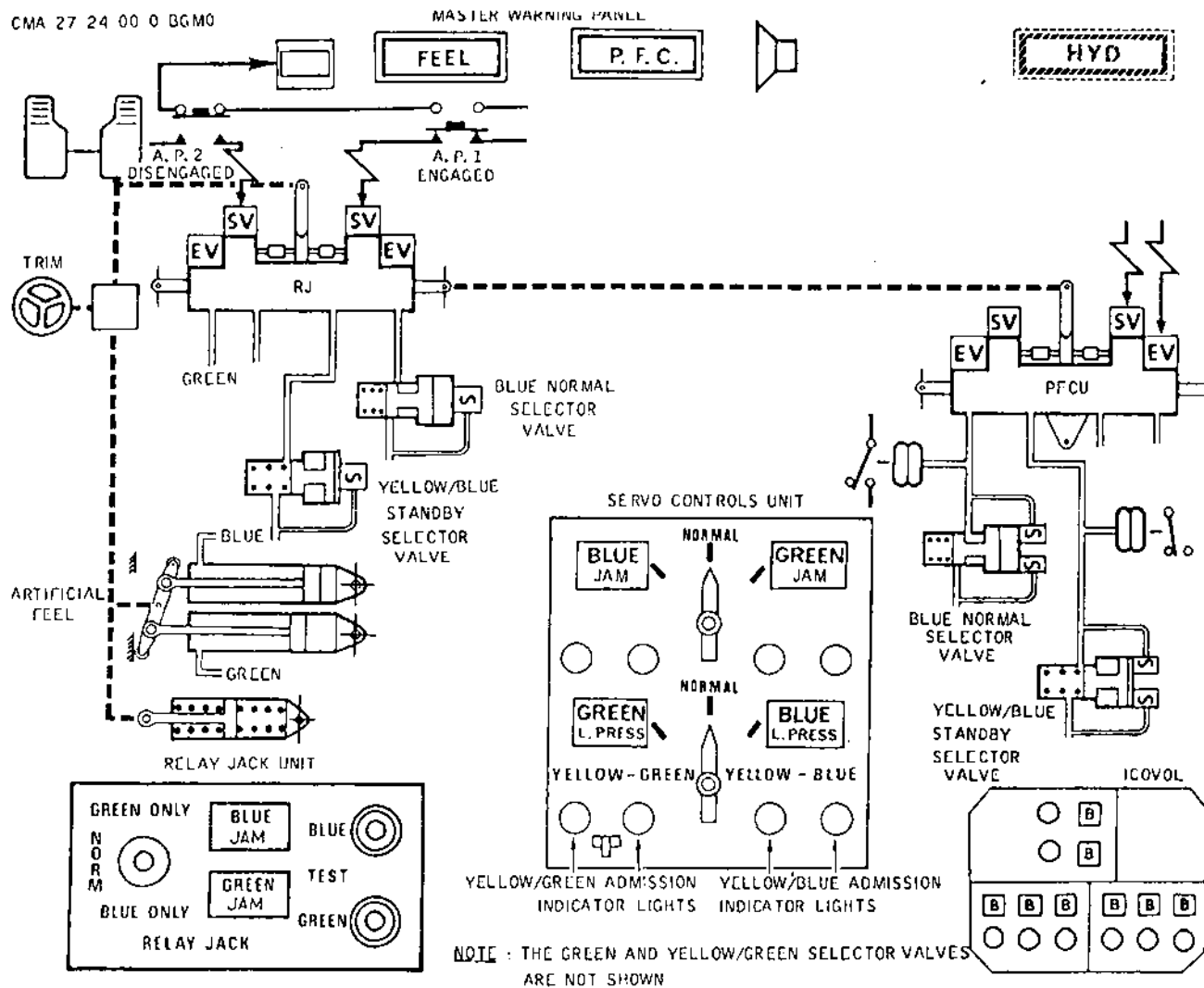
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## MAINTENANCE MANUAL

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Monitoring and Indicating, Normal Flight -  
Blue Electrical Mode  
Figure 016

R

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## MAINTENANCE MANUAL

- B. Blue System Low Pressure, in Normal Flight in the Blue Electrical Mode (Ref. Fig. 017 )

Indications :

- R The BLUE LOW PRESS caption light illuminates on the SERVO CONTROLS unit.
- R On the master warning panel the PFC and HYD warning lights illuminate and the gong sounds. The flight control Surface position indicator (ICOVOL) displays "G" as monitoring has caused the Blue electro valve to close and the Green electro valve to open.
- R

Results :

- R The servo controls operate on one cylinder only. (Green system). If autopilot No.1 is engaged, it disengages. Only the Green jacks on the artificial feel are available.

EFFECTIVITY: ALL

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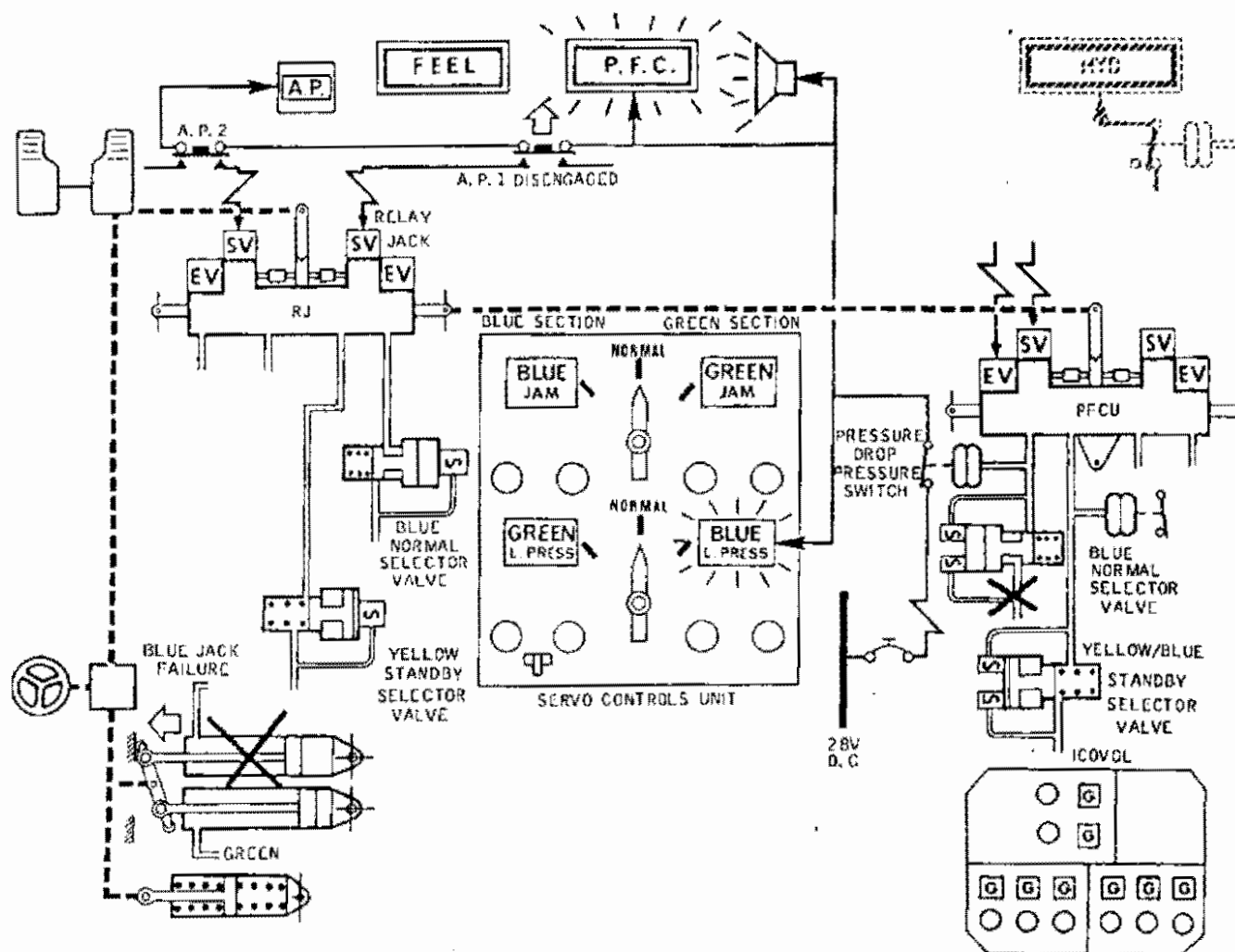
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CMA 27 24 00 0 BJM0

### MASTER WARNING PANEL



Monitoring and Indicating - Blue Low Pressure  
Figure 017

R

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## MAINTENANCE MANUAL

Corrective Action (Ref. Fig. 018 ) :

NOTE : The electrical selectors should always be turned towards the illuminated warning.

R Set YELLOW/BLUE on the SERVO CONTROLS unit.

R The BLUE LOW PRESS caption light extinguishes.

R The green indicator lights under GREEN ONLY illuminate signalling the closing of the Blue system selector valve.

R The green indicator lights YELLOW/BLUE illuminate signalling the opening of the Yellow/Blue system selector valve.

R Cancel the warnings by pressing the caption lights.

Results :

The servo controls re-function on both cylinders.

Only the Green jacks on the artificial feel are available.

R The green indicator lights on the SERVO CONTROLS unit remain illuminated indicating permanent standby Yellow/Blue hydraulic operation on one cylinder.

R Manually reselect the Blue electrical mode after resetting on the Flight Control Unit (PFCU control and monitoring panel).

R If required AP1 can be re-engaged.

EFFECTIVITY: ALL

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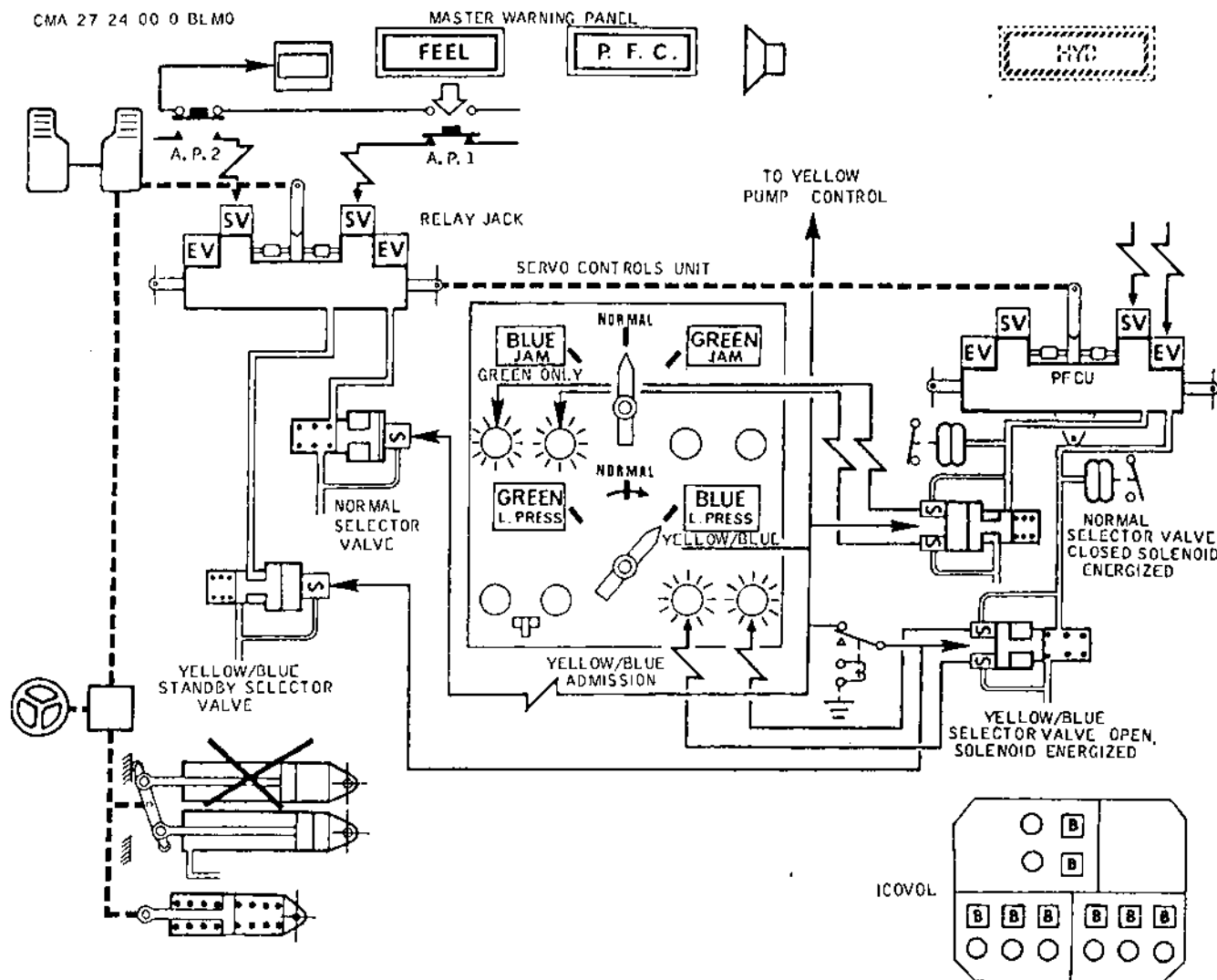
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## MAINTENANCE MANUAL

CMA 27 24 00 0 BLM0



Monitoring and Indicating - Blue Low Pressure  
Corrective Action  
Figure 018

R

EFFECTIVITY: ALL

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# *Concorde*

## MAINTENANCE MANUAL

- C. Green System Low Pressure, in Normal Flight with the Blue Electrical Mode (Ref. Fig. 019 )

Indications :

- R The GREEN LOW PRESS caption light on the SERVO CONTROLS unit illuminates.
- R On the master warning panel the PFC and HYD warning lights illuminate and the gong sounds.

Results :

The servo controls operate on one cylinder only (Blue system).

Only the Blue jacks on the artificial feel are available.

Corrective Action :

- R Set YELLOW/GREEN on the SERVO CONTROLS unit.
- R The GREEN LOW PRESS caption light extinguishes.
- R The green indicator lights under BLUE ONLY illuminate signalling the closing of the Green system selector valve. The green lights under YELLOW/GREEN illuminate signalling the opening of the Yellow/Green system selector valves.
- R Cancel the warnings by pressing the caption lights.

Results :

The servo controls operate on both cylinders. Only the Blue jacks on the artificial feel are available.

- R The green indicator lights remain illuminated on the SERVO CONTROLS unit indicating permanent standby YELLOW/GREEN hydraulic operation on one cylinder.

EFFECTIVITY: ALL

BA

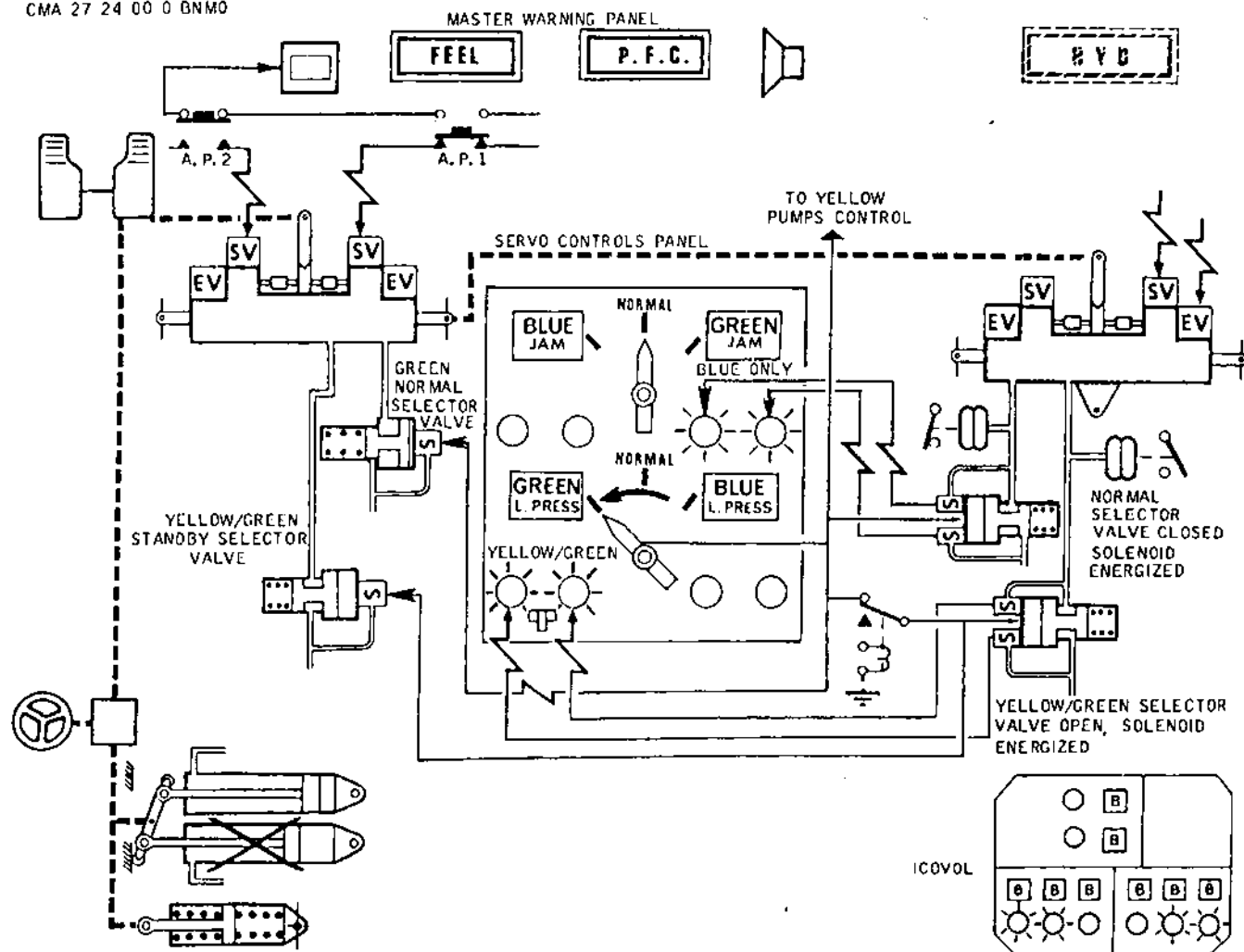
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CMA 27 24 00 0 BNMO



Monitoring and Indicating - Green Low Pressure  
In the Blue Electrical Mode  
Figure 019

R

EFFECTIVITY: ALL

BA

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## MAINTENANCE MANUAL

- D. Yellow tank Low 1st Level, Blue Electrical Mode, Yellow/Blue and Green Systems (Ref. Fig. 020 )

### Indications :

The BLUE LOW PRESS caption light on the SERVO CONTROLS unit illuminates, the two lower green indicator lights extinguish, as the 1st level relay has cut-off power to the Yellow/Blue selector valve.

The Flight Control Surface Position Indicator (ICOVOL) changes to "G" as monitoring has opened the green electro valve. On the master warning panel the PFC and HYD warning lights illuminate, the gong sounds and AP 1 disengages if it was engaged.

### Results :

The servo controls operate on one cylinder only in the Green electrical mode.

### Corrective Action :

Cancel the warnings by pressing the caption lights.

### Results :

The servo controls operate on one cylinder only in the Green electrical mode.

The BLUE LOW PRESS and GREEN ONLY caption lights remain illuminated.

In the event of a pressure drop on remaining cylinder (green body) change-over to Yellow pressure on this cylinder is automatic.

EFFECTIVITY: ALL

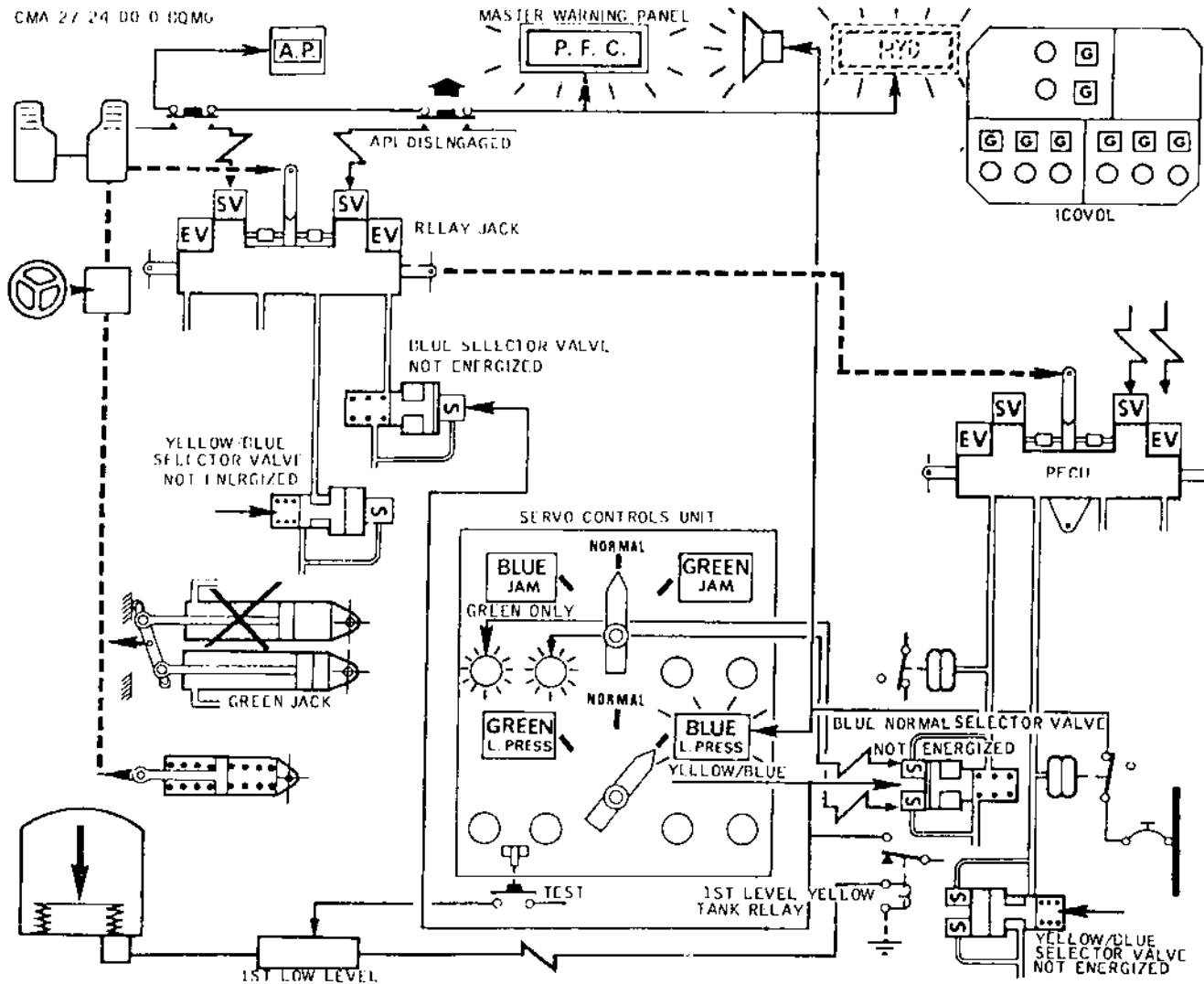
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## MAINTENANCE MANUAL



Monitoring and Indicating - Yellow Reservoir  
Low 1st Level  
Figure 020

R

EFFECTIVITY: ALL

BA

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# *Concorde*

## MAINTENANCE MANUAL

R E. PFCU Blue System Spool Valve Jamming (Ref. Fig. 021 )

Indications :

R The BLUE JAM caption light on the SERVO CONTROLS unit illuminates.

On the master warning panel the PFC warning light illuminates and the gong sounds.

R On ICOVOL indicator, the magnetic indicators for the rudders associated with the jammed PFCU change over to "G" (Green) and the corresponding red warning lights illuminate.

Results :

R The monitoring system detecting a desynchronization of the rudders, changes the control channel (from the Blue channel to the Green channel).  
The system is designed in such a way that in the case of jamming a change over to the mechanical mode is impossible. The Green channel thus remains in service.

Corrective Action :

High speed flight.

R Confirm the Green mode for the rudders displaying "G" on  
R ICOVOL indicator, at the Flight Control unit (PFCU control  
R and monitoring panel).

R Cancel the warnings, the BLUE JAM caption light remains  
R illuminated. The control surface not affected by the fault  
R operates in the Green electrical mode using the Blue and  
R Green systems, but the control surface controlled by the  
R jammed PFCU is uncontrollable.

R The other control surfaces operate normally in the Blue electrical mode using the Blue and Green systems.

Approach flight :

R Set GREEN ONLY and cancel the warnings by pressing the caption lights.

R The BLUE JAM caption light extinguishes and GREEN ONLY and BLUE LOW PRESS illuminate.

All the PFCUs operate on one cylinder only in GREEN electrical mode.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

R After this action, Yellow pressure will automatically supply  
R the Green body, in the event of a Green pressure drop.  
R Pilot will confirm automatic selection by placing selector  
R switch in Yellow/Green position.

EFFECTIVITY: ALL

BA

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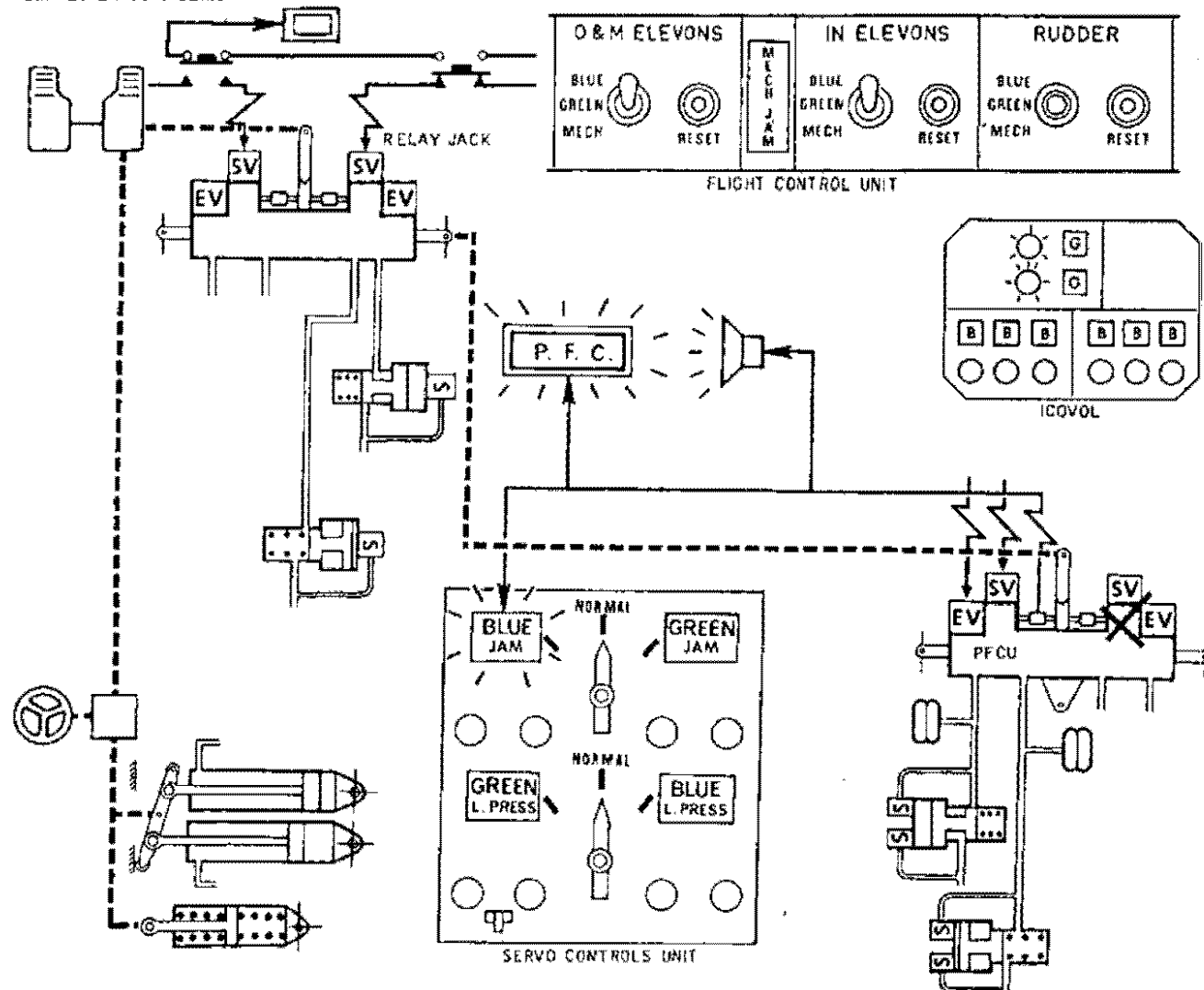
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## MAINTENANCE MANUAL

CMA 27 24 00 0 BSMO



Monitoring and Indicating - Blue Spool Valve Jamming  
Rudders  
Figure 021

R

EFFECTIVITY: ALL

BA

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## MAINTENANCE MANUAL

### F. Relay Jack Blue System Spool Valve Jamming (Ref. Fig. 022 )

#### (1) Manual control

##### Indications :

On the master warning panel the PFC warning light illuminates and the gong sounds.

On the RELAY JACK unit, the BLUE JAM caption light and the indicator incorporated in the switch illuminate.

##### Results :

The Blue cylinder hydraulically locks the relay jack

An electrical signal closes the Blue hydraulic supply selector valve and prohibits opening of the Yellow/Blue selector valve.

Cutting off the Blue system enables the relay jack to operate on only one Green cylinder.

##### Corrective Action :

On RELAY JACK unit, set the switch to GREEN ONLY which confirms closure of the Blue hydraulic selector valve and prohibits the opening of the Yellow/Blue selector valve. The BLUE JAM caption and the indicator incorporated in the switch extinguish.

#### (2) Cruise flight with the switch in NORM position, AP1 engaged.

##### Indications :

The AP1 monitoring comparator causes the auto pilot to trip out and change over to manual flight.

The AP warnings illuminate.

The results and corrective action are the same as for manual control.

It is possible to engage AP2.

#### (3) On approach flight, with switch in NORM Position AP1 and AP2 engaged.

##### Indications :

EFFECTIVITY: ALL

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R

BA

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## MAINTENANCE MANUAL

The monitoring comparator causes the AP1 to trip out.

The AP warnings illuminate.

Switch over to AP2.

The result and corrective action are the same as for manual control.

### 10. Electrical Power Supply

Hydraulic selection system control network is supplied from 28VDC essential bus bars.

The following table gives the distribution of these bars in the various circuit breaker panels

SERVICE	BUSBAR	C/B PANEL
Flight Control 1	12VDC A. ESS 3P	1-213
Flight Control 2	28VDC A. ESS 4P	3-213

EFFECTIVITY: ALL

BA

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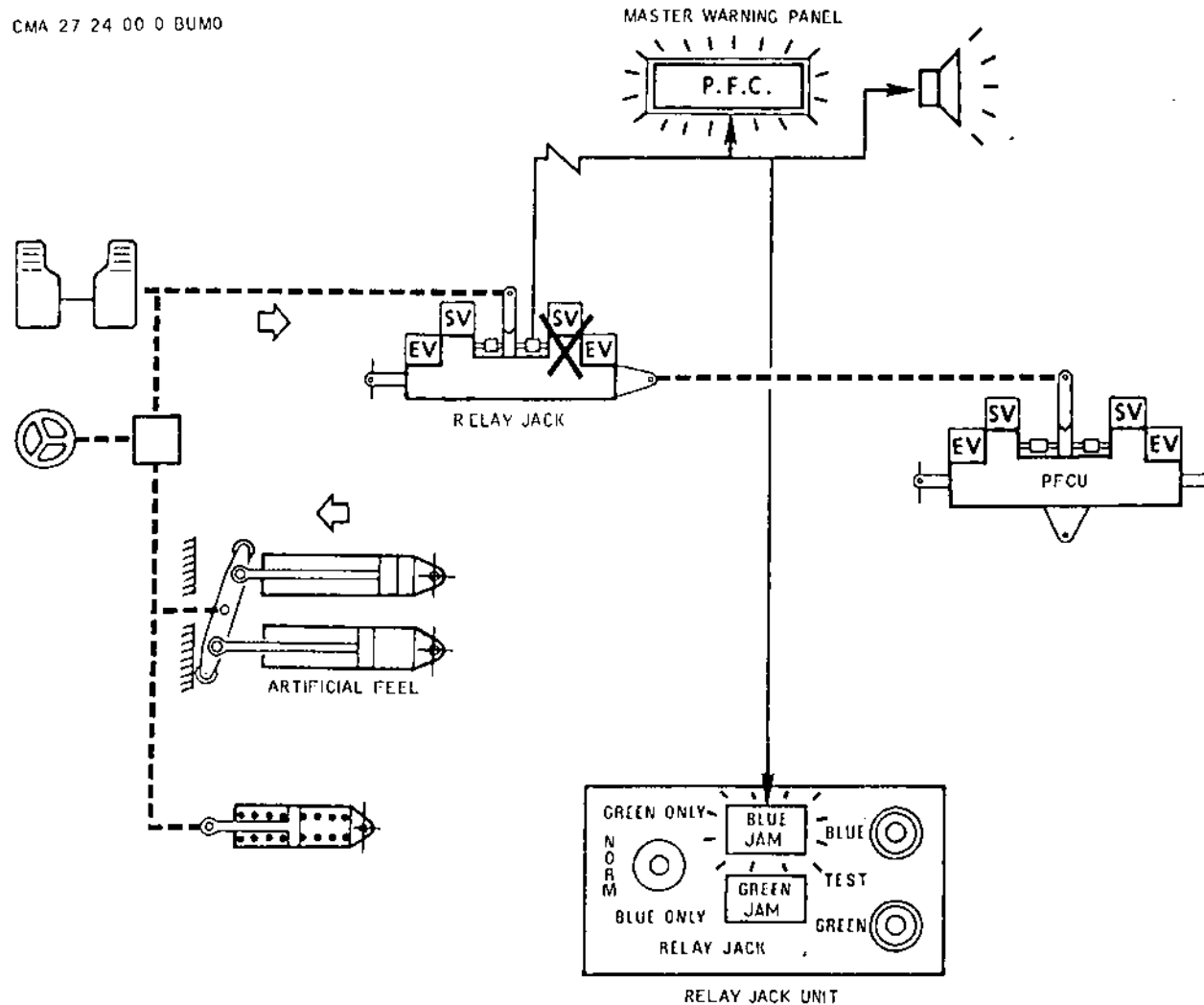
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## MAINTENANCE MANUAL

CMA 27 24 00 0 BUMO



Monitoring and Indicating - Relay Jack  
Blue Spool Valve Jamming  
Figure Q22

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

### HYDRAULIC SYSTEM - TROUBLE SHOOTING

#### 1. General

Power Flight Control Unit hydraulic supply is common to the elevon and rudder surface PFCUs.

Relay jack hydraulic supply is common to the pitch, roll and yaw relay jacks.

Trouble shooting shall be carried out by referring to topic 27-14-00, Trouble shooting.

#### 82. Procedures (BA - Mod 27C083)

B In the event of a prolonged P.F.C.U. jam warning caused by  
B microswitch spring box stiction i.e. jam warning indication  
B with Flying controls operating in correct sense and no control  
B surface lag, with the incorporation of this modification it is  
B now possible for trouble shooter to identify which P.F.C.U. is  
B at fault. Identification of faulty P.F.C.U. is by use of an  
B additional test socket in the LEFT HAND REAR EQUIPMENT, RACKING  
B 7-244. To gain access to test socket the rear LEFT HAND facia  
B panel requires removal by means of 8 quick release fasteners.  
B An AVO or similar meter must then be used by inserting one pin  
B to earth (PIN V) and the other to any one of the following pins,  
B a reading in excess of 20 volts identifies faulty P.F.C.U. All  
B pins should be checked to ensure that problem is an isolated  
B case and defect is not present on any other P.F.C.U.

B	P.F.C.U.	BLUE	GREEN
B	R.H. OUTER ELEVON	PIN H	PIN S
B	R.H. MIDDLE ELEVON	PIN G	PIN R
B	R.H. INNER ELEVON	PIN F	PIN P
B	UPPER RUDDER	PIN D	PIN M
B	LOWER RUDDER	PIN E	PIN N
B	L.H. INNER ELEVON	PIN C	PIN L
RB	L.H. MIDDLE ELEVON	PIN B	PIN K
RB	L.H. OUTER ELEVON	PIN A	PIN J

B Following identification of faulty P.F.C.U. jam switch gain  
B access to it by removing appropriate fairings.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

B PANEL 553 JB giving access to P.F.C.U. L.H. OUTER ELEVON  
B PANEL 552 JB giving access to P.F.C.U. L.H. MIDDLE ELEVON  
B PANEL 551 JB giving access to P.F.C.U. L.H. INNER ELEVON  
B PANEL 651 JB giving access to P.F.C.U. R.H. INNER ELEVON  
B PANEL 652 JB giving access to P.F.C.U. R.H. MIDDLE ELEVON  
B PANEL 653 JB giving access to P.F.C.U. R.H. OUTER ELEVON  
B PANEL 352 CR giving access to P.F.C.U. UPPER RUDDER  
B PANEL 351 CR giving access to P.F.C.U. LOWER RUDDER

B Using tool ST4 P285-45-2 (HZAT 2740) on spring box and  
B microswitch assembly, exercise spring box in both directions  
B several times to ensure stiction is removed. In the unlikely event  
B of stiction not being removed refer to Concorde M.E.L. 05-02-1  
B ref. No. 4 for alleviation. If exercising of spring box is  
B successful function flying controls I.A.W. 27-00-00 P/B 300 to  
B confirm this.

EFFECTIVITY: ALL

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# *Concorde*

## MAINTENANCE MANUAL

### HYDRAULIC SYSTEM - ADJUSTMENT/TEST

#### R 1. General

Adjustment/Tests concerning selection of hydraulic systems supplying rudder servo-controls are described in Chapter 27-14-00 - HYDRAULIC SYSTEM - Adjustment/Test.

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EFFECTIVITY: ALL

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# *Concorde*

## MAINTENANCE MANUAL

### ARTIFICIAL FEEL JACK (GREEN, YAW) - SERVICING

**WARNING:** MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

This procedure is to render an artificial feel jack inoperable following an electro-valve failure, servo valve failure or for other operational reasons.

#### 2. De-activation of Artificial Feel Jack (Green)

##### A. Equipment and Materials

	DESCRIPTION	PART NO.
	Blanking Plug	C27-133
RB	Blanking Plugs	AN 929-4S
RB	Blanking Plugs	AN 929-5S
	Circuit Breaker Safety Clips	B24715
	Lockwire dia. 1 mm (0.041 in)	
	Corrosion Resistant Steel	-
	Warning Notices	-

##### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (2) Trip, safety and tag the following circuit breakers:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
YAW ART FEEL COMP 2 SUP	13-216	2C242	G16
HYD TANK COMPR CONT	15-215	M602	D8
HYD TANK AIR COMPR SUP	13-215	M601	G7
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M626	F22

- (3) Open access doors 151DB, and 153BB beneath the fuselage and depressurize the Green, Blue and Yellow hydraulic systems. Depressurize the Green hydraulic tank. Close and safety tank depressurization valve with lockpin.

WARNING: DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS USED, DISPLAY A WARNING NOTICE ON THIS UNIT, PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (4) Open access doors 121DB and 121FB.

### C. Procedure A. (Ref. Fig. 001)

CAUTION: ENSURE THAT THE ARTIFICIAL FEEL JACK TO BE DE-ACTIVATED IS AGAINST MECHANICAL STOP.

NOTE: An alternative method for de-activation of artificial feel jack is shown in Procedure B.

- (1) Cut and remove wire locking. Disconnect artificial feel jack pressure pipe at hydraulic system manifold 5105.
- (2) Fit blanking plug C27-133 (located in the Flight Kit) to manifold. Connect the pressure pipe to blanking plug C27-133 and safety with lockwire.

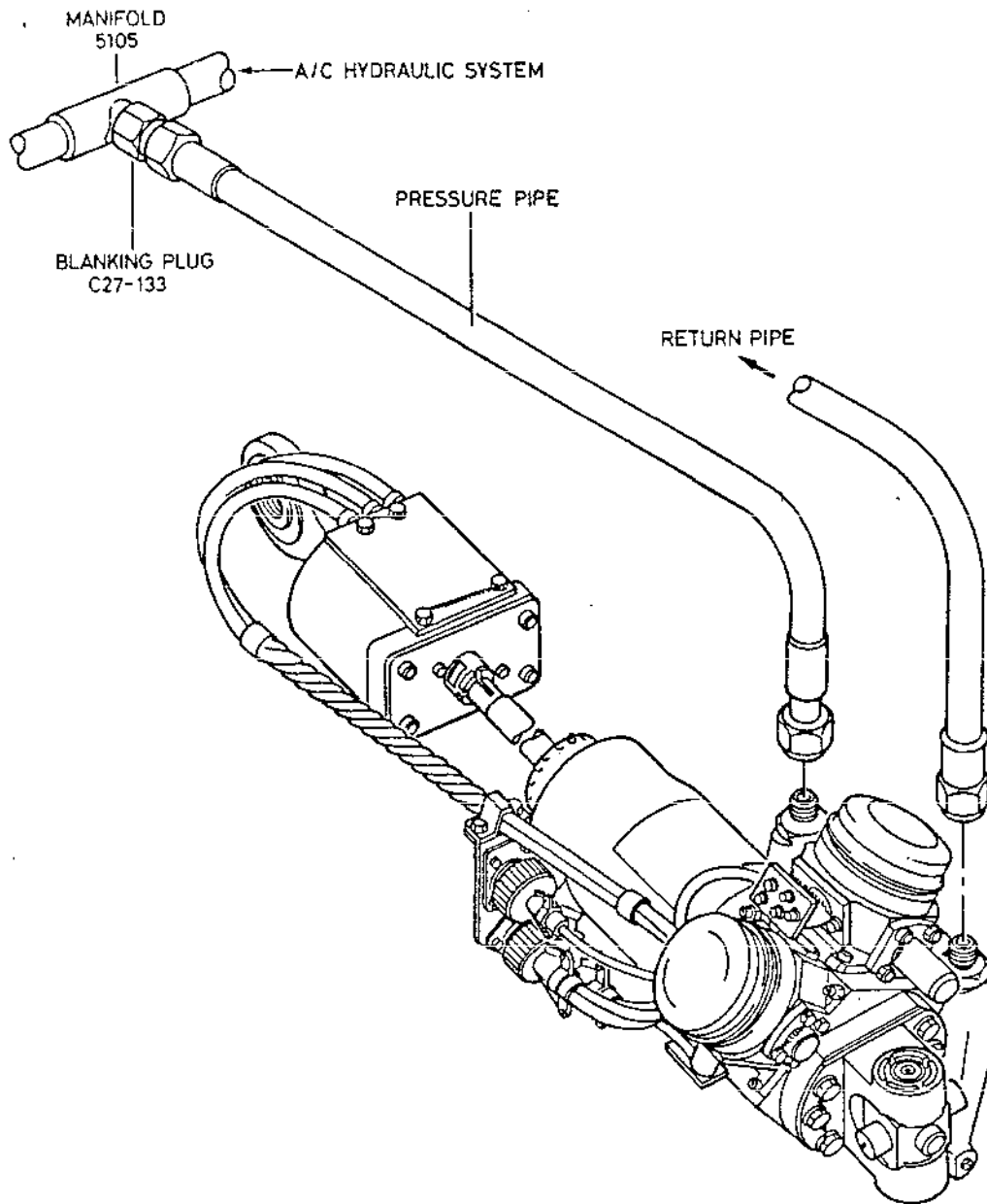
EFFECTIVITY: ALL

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## MAINTENANCE MANUAL



De-activation of Artificial  
Feel Jack  
Fig. 001

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

Procedure B. (Ref. Fig. 001)

CAUTION: ENSURE THAT THE ARTIFICIAL FEEL JACK TO BE  
DE-ACTIVATED IS AGAINST MECHANICAL STOP.

(1) Cut and remove wire locking. Disconnect pressure and return pipes from artificial feel jack and hydraulic system manifolds 5105 and 5106 respectively. Retain the hydraulic pipes removed.

RB (2) Fit blanking plugs AN 929-4S to artificial feel jack pressure port and manifold 5105. Fit blanking plugs  
RB AN 929-5S to artificial feel jack return port and manifold 5106. Wirelock all blanks.

### D. Test

(1) Remove safety clips and tags, reset circuit breakers tripped in para. B.(2).

(2) Establish interphone communication with ground crew.

(3) Pressurize Green hydraulic tank (Ref. 29-00-00, Servicing).

(4) Set flight controls in mechanical mode (Ref. 27-00-00, Servicing).

(5) At centre console, on ADC control panel:

(a) Place ADC2 switch in ON position.

(b) After approximately 30 seconds ADC2 blue TEST light is lit.

(c) Press and release ADC2 amber warning light:  
- the light must go off.

NOTE: During the test check for leaks around the blanking plug.

(6) Operate the rudder pedals over the full range of movement. Check control surface deflection at the ICOVOL indicator.

(7) On ADC control panel:

(a) Place ADC2 TEST selector switch in position 1.

(b) Press and release ADC2 amber warning light:  
- the light must go off.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (8) At overhead panel, on ARTIFICIAL FEEL engage switch unit, operate system 2 YAW channel switch. Check that:
  - (a) The switch does not engage.
  - (b) The gong sounds.
  - (c) The FEEL or PCA light comes on.
- (9) Place ADC2 TEST selector switch in NORM position.
- (10) On ADC control panel place ADC2 switch in OFF position.

### E. Close-up

- (1) Carry out close-up operations detailed in procedure to set flight controls in mechanical mode (Ref. 27-00-00, Servicing).
- (2) Discontinue interphone communication with ground crew.
- (3) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.
- (4) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (5) Remove warning notices.
- (6) Close access doors and panels 151DB, 153BB, 121DB and 121FB.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### ARTIFICIAL FEEL JACK - GREEN SYSTEM - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The Green artificial feel jack applies a force to the mechanical control, which is a function of the flight conditions.

#### 2. Artificial Feel Jack - Green System

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins - Synchro Pack	D925252000
Lockwire Dia. 1 mm (0.041 in.) Corrosion-Resistant Steel	
General Lubricant (Ref. 20-30-00, No.51)	
Access Platform 3.672 m (12 ft.)	
Circuit Breaker Safety Clips	
Blanking Caps for Hydraulic Lines	

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
YAW ART FEEL COMP 2 SUP	13-216	2C 242	G16
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

- (3) Make certain that yaw controls and yaw trim control are set to zero.
- (4) Remove access panels 121DB and 121FB, insert rigging pin D925252002 in yaw resolvers.
- (5) Open access doors 151DB and 153BB beneath the fuselage and depressurize the Green, Blue and Yellow hydraulic systems. Depressurize the green hydraulic tank. Close and safety tank depressurization valve with lockpin.

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (6) Remove rods between artificial feel lever and synchro pack of yaw mechanical control. Do not change length of these rods.

NOTE : For installing or removing attachment bolts it is necessary to press plunger on head of bolt in order to free the locking system balls.

EFFECTIVITY: ALL

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### C. Remove

- (1) Disconnect electrical connectors (11) on mounting (18).
- (2) Remove electrical connector mounting (18).
  - (a) Remove cotter pins, unscrew nuts (15), remove washers (16) and bolts (17).
  - (b) Remove cotter pins (20) and tube (19).
  - (c) Remove mounting (18).
- (3) Remove cotter pin (1), remove nut (2).
- (4) Remove washer (3), and bolt (4).
- (5) Disconnect hydraulic lines (9), (10) and cap their ends.
- (6) Unsafety and unscrew bolts (6), attaching LH pivot support (5).
- (7) Support jack, unsafety and unscrew bolts (7) attaching RH pivot support (8).
- (8) Remove jack (12).
- (9) Remove RH and LH pivot supports (8) and (5).

### D. Preparation of Replacement Component

WARNING : HOLD JACK BY BODY : CAREFULLY AVOID TO DAMAGE EYE END FITTING OR TRANSDUCER HOUSING.  
DO NOT HOLD JACK BY : EYE END FITTING, FORCE TRANSDUCER HOUSING, TRANSDUCER CABLE BUNDLE, JACK PISTON ROD, SERVO VALVES.

### E. Install

- (1) Position and install rear section of jack (12) with RH and LH pivot supports (8) and (5) on beam attachment fittings.

NOTE : During installation, lubricate bearing housings of pivots (5) and (8) with product No.51.

- (2) Attach jack (12) to beam attachment fittings using screws (7) and (6). Torque to between 125 and 140 lbf.in. (1.412 and 1.581 m.daN). Safety with lockwire

EFFECTIVITY: ALL

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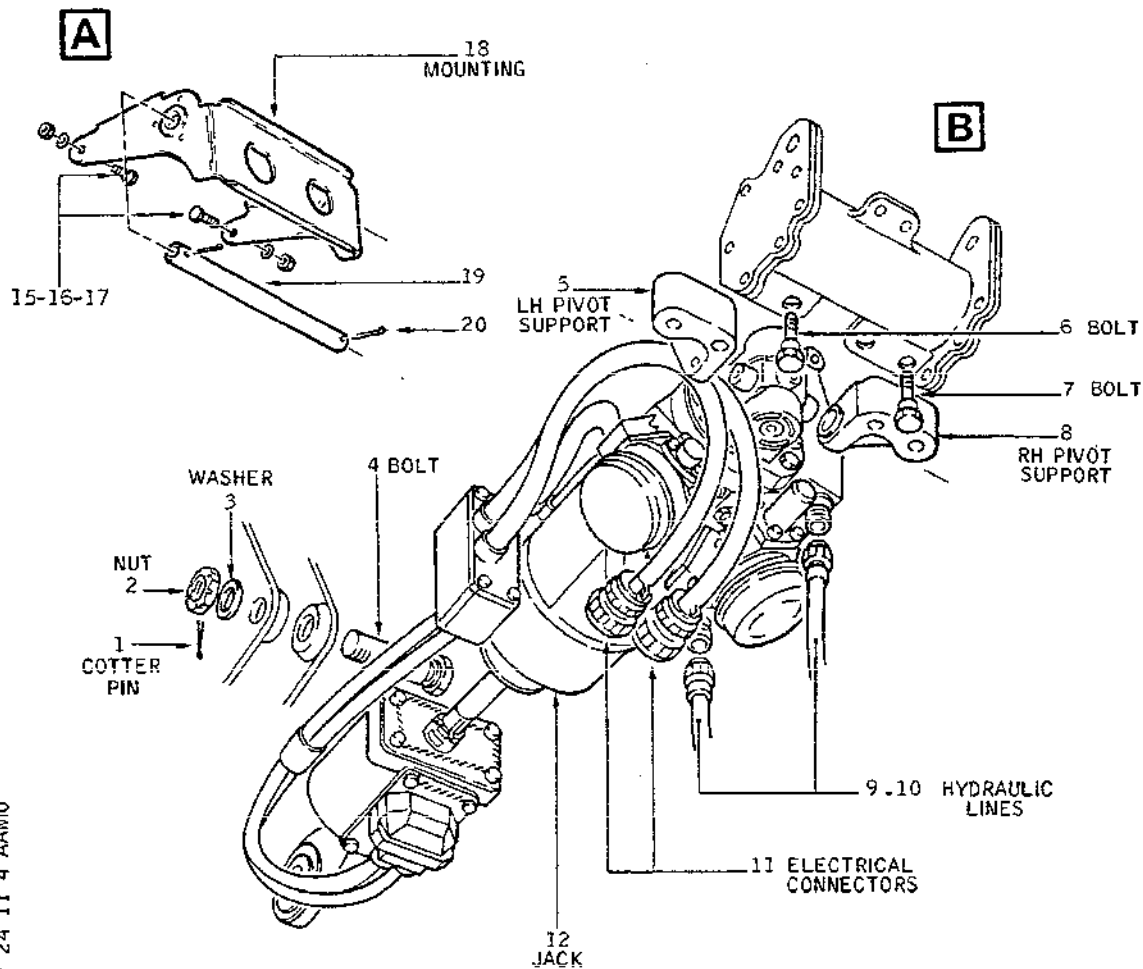
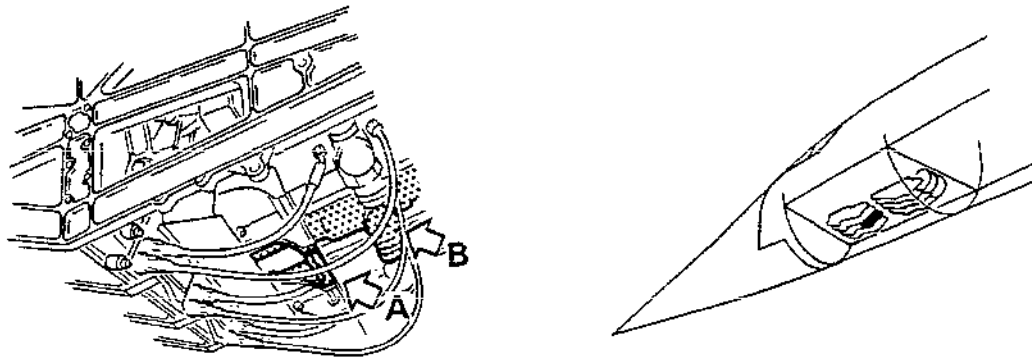
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## MAINTENANCE MANUAL



Green Artificial Feel Jack  
Figure 401

EFFECTIVITY: ALL

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as per 20-21-13.

- (3) Connect hydraulic lines (9) and (10) to hydraulic supply block. Jack must be left free to move in order to avoid imposing force (due to tightening) on transducer.
- (4) Install eye end fitting on rocker arm ; attach with bolt (4), washer (3), nut (2).  
Torque to between 140 and 155 lbf.in. (1.581 and 1.751 m.daN). Safety with cotter pin.
- (5) Install electrical connector mounting (18) on chassis.
  - (a) Install tube (19) ; attach with cotter pins (20).
  - (b) Install bolts (17) washers (16) nuts (15).  
Torque to between 12 and 15 lbf.in. (0.135 and 0.169 m.daN). Safety with cotter pin.
- (6) Connect electrical connectors (11).
- (7) Install rods between Artificial Feel Lever and synchro pack, bolt, special washer, flat washer, nut.  
Torque to between 27 and 32 lbf.in. (0.30 and 0.35 m.daN). Safety with cotter pins.
- (8) Remove rigging pin D925252002.
- (9) Remove safety clips and tags and set the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
YAW ART FEEL COMP 2 SUP	13-216	2C 242	G16
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

### F. Test

- (1) Carry out an operational test (Ref. 27-24-11, Adjustment/Test).
- (2) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### G. Close-Up

- (1) Clean artificial feel jack and adjacent area, making certain that no trace of hydraulic fluid remains.
- (2) Remove warning notices.
- (3) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (4) Close access doors and panels 121DB, 121FB, 151DB and 153BB.
- (5) Remove access platform.

EFFECTIVITY: ALL

BA

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## MAINTENANCE MANUAL

### ARTIFICIAL FEEL JACK - GREEN SYSTEM - ADJUSTMENT/TEST

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The purpose of the following test is to check the operation of the artificial feel jack electrovalve (Green system) on the Yaw axis.

#### 2. Test

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Circuit Breaker Safety Clips	

##### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Aircraft must be on the ground ; shock absorbers compressed.

EFFECTIVITY: ALL

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(3) On ADC control panel (centre console), check that ADC1 and ADC2 switches are in OFF position and ADC1 and ADC2 TEST selector switches are in NORM position.

(4) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
STICK SHAKER SUP	1-213	W 513	P15

(5) Check that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW A SYS SUP	1-213	G 292	M17
ADC2 28V SUP	5-213	2F 74	F12
2ND PLT ADC INST SUP	13-216	2F 75	A14
ADC2 26V SUP		2F 78	F14
ADC2 115V SUP		2F 73	F15
YAW ART FEEL COMP 2 SUP		2C 242	G16

(6) Remove safety clips and tags and set the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT & NAV BUS 14XS	2-213	X 355	H 2
NAV INST BUS 13XS	13-216	X 345	G 4

(7) Carry out Prepare paragraph operations detailed in Procedure to set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).

NOTE : During the following test, do not take into account aural and visual warnings which are not mentioned.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### C. Test

- (1) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (2) At centre console, make certain that yaw trim knob is set to zero.
- (3) At centre console, on ADC control panel,
  - (a) Place ADC2 switch in ON position.
  - (b) Place ADC2 TEST selector switch in position 1.
    - (b1) Amber ADC2 warning light must illuminate.
    - (b2) After approximately 30 seconds, ADC2 blue TEST indicator light must illuminate.
  - (c) Press and release ADC2 warning light : this light must go off.
- (4) Fully deflect rudder pedals in both directions, and note load required to carry out this operation.
- (5) At overhead panel, on ARTIFICIAL FEEL No.2 engage switch unit, engage YAW switch : this switch must remain engaged.
- (6) Fully deflect rudder pedals in both directions and check that load required to carry out this operation is greater than that exerted in (4) above.
- (7) With rudder pedals deflected midway to right (or left).
  - (a) Maintain YAW switch engaged.
  - (b) Press and hold ARTIFICIAL FEEL TEST 2 push-button (at Flight Engineer's station, panel 29-214). As soon as TEST push-button is pressed, pulsations (approximately 20Hz frequency) must be felt at rudder pedals. Duration of pulsation test must not exceed 3 seconds to avoid unnecessary stress on linkage.
- (8) Release YAW switch (while holding TEST 2 push-button pressed). YAW switch must disengage and indicate OFF.
- (9) At Flight Engineer's panel 29-214, release ARTIFICIAL FEEL TEST 2 push-button.

EFFECTIVITY: ALL

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### D. Close-Up

- (1) At centre console, on ADC control panel ;
  - (a) Place TEST selector switch in NORM position.
  - (b) Place ADC2 switch in OFF position.
- (2) Carry out Close-Up operations detailed in Procedure to set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (3) Remove safety clip and tag and reset circuit breaker W513.
- (4) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT & NAV BUS 14XS	2-213	X 355	H 2
NAV INST BUS 13XS	13-216	X 345	G 4

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### RELAY JACK - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The relay jack is mounted on a chassis located between frames 5 and 7. Access is obtained through panel 121FB. Its purpose is to transmit flight control orders :

- In autopilot mode to mechanical linkage and to the electrical control resolvers.
- In manual flight to the mechanical linkage.

#### 2. Relay Jack Removal

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Zero Rigging Device - Relay Chassis	E925019000
Rigging Pins - Synchro Pack	D925252000
Circuit Breaker Safety Clips	
Lockwire Dia. 0.032 inch (0.8 mm) Corrosion Resistant Steel	

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

DESCRIPTION

PART NO.

Access Platforms 3.67 m (12 ft.)

### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RELAY JACK HYD SEL IND & SUP	1-213	C 281	N17
AP/FD SYS 1 CONT		1C 17	Q13
AP/FD SYS 1 SUP	2-213	1C 20	C 5
AP/FD SYS 2 CONT	5-213	2C 17	A11
AP/FD COMP 1 SUP	13-215	1C 18	A 5
AP/FD SYS 2 SUP	13-216	2C 20	A17
AP/FD COMP 2 SUP		2C 18	F18

- (3) Make certain that the yaw trim control is in zero position.
- (4) Open access door 151DB and depressurize the Green, Blue and Yellow hydraulic systems.
- (5) Open door 153BB, depressurize Blue, Green and Yellow hydraulic tanks.
- (6) Remove panels 121FB and 121GB and install rigging pin D925252002 in yaw synchro pack.

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURI-

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### ZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

(7) Open floor panel 213DF.

C. Remove  
(Ref. Fig. 401 )

NOTE : To remove or install attachment bolts, it is necessary to press the plunger located on head of bolt in order to free the locking balls.

- (1) Remove the AP force limiter (1). (Ref. 27-21-16, Removal/Installation).
- (2) Remove the ground bonding leads from the relay jack.
- (3) Disconnect hydraulic lines from the relay jack as follows :
  - (a) Maintain adapter screwed in Relay Jack using appropriate wrench.
  - (b) Unscrew hydraulic line union nut and disconnect the line.
  - (c) Cap open line ends.

WARNING : WHEN A HOSE WITH A BEND RADIUS IS REMOVED FROM AN INSTALLATION, CARE SHALL BE TAKEN NOT TO STRAIGHTEN THE HOSE FROM ITS ACQUIRED SHAPE.  
IF REQUIRED FOR RE-INSTALLATION IT SHALL BE FITTED AS NEAR AS POSSIBLE TO THIS SHAPE WITHOUT ANY UNDUE FORMING.

- (4) Disconnect electrical connectors from the relay jack.
- (5) Remove cotter and unscrew nut (3); remove washers (4) and (5), and bolt (6) attaching link rod (2).
- (6) Remove screws (12), recover washers (11) and lift up attach bracket (13).
- (7) Remove cotter and unscrew nut (15) from the rear attachment point of the relay jack : remove washers (16)

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

and (17).

- (8) Remove cotter and unscrew nut (10) from the front attachment point of the relay jack ; remove washers (8) and (9).
- (9) Support the relay jack and remove special bolts (7) and (18) from attachment points.
- (10) Pivot the relay jack and disengage it from its mounting.

CAUTION : HANDLE THE RELAY JACK CAREFULLY BY ITS ATTACHMENT POINTS ONLY.  
WEIGHT = 18.1 Kg (40lb).

### D. Preparation of Replacement Component

- (1) Note the length between the two attachment points of the removed relay jack.
- (2) Adjust the replacement relay jack to the same length as that removed, by pulling or pushing piston.

### E. Install

- (1) Lift attach bracket (13) and carefully install the relay jack.
- (2) Install bolts (7) and (18).
- (3) Install washers (8) and (9), tighten nut (10). Torque to between 45 and 50 lbf.in. (0.50 and 0.55 m.daN). Safety with cotter.
- (4) Install washers (16) and (17); tighten nut (15) and safety with cotter.
- (5) Re-position attach bracket (13), install washers (11) and tighten screws (12). Torque to between 75 and 85 lbf.in. (0.85 and 0.96 m.daN). Wirelock (Ref. 20-21-13).
- (6) Connect Link rod (2) install bolt (6) washers (4) (5) tighten nut (3). Torque to between 12 and 15 lbf.in. (0.13 and 0.16 m.daN). Safety with cotter.
- (7) Connect hydraulic lines to relay jack as follows :
  - (a) Maintain adapters screwed in relay jack using appropriate wrench.

EFFECTIVITY: ALL

R

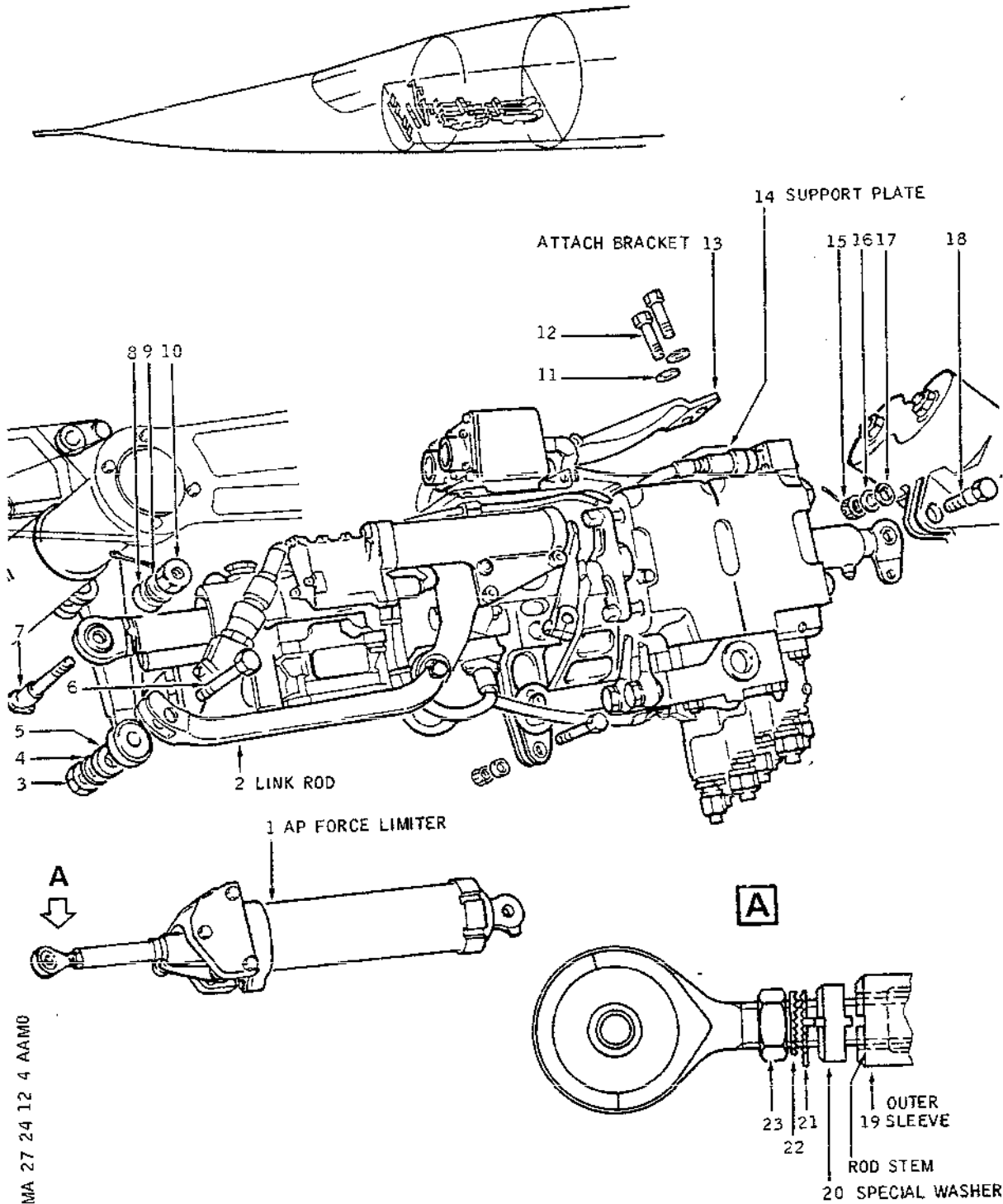
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CMA 27 24 12 4 AAM0

Relay Jack  
Figure 401

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- (b) Torque hydraulic line union nuts to the following values :

Blue pressure	: 1.51 to 1.63 m.daN (11.1372 to 12.0223 lbf.ft.)
Blue return	: 1.92 to 2.15 m.daN (14.1612 to 15.8576 lbf.ft.)
Green pressure	: 1.51 to 1.63 m.daN (11.1372 to 12.0223 lbf.ft.)
Green return	: 1.92 to 2.15 m.daN (14.1612 to 15.8576 lbf.ft.)
Yell/Green pressure	: 2.43 to 2.76 m.daN (17.9228 to 20.3567 lbf.ft.)
Yellow return	: 2.43 to 2.76 m.daN (17.9228 to 20.3567 lbf.ft.)
Yell/Blue pressure	: 2.43 to 2.76 m.daN (17.9228 to 20.3567 lbf.ft.)

RB  
RB  
RB

- (8) Connect electrical connectors. Connect bonding strips to relay jack and carry out bonding check. Resistance to be not greater than 50 milli-ohms.

- (9) Install AP force limiter (Ref. 27-21-16, Removal/Installation).

- (10) Install equipment E925019010 without inserting pins on yaw control.

- (11) Remove warning notices.

- (12) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).

- (13) Install equipment E925019014 on equipment E925019010 and on load limiting mechanism output lever by means of pins E925019105. Make certain that pins can be inserted freely. If not adjust length of AP force limiter as follows :

- (a) Cut and remove lockwire, loosen nut (23) disengage washers (21) (22).

- (b) Maintain special washer (20) inserted in its groove on outer sleeve (19) and rod stem.

- (c) Manually turn both sleeve and rod stem in order to lengthen or shorten AP force limiter until pin E925019105 can be inserted and removed easily.

- (d) Make certain that special washer (20) is inserted in groove of rod stem and outer sleeve (19).

EFFECTIVITY: ALL

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R

- (e) Engage lock washer (21), tab in groove on front face of special washer (20).
  - (f) Engage the second lock washer (22).
  - (g) Tighten nut (23).  
Torque to between 80 and 90 lbf.in. (0.9 and 1 m.daN). Wirelock.
- (14) Check adjustment of relay jack sensor (Ref. 22-13-61, Adjustment/Test).
- (15) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
- (16) Remove items of equipment E925019014, E925019010 and rigging pin D925252002 from synchro pack.
- (17) Remove safety clips, and tags and reset the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RELAY JACK HYD SEL IND & SUP	1-213	C 281	N17
AP/FD SYS 1 CONT		1C 17	Q13
AP/FD SYS 1 SUP	2-213	1C 20	C 5
AP/FD SYS 2 CONT	5-213	2C 17	A11
AP/FD COMP 1 SUP	13-215	1C 18	A 5
AP/FD SYS 2 SUP	13-216	2C 20	A17
AP/FD COMP 2 SUP		2C 18	F18

### F. Tests

- (1) Carry out an operational test (Ref. 27-21-00, Adjustment/Tests) and visually check for free operation of the relay jack throughout full travel. Make certain that clearance between the relay jack body and chassis beams is within the following limits :

Nominal clearance : 3 mm (0.1181 in.)  
Minimum clearance : 1 mm (0.0394 in.)

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

Check assembly for absence of leaks.

- (2) Carry out a test in AP mode : TURN knob on AFCS DATUM ADJUST unit (Ref. 22-13-00, Adjustment/Test)
- (3) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Make certain that no trace of hydraulic fluid remains.
- (3) Install floor panels 213DF.
- (4) Close access doors and panels 121GB, 121FB, 1538B and 151DB.
- (5) Remove access platforms.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### 3. Green or Blue Electrovalve Removal

NOTE : Only the Green Electrovalve can be removed "in situ" ;  
due to difficulty of access the Blue electrovalve  
removal cannot be performed.

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 3.672 m (12 ft.)	
Lockwire Dia 0.5 mm (0.020 in.) Corrosion Resistant Steel	
Warning Notices	

#### B. Prepare

- (1) Take the precautions described in the previous  
WARNING paragraph.
- (2) Open door 151DB, depressurize Green, Blue and  
Yellow hydraulic systems (Ref. 29-11-00,  
29-12-00 and 29-21-00, Servicing).
- (3) Open door 153BB, depressurize Green, Blue and  
Yellow hydraulic tanks (Ref. 29-13-00, Servicing).
- (4) On centre glareshield, on AFCS control unit, make  
certain that AP1 and AP2 switches are not engaged.
- (5) Remove access panels 121FB, 121GB.

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2  
AND 3 PROHIBITING PRESSURIZATION OF BLUE,  
GREEN AND YELLOW HYDRAULIC SYSTEMS BY  
HYDRAULIC GROUND POWER UNIT.  
DISPLAY A WARNING NOTICE AT FLIGHT ENGI-  
NEER'S STATION PROHIBITING USE OF GROUND  
PRESSURIZING SYSTEM ELECTRIC PUMPS.  
IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED  
DISPLAY A WARNING NOTICE ON THIS UNIT,  
PROHIBITING PRESSURIZATION OF THE AIRCRAFT  
HYDRAULIC SYSTEMS.

#### C. Remove (Ref. Fig. 402 )

- (1) Disconnect electrical connector.

EFFECTIVITY: ALL

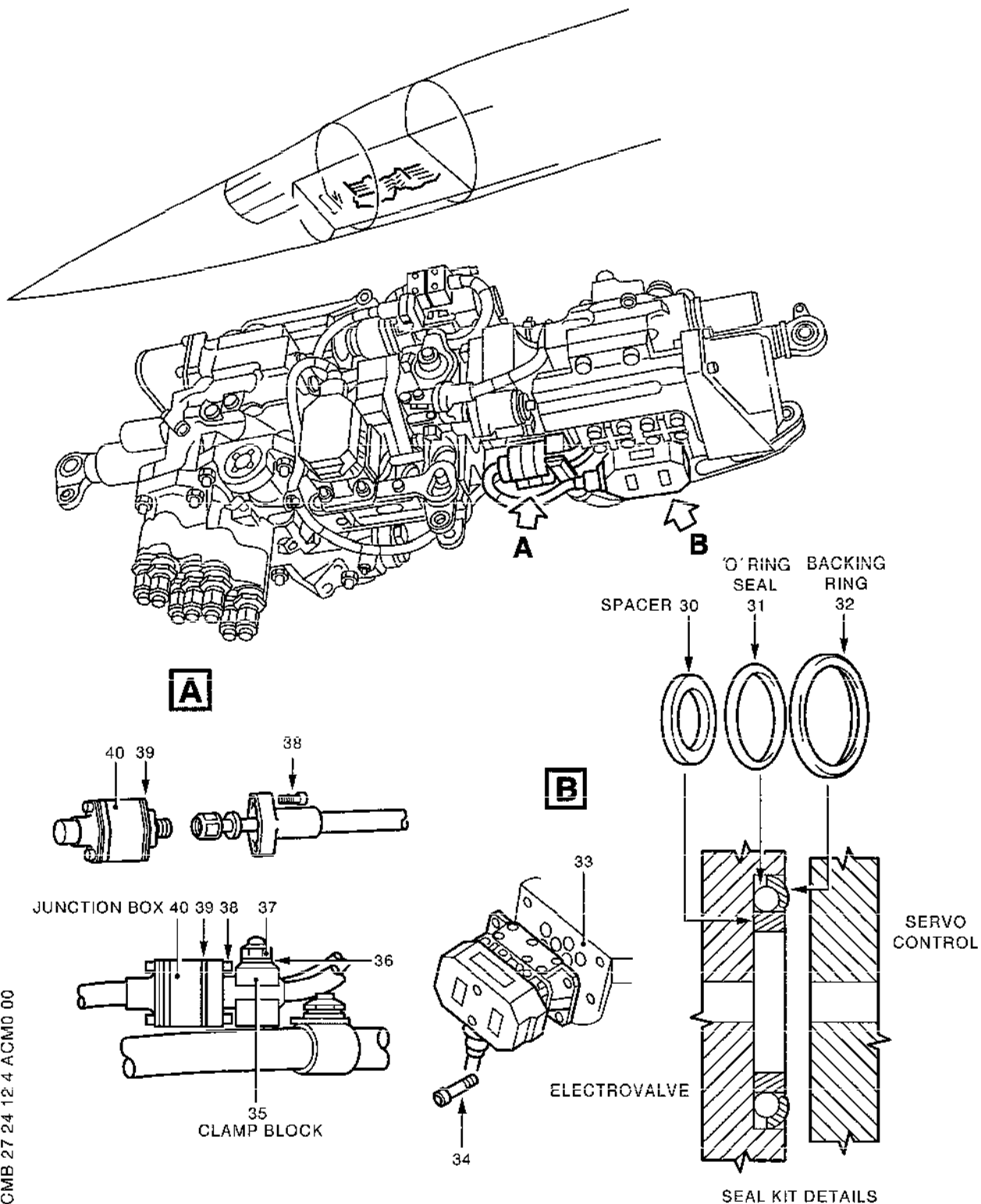
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Electrovalve  
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## MAINTENANCE MANUAL

- (a) Remove straps and clamps attaching electrical leads.
  - (b) Remove clamp block (35) securing junction box (40), nut (37), washer (36).
  - (c) Remove lockwire and screws (38), separate the two sections of the junction box (40), then disconnect plug connector. Discard gasket (39).
- (2) Cut and remove lockwire, remove screws (34) then electrovalve with seal kit (33) or coaxial seals.

CAUTION: TAKE ALL NECESSARY PRECAUTIONS TO AVOID CONTAMINATION OF HYDRAULIC FLUID.

### D. Preparation of Replacement Component

- B (1) If fitted, the transit protective plate is to be  
B removed from the electrovalve seal face.
- B (2) Check that the four replacement seal kits are  
B correctly installed. Before fitting the seal  
B assemblies into the electrovalve counterbore, a trial  
B installation of the copper backing rings should be  
B accomplished. If they do not fit into the counterbore  
B the copper backing rings should be lightly dressed  
B using a fine file until they do.
- B (3) The order of assembly is O ring (31) first, then  
B copper backing ring (32) with the concave surface  
B facing the seal and finally the alloy spacer (30).  
B Under pressure the O ring would distort, the light  
B alloy spacer retains it concentrically in the  
B counterbore and ensures seal loading is face to face,  
B the copper backing ring precludes feathering of the  
B O ring during its service life.

### E. Install

- (1) Position electrovalve and secure with screws (34).

CAUTION: WHEN POSITIONING ELECTROVALVE, TAKE CARE THAT SEALS ARE NOT DISTURBED FROM COUNTERBORES.

Torque screws to between 20 and 22 lbf in (0.23 and 0.25 mdaN).

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Safety screws in pairs with lockwire (Ref. 20-21-13).

R (2) Connect electrical connector.

(a) Install a new gasket (39).

(b) Connect the two halves of connector then the two sections of junction box.  
Secure the two sections of junction box with screws (38). Safety screws with lockwire (Ref. 20-21-13).

(c) Attach junction box with clamp block (35), washer (36), nut (37).

(d) Tighten electrical lead clamps and replace straps.

R (3) Pressurize Green, Blue and Yellow hydraulic tanks (Ref. 29-13-00, Servicing).

### F. Tests

(1) Proceed with an Operational Test (Ref. 27-21-00, Adjustment/Test).

(2) Carry out test in AP mode: TURN knob on AFCS DATUM ADJUST unit (Ref. 22-13-00, Adjustment/Test).

(3) Upon completion of tests, carefully check electrovalve for external leaks.

(4) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

(1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2) Close access doors and panels.

(3) Remove warning notices and access platform.

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## MAINTENANCE MANUAL

### RELAY JACK - ADJUSTMENT/TEST

#### 1. Functional Test of Jamming Microswitches

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Tool - Jamming Detector	CT1 P28945002
Ground Service Telephone	

##### B. Prepare

- (1) This test is carried out without hydraulic pressure : depressurize Blue, Green and Yellow hydraulic systems (Ref. 29-12-00, Servicing ; 29-11-00, Servicing ; 29-21-00, Servicing).
- (2) To gain access to jamming microswitch, Green side, open access door 121FB.
- (3) To gain access to jamming microswitch, Blue side, open floor panel 213DF.
- (4) On overhead panel :
  - (a) On Flight Control Unit, make certain that BLUE INVERTER and GREEN INVERTER switches are in PWR OFF position and that O & M ELEVONS, IN ELEVONS and RUDDER switches are in MECH position.
  - (b) On SERVO CONTROLS unit, make certain that both switches are in NORMAL position.
  - (c) On RELAY JACK unit, make certain that control switch is in NORM position.
- (5) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
AUDIO WARN SYS SUP 1	1-213	W 371	M21
RELAY JACK HYD SEL IND &		C 281	N17

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SUP MWS SUP 1		W 252	N21
AUDIO WARN SYS SUP 2 MWS SUP 2	5-213	W 372 W 251	C17 D15
ROOF PNL LT TEST SUP	15-216	L1002	D13
(6) At centre section of glareshield, on AFCS control unit, make certain that AP1 and AP2 switches are not in engaged position.			
(7) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).			
- Gong must sound.			
- On overhead panel, PFC warning light must illuminate on master warning panel.			
<u>NOTE</u> : Do not take visual or aural warnings that are not mentioned into account.			
(8) Press and release PFC warning light :			
- It must go off.			
(9) On RELAY JACK unit, press and release BLUE JAM-TEST push-button.			
- Gong must sound.			
- On RELAY JACK unit, BLUE JAM caption light must illuminate then go off.			
- On overhead panel on master warning panel, PFC warning light must illuminate.			
(10) Press and release PFC warning light :			
- It must go off.			
(11) On RELAY JACK unit, press and release GREEN JAM-TEST push-button.			
- Gong must sound.			
- On RELAY JACK unit, GREEN JAM caption light must illuminate then go off.			

EFFECTIVITY: ALL

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- On overhead panel, on master warning panel, PFC warning light must illuminate.

R (12) Press and release PFC warning light :

- It must go off.

### C. Test

R (1) For carrying out jamming test of the Blue spool valve, install jamming detector tool on spring box of Relay Jack C10. Access to the latter is gained in Flight Compartment.

(2) Slowly compress handles of tool and maintain in this position.

- Gong must sound.
- On overhead panel, on RELAY JACK unit, BLUE JAM caption light must illuminate.
- On master warning panel, PFC warning light must illuminate.

(3) On RELAY JACK unit, place control switch in GREEN ONLY position.

R - BLUE JAM caption light must go off.

(4) Press and release PFC warning light

- It must go off.

(5) On RELAY JACK unit, place control switch in NORM position.

- Same results as in (2) above.

(6) Release handles of tool and remove tool.

- No change in indications described in (2) above.

(7) On RELAY JACK unit, place control switch in GREEN ONLY position then in NORM position.

R - BLUE JAM caption light must go off and remain off.

(8) Press and release PFC warning light.

- It must go off.

(9) For carrying out test of Green spool valve, install

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R jamming detector tool on spring box of centre relay jack (C10). Access to the latter is gained in zone 121.

- (10) Carry out again steps (2), (3), (4), (5), (6), (7) and (8) placing switch in BLUE ONLY position instead of GREEN ONLY.

- Results must be identical except that GREEN JAM caption light must illuminate on RELAY JACK unit instead of BLUE JAM caption light.

### D. Close-Up

- (1) De-energize the aircraft electrical network and disconnect electrical ground power unit.
- (2) Install floor panel 213DF.
- (3) Close access door 121FB.

EFFECTIVITY: ALL

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**Concorde**  
**MAINTENANCE MANUAL**  
**RELAY JACK - INSPECTION/CHECK**

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

**1. General**

The purpose of the procedure described in this topic is to check :

- Relay jacks for external hydraulic leakage
- Relay jacks for internal hydraulic leakage between chambers
- Permissible load applied to end of input lever to initiate relay jack forward and rearward movement
- General condition of relay jack components and attachments by visual inspection
- Fail safe springbox, on relay jack locking system.

**2. Relay Jack External Hydraulic Leakage**

**A. Equipment and Materials**

DESCRIPTION	PART NO.
Warning Notice	
Access Platform 12 ft. (3.67 m)	

**B. Prepare**

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## MAINTENANCE MANUAL

- (1) Open access door 121FB and 121GB.
- (2) Take the precautions described in the previous WARNING paragraph.
- (3) Set flight controls in Blue electrical mode (Ref. 27-00-00, Servicing).
- (4) Check that pitch, roll and yaw trim controls are set to zero.

### C. Check

- (1) Check on Flight Engineer's HYDRAULIC MANAGEMENT panel that hydraulic fluid temperature is in 30° C to 70° C range (86° F and 158° F).  
To attain required temperature, operate elevons several times, as required.
- (2) Engage autopilot AP1 (Ref. 22-10-00, Servicing, para 2)
- (3) Place a warning notice in flight compartment prohibiting operation of flight controls.
- (4) Wait 3 minutes for any regular external leakage to establish and proceed to measure it.
- (5) Permissible leakage from the relay jack is 4 drops per minute.
- (6) Disengage AP1 and engage AP2 (Ref. 22-10-00, Servicing para 4) and measure amount of leakage, as for AP1.

### D. Close-Up

- (1) Disengage AP2 (Ref. 22-10-00, Servicing).
- (2) Shut down pressurization of Blue and Green hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set flight controls in electrical mode).
- (3) Close access doors 121FB and 121GB.
- (4) Remove warning notice.
- (5) Remove access platform.

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## MAINTENANCE MANUAL

### 3. Internal Hydraulic Leakage Between Relay Jack Chambers

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 12 ft. (3.67 in.)	
Rigging Pins - Synchro Pack	D925252000
Ground Power Unit, Hydraulic Power and Preliminary Testing (2 units)	EMH 39HE
Flowmeters, 1 per Hydraulic System (2 meters)	

The flowmeters must have the following characteristics : flow rate range 0 to 25 litres/min. 96% precision in flow rate range 0.4 to 1 litre/min.

#### B. Prepare

- (1) Open access doors 121FB and 121GB.
- (2) Take the precautions described in the previous WARNING paragraph.
- (3) Set flight controls in electrical mode (Ref. 27-00-00, Servicing).

NOTE : Fit flowmeters described in the Equipment and Materials paragraph to ground power unit.

- (4) Check that pitch, roll and yaw trim controls are set to zero.

#### C. Check

- (1) Check on Flight Engineer's HYDRAULIC MANAGEMENT panel that hydraulic fluid temperature is within range 30°C to 70°C (86°F and 158°F).  
To attain required temperature operate elevons several times as required.
- (2) Immobilize roll, pitch, and yaw resolvers with rigging pins D925252001, D925252002, D925252003.
- (3) Disconnect link rod connecting load limiting mecha-

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## MAINTENANCE MANUAL

nism to roll cable tension regulator.

NOTE : To remove attachment bolts it is necessary to press plunger located on bolt head in order to release locking balls.

- (4) Wait 2 minutes, then note flow rate per minute on flowmeters QB and QG.
- (5) Disconnect AP force limiter from yaw relay jack input lever.
- (6) Manually move relay jack input lever slowly towards front of aircraft. With relay jack at stop position, maintain control lever in fully open position.
- (7) Note QB1 and QG1 flow rate.
- (8) The difference in flow rate between QB1 - QB and QG1 - QG must be less than 1 litre per minute.
- (9) Connect AP force limiter to relay jack input lever. Install bolt, washers, nut. Torque to between 0.30 and 0.36 mdaN (27 and 32 lbf. in.). Safety with cotter pin.
- (10) Connect link rod between load limiting mechanism and cable tension regulator. Install bolt, washers, nut. Torque to between 0.50 and 0.55 mdaN (45 and 50 lbf. in.). Safety with cotter pin.
- (11) Remove rigging pins D925252001, D925252002, D925252003 from resolvers.

### D. Close-Up

- (1) Shut down pressurization of Blue and Green hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set flight controls in electrical mode).
- (2) Close access doors 121FB and 121GB.
- (3) Remove access platform.

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### 4. Permissible Load Applied to End of Relay Jack Input Lever

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Spring Scales, 0 to 20N (0 to 4.48 lbf.)	
Access Platform, 12 ft. (3.67 m)	
Rigging Pins - Synchro Pack	D925252000

#### B. Prepare

- (1) Open access door 121FB.
- (2) Take the precautions described in the previous WARNING paragraph.
- (3) Set flight controls in electrical mode  
(Ref. 27-00-00, Servicing).
- (4) Check that pitch, roll and yaw trim controls are set to zero.

#### C. Force Measurement

- (1) Operate elevons several times.
- (2) Immobilize roll, pitch and yaw resolvers with rigging pins D925252001, D925252002, D925252003.
- (3) Disconnect AP force limiter rod from yaw relay jack input lever.

NOTE : To remove attachment bolts it is necessary to press plunger on bolt head in order to release locking balls.

- (4) Proceed to take measurements, under the following conditions :
  - Hydraulic fluid temperature :  
40°C ± 10°C (104°F ± 18°F)
  - Ambient temperature :  
20°C ± 15°C (68°F ± 27°F)
  - Force applied to end of lever, measured on spring scale :  
Less than 7.7N (1.73 lbf.) - permissible

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More than 13N (2.92 lbf.) - not permissible  
If the force is equal to or greater than 7.7N (1.73 lbf.) measure force again under the following conditions :

- Hydraulic fluid temperature :  
90°C ± 5°C (194°F ± 9°F)
- Ambient temperature :  
20°C ± 10°C (56°F ± 18°F)
- Force at end of lever :  
Equal to or less than 10N (2.25 lbf.) - permissible  
Greater than 10N (2.25 lbf.) - not permissible

- (5) Connect AP force limiter rod to relay jack input lever.  
Install bolt, washers, nut.  
Torque to between 0.30 and 0.36 m.daN (27 and 32 lbf. in.).  
Safety with cotter pin.
- (6) Remove rigging pins : D925252000, D925252002, D925252003 from resolvers.

### D. Close-Up

- (1) Shut down pressurization of Blue and Green hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set flight controls in electrical mode).
- (2) Close access door 121FB.
- (3) Remove access platform.

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## MAINTENANCE MANUAL

### 5. Visual Check of Relay Jacks

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 12 ft. (3.67 in.)	

#### B. Prepare

- (1) Remove floor panel 213EF.
- (2) Open access doors 121FB and 121GB.

#### C. Check

- (1) Relay jack and attachment points.
  - (a) Apply force to both front and rear ends of jack to make certain that it is in working condition.
  - (b) Visually inspect and check, by means of an inspection mirror, that the following items bear no trace of breakage, corrosion or cracks :
    - Fork end-fitting on structure (front relay jack attachment)
    - End-fitting and body (front section of relay jack)
    - End-fitting and body (rear section of relay jack)
    - Fork end-fitting on load limiting mechanism.
  - (c) Check by rotating body of jack that it is able to pivot several degrees.
  - (d) Check through floor panel that relay jack fail safe bracket is not resting on transverse bar of structure.
  - (e) Check safetying of :  
Relay jack front and rear attachments (self locking nut and cotter pin present).
- (2) Feedback linkage
  - (a) Visually inspect and check by means of inspection mirror that the following items bear no trace of breakage, corrosion or cracks :
    - Front and rear sections of lever linking relay

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- jack sensor to link rod
- Lower and upper part of link rod
- Forward and aft sections of link rod attachment on relay jack.

- (b) Check safetying of :
  - Attachment on relay jack
  - Link rod
  - Lever linked to relay jack sensor

### (3) Cable harness

- (a) Make certain that bonding strips are present and secured between :
  - Front section of jack and aircraft structure (accessible through floor panel)
  - Rear section of jack and aircraft structure.
- (b) Make certain that electrical connectors are correctly locked :
  - Connectors C10A, C10B, H and C
- (c) Make certain that cable harness is in correct condition (No trace of rubbing, and correctly secured).

### (4) Control and Locking Lever.

- (a) Check locking lever fork end fitting and make certain that it shows no trace of damage, corrosion or cracks.
- (b) Check mechanical locking centering pin (nut and cotter pin)
- (c) Make certain that locking lever shows no trace of cracks or corrosion, and check that nut on central horizontal section of lever is present, and safetied.

### (5) Hydraulic System

- (a) Check flexible hose and unions for leakage, and for absence of any trace of cuts, breaks, rubbing or distortion.
- (b) Check exposed surfaces of relay jack piston (for cracks, peening, corrosion).
- (c) Check hydraulic pipe connection for leakage.

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- (d) Check that safety disc located on side casing of each electrovalve is not out of position or has not been ejected. (the disc is a lighter colour than the electrovalve casing).

### D. Close-Up

- (1) Close floor panel 213DF.
- (2) Close access doors 121FB and 121GB.
- (3) Remove access platform.

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### 6. Check of Relay Jack Locking Mechanism Safety Springbox

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 12 ft. (3.67 in.)	
Fail Safe Spring Box	
Checking Tool - Relay Jack	CT3P289450002

#### B. Prepare

- (1) Open access door 121FB.

#### C. Check

- (1) Make certain that relay jacks are in mechanical mode.
- (2) Make certain that fail safe spring box is in correct operating condition by :  
Positioning tool CT3 P289 45 002 on lower part of springbox, and exerting and alternately releasing an upward vertical thrust several times. This operation enables the extension and compression of springbox to be checked.

#### D. Close-Up

- (1) Close access door 121FB.
- (2) Remove access platform.

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## MAINTENANCE MANUAL

### ARTIFICIAL FEEL JACK (BLUE, YAW) - SERVICING

**WARNING:** MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

This procedure is to render an artificial feel jack inoperable following an electro-valve failure, servo valve failure or for other operational reasons.

#### 2. De-activation of Artificial Feel Jack (Blue)

##### A. Equipment and Materials

	DESCRIPTION	PART NO.
	Blanking Plug	C27-133
RB	Blanking Plugs	AN 929-4S
RB	Blanking Plugs	AN 929-5S
	Circuit Breaker Safety Clips	B24715
	Lockwire dia. 1 mm (0.041 in.)	
	Corrosion Resistant Steel	-
	Warning Notices	-

##### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.

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- (2) Trip, safety and tag the following circuit breakers:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
YAW ART FEEL COMP 1 SUP	2-213	1C242	E2
HYD TANK COMPR CONT	15-215	M602	D8
HYD TANK AIR COMPR SUP	13-215	M601	G7
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M626	F22

- (3) Open access doors 151DB, and 153BB beneath the fuselage and depressurize the Green, Blue and Yellow hydraulic systems. Depressurize the Blue hydraulic tank. Close and safety tank depressurization valve with lockpin.

WARNING: DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS USED, DISPLAY A WARNING NOTICE ON THIS UNIT, PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (4) Open floor panel 213AF and remove access door 213AZ.

### C. Procedure A. (Ref. Fig. 001)

CAUTION: ENSURE THAT THE ARTIFICIAL FEEL JACK TO BE DE-ACTIVATED IS AGAINST MECHANICAL STOP.

NOTE: An alternative method for de-activation of artificial feel jack is shown in Procedure B.

- (1) Cut and remove wire locking. Disconnect artificial feel jack pressure pipe at hydraulic system manifold 5103.
- (2) Fit blanking plug C27-133 (located in the Flight Kit) to manifold. Connect the pressure pipe to blanking plug C27-133 and safety with lockwire.

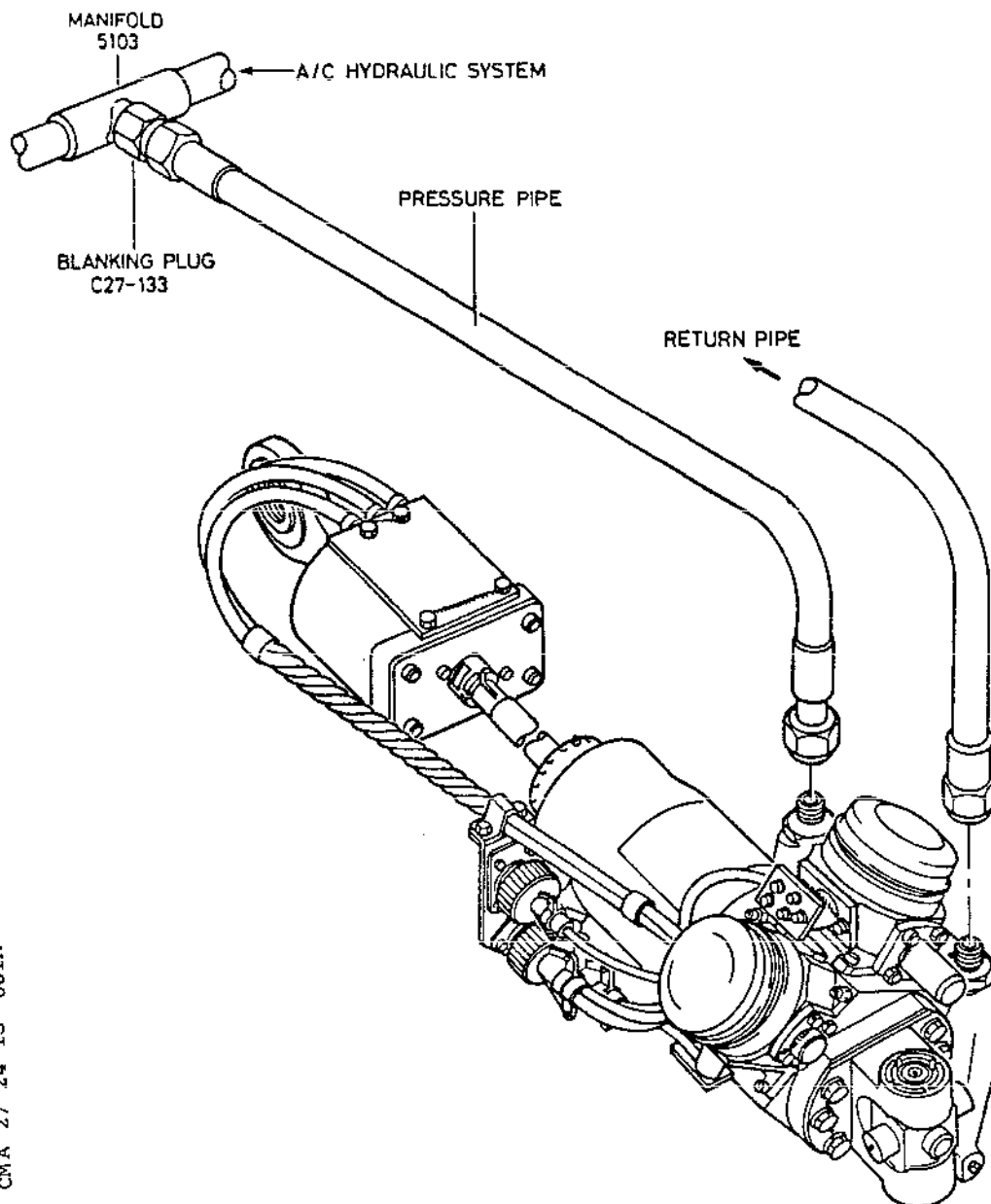
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## MAINTENANCE MANUAL



De-activation of Artificial  
Feel Jack  
Fig. 001

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Procedure B. (Ref. Fig. 001)

CAUTION: ENSURE THAT THE ARTIFICIAL FEEL JACK TO BE  
DE-ACTIVATED IS AGAINST MECHANICAL STOP.

(1) Cut and remove wire locking. Disconnect pressure and return pipes from artificial feel jack and hydraulic system manifolds 5103 and 5104 respectively. Retain the hydraulic pipes removed.

RB (2) Fit blanking plugs AN 929-4S to artificial feel jack  
RB pressure port and manifold 5103. Fit blanking plugs  
AN 929-5S to artificial feel jack return port and  
manifold 5104. Wirelock all blanks.

### D. Test

- (1) Remove safety clips and tags, reset circuit breakers tripped in para. B.(2).
- (2) Establish interphone communication with ground crew.
- (3) Pressurize Blue hydraulic tank (Ref. 29-00-00, Servicing).
- (4) Set flight controls in mechanical mode (Ref. 27-00-00, Servicing).
- (5) At centre console, on ADC control panel:
  - (a) Place ADC1 switch in ON position.
  - (b) After approximately 30 seconds ADC1 blue TEST light is lit.
  - (c) Press and release ADC1 amber warning light:  
- the light must go off.

NOTE: During the test check for leaks around the blanking plug.

- (6) Operate the rudder pedals over the full range of movement. Check control surface deflection at the ICOVOL indicator.
- (7) On ADC control panel:
  - (a) Place ADC1 TEST selector switch in position 1.
  - (b) Press and release ADC1 amber warning light:  
- the light must go off.

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- (8) At overhead panel, on ARTIFICIAL FEEL engage switch unit, operate system 1 YAW channel switch. Check that:
  - (a) The switch does not engage.
  - (b) The gong sounds.
  - (c) The FEEL or PCA light comes on.
- (9) Place ADC1 TEST selector switch in NORM position.
- (10) On ADC control panel, place ADC1 switch in OFF position.

### E. Close-up

- (1) Carry out close-up operations detailed in procedure to set flight controls in mechanical mode (Ref. 27-00-00, Servicing).
- (2) Discontinue interphone communication with ground crew.
- (3) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.
- (4) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (5) Remove warning notices.
- (6) Close access doors and panels 151DB, 153BB, 213AF, 213AZ

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## MAINTENANCE MANUAL

### ARTIFICIAL FEEL JACK - BLUE SYSTEM - REMOVAL/INSTALLATION

- 9 WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR  
9 DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RES-  
9 PECTIVE OPERATING HANDLES.  
9 HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS  
9 CLOSED.  
9 HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.
- 9 MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON  
9 THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE  
9 ACTUAL POSITION OF THE LANDING GEAR.
- 9 BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE  
9 MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SUR-  
9 FACES ARE CLEAR.
- 9 BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL  
9 CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION  
9 OF THE SERVICES THEY OPERATE.
- 9 MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM  
9 SAFETY DEVICES ARE IN POSITION.

#### 1. General

The Blue artificial feel jack applies a force to the mechanical control which is a function of the flight conditions.

#### 2. Artificial Feel Jack - Blue System

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Lockwire Dia. 1 mm (0.041 in.) Corrosion Resistant Steel	
Rigging Pins - Synchro Pack	D925252000
General Lubricant (Ref. 20-30-00, No.51)	
Access Platform 3.672 m (12 ft.)	
Circuit Breaker Safety Clips	
Blanking Caps for Hydraulic Lines	

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### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
YAW ART FEEL COMP 1 SUP	2-213	1C 242	E 2
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

- (3) Make certain that yaw Flight controls and yaw trim control are in zero position.
- (4) Remove access panels 121DB and 121FB, insert rigging pins in yaw resolvers using equipment D925252002.
- (5) Open access doors 151DB, and 153BB beneath the fuselage and depressurize the Green, Blue and Yellow hydraulic systems. Depressurize the Green hydraulic tank. Close and safety tank depressurization valve with lockpin.

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS USED, DISPLAY A WARNING NOTICE ON THIS UNIT, PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (6) Open floor panel 213AF and remove access door 213AZ.
- (7) Remove spring rod (Ref. 27-22-12, Removal/Installation)

### C. Remove

- (1) Disconnect electrical connectors (9).

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- (2) Cut lockwire, unscrew bolts (13) and (15) and remove mounting (14).
- (3) Remove cotter (11) and remove nut (10).
- (4) Retain washer (12) for reinstallation and remove bolt (1).
- (5) Disconnect hydraulic lines (3) and (4), and cap their ends.
- (6) Cut and remove lockwire and remove bolts (7) attaching LH pivot support (8).
- (7) Support jack (2) : cut and remove lockwire and remove bolts (6) attaching RH pivot support (5).
- (8) Remove artificial feel jack (2).
- (9) Remove RH and LH pivot supports (5) and (8).

### D. Preparation of Replacement Component

**WARNING :** HOLD JACK BY BODY ; CAREFULLY AVOID TO DAMAGE EYE END FITTING OR TRANSDUCER HOUSING.

DO NOT HOLD JACK BY :

- EYE END FITTING
- FORCE TRANSDUCER HOUSING
- TRANSDUCER CABLE BUNDLE
- JACK PISTON ROD
- SERVO VALVES

### E. Install

- (1) Position and install rear section of jack with RH and LH pivot supports (5) and (8) on beam attachment fittings.

**NOTE :** Lubricate, when installing, bearing housings of pivots (5) and (8), with material No.51.

- (2) Attach jack to beam attachment fittings with bolts (6) and (7). Torque to between 125 and 140 lbf.in. (1.412 and 1.581 m.daN). Safety with lockwire.
- (3) Connect hydraulic lines (3) and (4) to jack supply block. Jack must be left free to move in order to avoid imposing force on transducer due to tightening of nuts.
- (4) Install eye end fitting on rocker arm ; attach with

EFFECTIVITY: ALL

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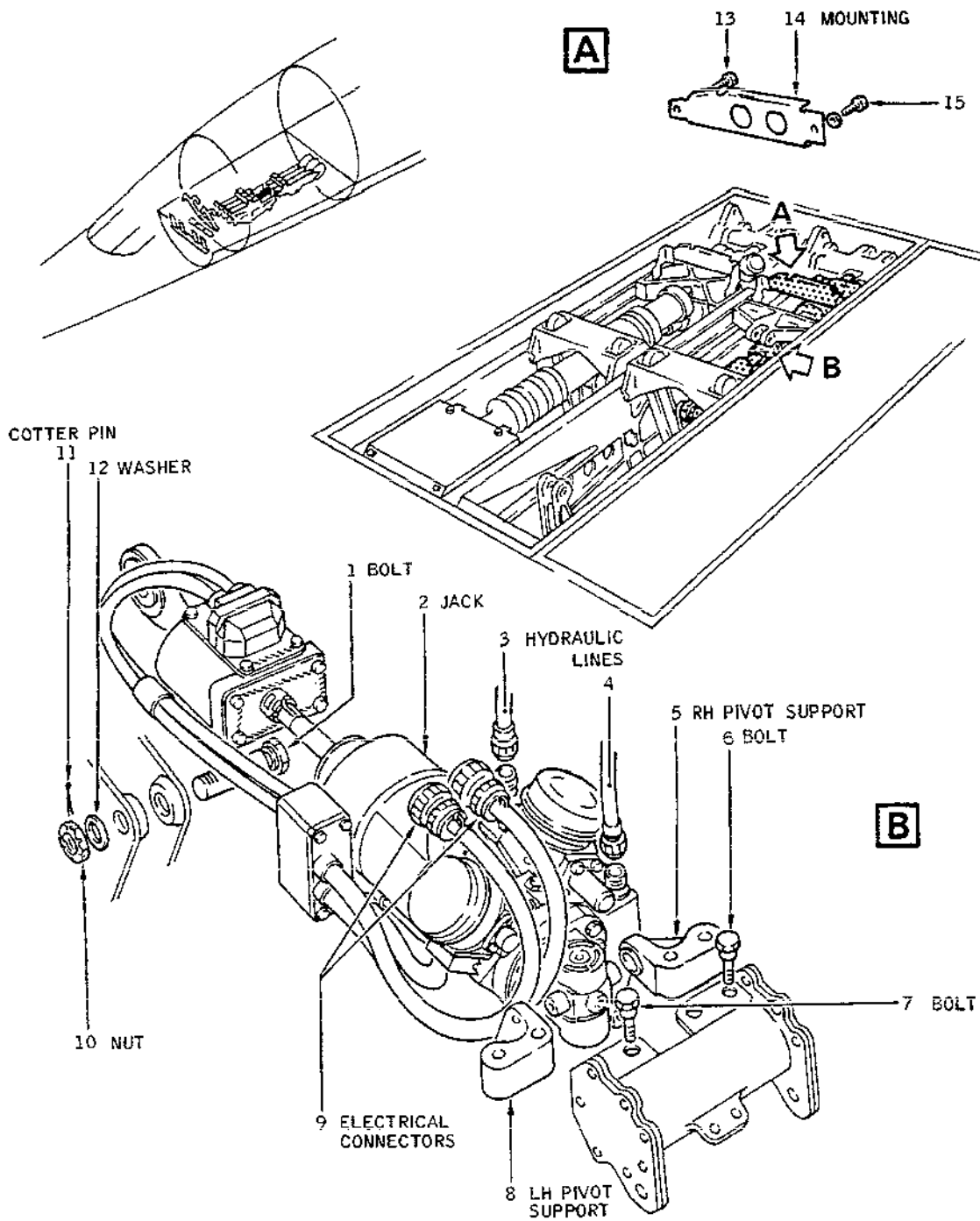
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Artificial Feel Jack - Blue System  
Figure 401

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bolt (1), washer (12), nut (10). Torque to between 140 and 155 lbf.in. (1.581 and 1.751 m.daN). Safety with cotter pin.

- (5) Install mounting (14), attach with bolts (13) and (15). Safety with lockwire.
- (6) Connect electrical connectors (9).
- (7) Install spring rod (Ref. 27-22-12, Removal/Installation).
- (8) Remove rigging pin D925252002.
- (9) Remove safety clips and tags and set the following circuit breakers :

---

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
YAW ART FEEL COMP 1 SUP	2-213	1C 242	E 2
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

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### F. Test

- (1) Carry out an operational test (Ref. 27-24-13, Adjustment/Test).
- (2) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Clean artificial feel jack and adjacent area ; make certain that no traces of hydraulic fluid remain.
- (3) Install access door 213AZ, floor panel 213AF and access doors 121DB, 121FB, 151DB and 153BB.
- (4) Remove access platforms.
- (5) Remove warning notices.

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## MAINTENANCE MANUAL

### ARTIFICIAL FEEL JACK - BLUE SYSTEM - ADJUSTMENT/TEST

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The purpose of the following test is to check the operation of the artificial feel jack electrovalve (Blue system) on the yaw axis.

#### 2. Test

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Circuit Breaker Safety Clips	

##### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Aircraft must be on the ground; shock absorbers compressed.

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(3) On ADC control panel (centre console), check that ADC1 and ADC2 switches are in OFF position and ADC1 and ADC2 TEST selector switches are in Norm position.

(4) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
STICK SHAKER SUP	1-213	W 513	P15

(5) Check that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ADC1 28V SUP	1-213	1F 74	P12
ADC1 26V SUP	2-213	1F 78	A 2
1ST PLT ADC INST SUP		1F 75	B 3
YAW ART FEEL COMP 1 SUP		1C242	E 2
ADC1 115 V SUP		1F 73	F 3
RH UC WEIGHT SW B SYS SUP	3-213	G294	B 9

(6) Remove safety clips and tags and set the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT & NAV BUS 14XS	2-213	X 355	H 2
NAV INST BUS 13XS	13-216	X 345	G 4

(7) Carry out Prepare paragraph operations detailed in Procedure to set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).

NOTE : During the following test, do not take into account visual and aural warnings which are not mentioned.

C. Test

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- (1) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (2) At centre console, make certain that yaw trim knob is set to zero.
- (3) At centre console, on ADC control panel,
  - (a) Place ADC1 switch in ON position.
  - (b) Place ADC1 TEST selector switch in position 1
    - (b1) After approximately 30 seconds, ADC1 blue TEST indicator light must illuminate.
  - (c) Press and release ADC1 warning light; this light must go off.
- (4) Fully deflect rudder pedals in both directions and note load applied to carry out this operation.
- (5) At overhead panel, on ARTIFICIAL FEEL No.1 engage switch unit, engage YAW switch ; this switch must remain engaged.
- (6) Fully deflect rudder pedals in both directions and check that load applied to carry out this operation is greater than that exerted in (4) above.
- (7) With rudder pedals deflected midway to right (or left);
  - (a) Maintain YAW switch engaged.
  - (b) Press and hold ARTIFICIAL FEEL TEST 1 push-button (at Flight Engineer's station, panel 29-214). As soon as TEST push-button is pressed, pulsations (approximately 20Hz frequency) must be felt at rudder pedals. Duration of pulsation test must not exceed 3 seconds to avoid unnecessary stress on linkage.
- (8) Release YAW switch while holding TEST 1 push-button pressed :  
YAW switch must disengage and indicate OFF.
- (9) At Flight Engineer's panel 29-214, release ARTIFICIAL FEEL TEST 1 push-button.

### D. Close-Up

- (1) At centre console, on ADC control panel;

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- (a) Place ADC1 TEST selector switch in NORM position.
- (b) Place ADC1 switch in OFF position.
- (2) Carry out Close-Up operations detailed in Procedure to set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (3) Remove safety clip and tag and set circuit breaker W513.
- (4) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT & NAV BUS 14XS	2-213	X 355	H 260
NAV INST BUS 13XS	13-216	X 345	G 4

EFFECTIVITY: ALL

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**END OF THIS  
SECTION**

**NEXT**

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## MAINTENANCE MANUAL

### RUDDER POWER FLIGHT CONTROL UNIT - REMOVAL/INSTALLATION

WARNING: MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The removal/installation of the lower and upper power flight control units (PFCUs) is identical. Only the removal/installation of the lower PFCU will therefore be described.

#### 2. Power Flight Control Unit Removal with Test Set TE3016000

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging pin - synchro pack	D925252000
Jig - neutral setting - rudder	E920112000
Rigging pin - quadrant	D925422000
Test set - zero setting - resolvers	TE3016000
Rudder - locking fixture	D925401000
Protractor - elevon and rudder - or clinometer	TE2012000

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DESCRIPTION	PART NO.
Tool kit - rudder - PFCU	E920111000
Handling equipment - rudder - PFCU	D935078000
Fin access platform 11.25 m (36 ft 7 in)	-
Hydraulic fluid container	-
Lockwire dia. 0.032 in (0.8 mm) corrosion resistant steel	-
Warning notices	-
Circuit breaker safety clips	-
Electrical ground power unit	-
Standard lubricants (Ref. 20-30-00, No.51)	-

### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Remove fairings of relevant power flight control unit:  
  
Upper PFCU : 352 BR. CR. DR.  
Lower PFCU : 351 BL, CL, DL.
- (3) If tool No. TE 2012000 is to be employed, install on rudder.
- (4) Open door 121FB, immobilize yaw resolvers with rigging pin D925252000.
- (5) Disconnect actuating rod from PFCU input lever. Do not change length of rod.

NOTE: For installing or removing attachment bolts, it is necessary to press the plunger located on head of bolt to free the locking balls.

- (6) Open access door 151DB and depressurize the Blue, Green and Yellow hydraulic systems (Ref. 29-12-00, Servicing

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29-11-00, Servicing and 29-21-00, Servicing).

- (7) Open access door 153BB, depressurize Blue, Green and Yellow hydraulic tanks (Ref. 29-13-00, Servicing).
- (8) Close and safety tank depressurization valves with lockpin.
- (9) Trip, safety and tag the following circuit breakers

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFCs INV GRN FAIL IND	1-213	1C 73	M15
PFCs INV GRN SUP		1C 66	P11
FLT CONT POSN IND 26 V 400 Hz SUP	2-213	C 84	B 4
PFCs INV BLUE SUP	5-213	2C 66	B14
PFCs INV BLUE FAIL IND		2C 73	E11
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22
HYD TANKS COMPR CONT	15-215	M 602	D 8

- (10) Place rudder in neutral.

- (a) Remove cable loom clamps and disconnect PFCU electrical connectors.
- (b) Connect zero setting test set TE 3016000 loom to PFCU connectors (Switch in LAB0 position). Supply test set with 28VDC.
- (c) Manually, or by other appropriate methods, move rudder until neutral is obtained on Blue CT (Green CT if Blue CT is faulty).

NOTE : If the 2 CT's are faulty, move rudder to neutral position using jig E920112000.

- (11) Set protractor to 0°.  
(or check rudder neutral with a clinometer).
- (12) Disconnect test set electrical connectors from PFCU.

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3

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## MAINTENANCE MANUAL

PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

(13) Open access door 323NR, insert rigging pin D925422000 in cable quadrant in fin.

C. Remove (Ref. Fig.401 and 402)

CAUTION : GREAT CARE MUST BE TAKEN HANDLING THE PFCUS FOR INSTALLATION AND REMOVAL BECAUSE OF THE RELATIVE FRAGILITY OF SOME OF THEIR COMPONENTS.

IT IS MANDATORY TO USE THE PFCU INSTALLATION EQUIPMENT. ALL BOLTS ARE FITTED HEAD UPWARDS UNLESS OTHERWISE SPECIFIED.

(1) Disconnect hydraulic lines as follows :

- (a) Maintain adapter screwed in PFCU using appropriate wrench.
- (b) Unscrew hydraulic line union nut and disengage the line.
- (c) Cap open line ends.

(2) Disconnect bonding strips.

(3) Disconnect resolver feedback link (10) from structure.

- (a) Remove cotter pins and bolt (20).
- (b) Remove nut (21) hollow pin (23) and washer (22).

(4) Remove both rods (12).

For each rod :

- (a) Remove cotter-pin and nut (24) from PFCU trunnion, remove washer (25) and withdraw eccentric bush (26) by means of extractor D921226100.

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NOTE : For removal of eccentric bush (26), press end of lever to release locking system.

- (b) Remove cotter-pin and nut (28) from rudder fitting. Retain washer (29) and remove bolt (30).

NOTE : For removing bolt it is necessary to press spring blade.

- (5) Separate ball joint assemblies (6), located at the end of sliding tubes, from structure.

For each ball joint assembly :

- (a) Cut and remove lockwire and remove bolt (5).
  - (b) Remove cotter-pin and nuts (1) retain washers (2) (lockwire attachment washers for outer bolt) bolts (3) and washers (4).
- (6) Remove screws, attaching tracks (11), to structure.  
Cut and remove lockwire (9) remove screws (7) retain washers (8).
  - (7) Attach PFCU lifting equipment bracket to fin at RIB13 (or RIB19 for upper PFCU). Assemble hoist arm of equipment D935078000 to bracket and attach to PFCU.
  - (8) Support PFCU with lifting equipment winch.
  - (9) Disconnect forward and rear PFCU attachment fittings from structure.
    - (a) Remove cotter-pin and nuts (35) from the two attachment fittings and retain washer (36).
    - (b) Remove bolts (38) from attachment fittings.
    - (c) Remove tracks (11) from their recess in the structure and carefully lower PFCU using the winch.

CAUTION : DO NOT DAMAGE TRACKS (11) AND SLIDER (27).

- (10) Install tool No. D925401000.

### D. Preparation of Replacement Component

- (1) Remove equipment D925401000.

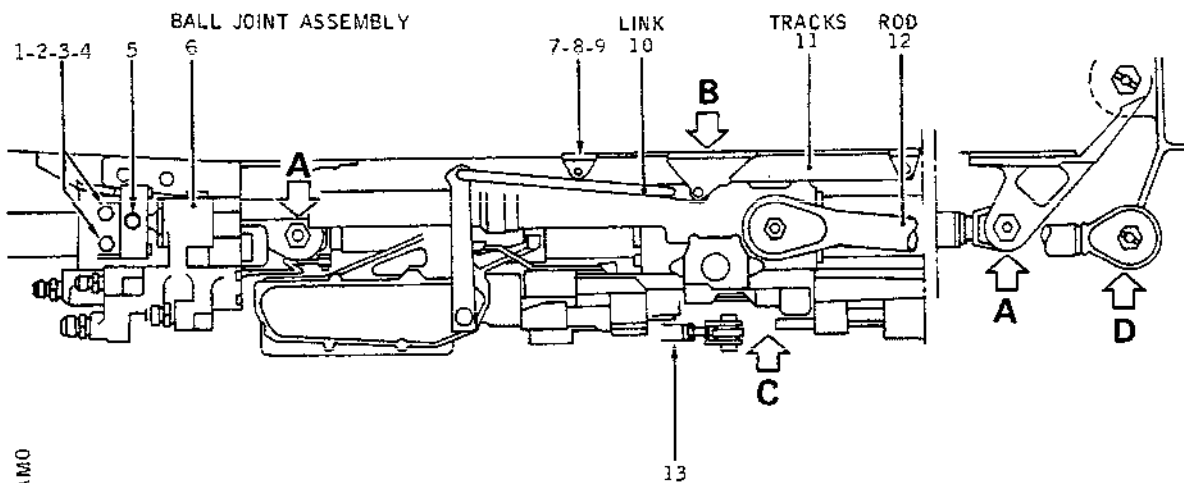
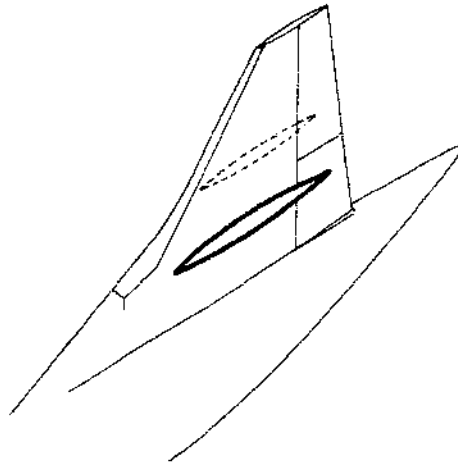
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## MAINTENANCE MANUAL



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Power Flight Control Unit  
Figure 401

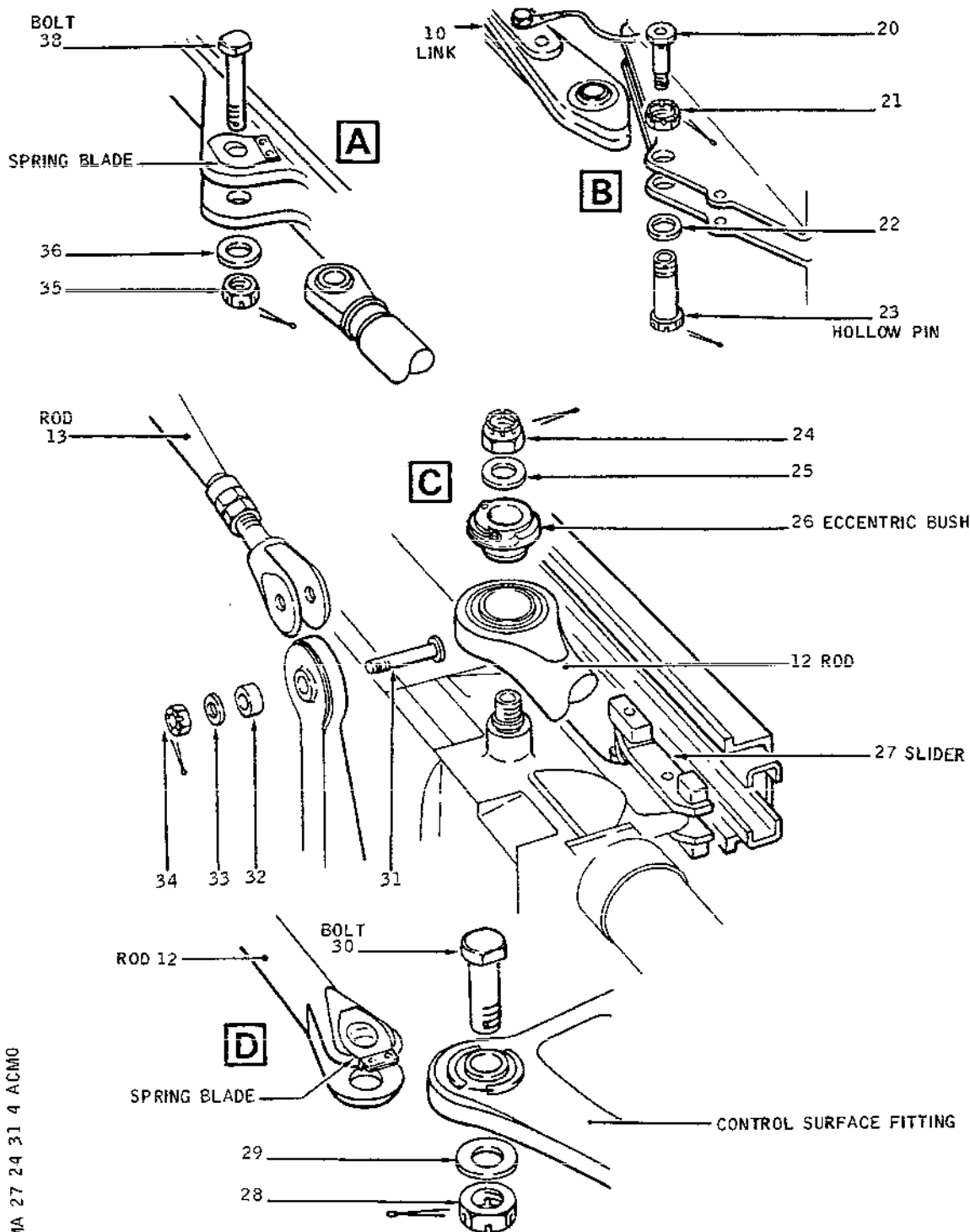
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Detail of Power Flight Control Unit Installation  
Figure 402

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- (2) Install replacement PFCU on hoist of handling equipment 0935078000.
- (3) Lightly grease tracks (11) with product No.51.
- (4) Using minilift winch, position PFCU, with tracks (11) correctly located on slider (27).
- (5) Circular scratches of less than 0.05 mm (0.00196 in.) deep are the only permissible damage on elevon control rod attachment bolts.

### E. Install

NOTE : Before installation apply a slight coat of product No.51 on attachment bolts.  
During installation of PFCU/Structure attachment bolts make certain that pitch between PFCU attachment points corresponds to that of structural attachment points.  
The two bolts (coated with product No.51) must be inserted freely, without force being applied (sliding fit).

- (1) Insert tracks (11) into their recess on the structure and insert bolts (38) in the PFCU attachment fittings.
- (2) Secure tracks (11) to structure with screws (7) and washers (8) wirelock (as per 20-21-13).
- (3) Secure PFCU to its attachment fittings. Install washer (36) and nut (35).  
Torque nut to between 5.6 and 7.9 m.daN (41.3 and 58.2 lbf.ft.). Safety with cotter pin.
- (4) Remove lifting tool from the PFCU.
- (5) Install ball joint assemblies (6) on structure with bolts (3) and (5) and washers (2) and (4), tighten nuts (1) and bolts (5).  
Nuts (1) : torque to between 0.28 and 0.34 m.daN (25 and 30 lbf.in.).  
Bolts (5) : torque to between 0.56 and 0.68 m.daN (50 and 60 lbf.in.).  
Safety bolts (5) with lockwire (Ref. 20-21-13).  
Safety nuts (1) with cotter pin.
- (6) Install upper control rod
  - (a) Install rod (12) on PFCU trunnion, position eccentric bush (26) in neutral position.

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NOTE : For removal or installation of eccentric bush, press end of lever to release locking mechanism.

Install shim washer (25) and nut (24).  
Torque to between 3.3 and 4.5 m.daN (24.3 and 33.1 lbf.ft.).  
Safety with cotter pin.

- (b) Install rod (12) on rudder fitting.  
Install bolt (30) washer (29) and nut (28).  
Torque to between 18.6 and 20.2 m.daN (137.1 and 148.9 lbf.ft.).  
Safety with cotter pin.

NOTE : Bolt (30) must be installed head downwards

- (7) Install lower control rod

- (a) Attachment to rudder

Install rod (12) on rudder fitting. Install bolt (30) washer (29) nut (28). Tighten nut (28).  
Torque to between : 18.6 and 20.2 m.daN (137.1 and 148.9 lbf.ft.).  
Safety with cotter pin.

- (b) Attachment to PFCU

Install rod (12) on PFCU trunnion, eccentric bush (26), shim washer (25), nut (24) without tightening.

NOTE : For removal or installation of eccentric bush press end of lever to release locking mechanism.

Position eccentric bush so that rod (12) can be installed without forcing.

If, exceptionally, the eccentricity of lower eccentric bush is not sufficient, adjust upper eccentric bush so that rod can be easily installed.

If necessary, adjust thickness of shim washers on trunnions to obtain required torque loading on attachment nuts.

- (c) Tighten nut (24) on trunnion.  
Torque to between 3.3 and 4.5 m.daN (24.3 and 33.1 lbf.ft.).  
Safety with cotter pin.

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NOTE : Minimum clearance between rear attachment bolt lower end and upper part of rudder control rod must be 1 mm (0.039 in.) in all positions.

- (8) Connect PFCU hydraulic lines as follows :  
(Ref. Fig.403 and 404)

WARNING 1 : WHEN A HOSE WITH A BEND RADIUS IS REMOVED FROM AN INSTALLATION, CARE SHALL BE TAKEN NOT TO STRAIGHTEN THE HOSE FROM ITS ACQUIRED SHAPE.

IF REQUIRED FOR RE-INSTALLATION IT SHALL BE FITTED AS NEAR AS POSSIBLE TO THIS WITHOUT ANY UNDUE FORMING.

WARNING 2 : IN ORDER TO PREVENT DAMAGE TO HYDRAULIC HOSES ON PFCU, CHECK THAT THE LATTER DO NOT CONTACT ADJACENT STRUCTURE PRIOR TO INSTALLATION OF ACCESS PANELS 351CL AND 352CR.

- (a) Maintain adapter screwed in PFCU using appropriate wrench.

- (b) Torque tighten hydraulic line union nuts to the following values :

NOTE : Make certain that PFCU hoses are positioned as required

Blue pressure	: 2.43 to 2.76 m.daN (17.9228 to 20.3576 lbf.ft.)
Blue return	: 4.86 to 5.31 m.daN (35.8456 to 39.1645 lbf.ft.)
Green pressure	: 2.43 to 2.76 m.daN (17.9228 to 20.3576 lbf.ft.)
Green return	: 4.86 to 5.31 m.daN (35.8456 to 39.1645 lbf.ft.)
Yell/Blue pressure	: 2.43 to 2.76 m.daN (17.9228 to 20.3576 lbf.ft.)
Yell/Blue return	: 4.86 to 5.31 m.daN (35.8456 to 39.1645 lbf.ft.)
Yell/Green pressure	: 2.43 to 2.76 m.daN (17.9228 to 20.3576 lbf.ft.)
Yell/Green return	: 4.86 to 5.31 m.daN (35.8456 to 39.1645 lbf.ft.)

- (9) Connect bonding strips and carry out bonding check.  
Resistance to be not greater than 50 milli-ohms.

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EFFECTIVITY: ALL

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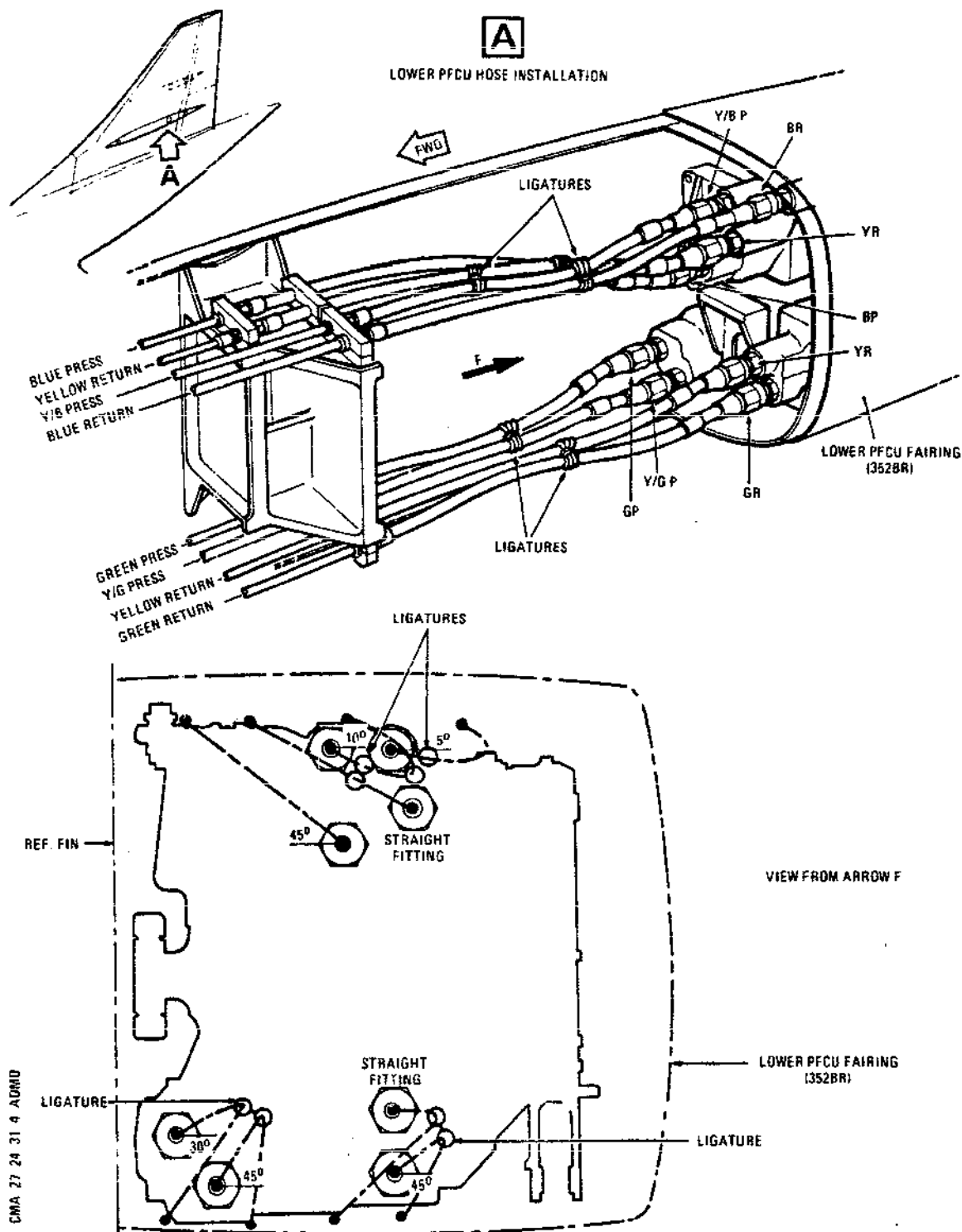
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PFCU Hydraulic Hose Installation (Lower)  
Figure 403

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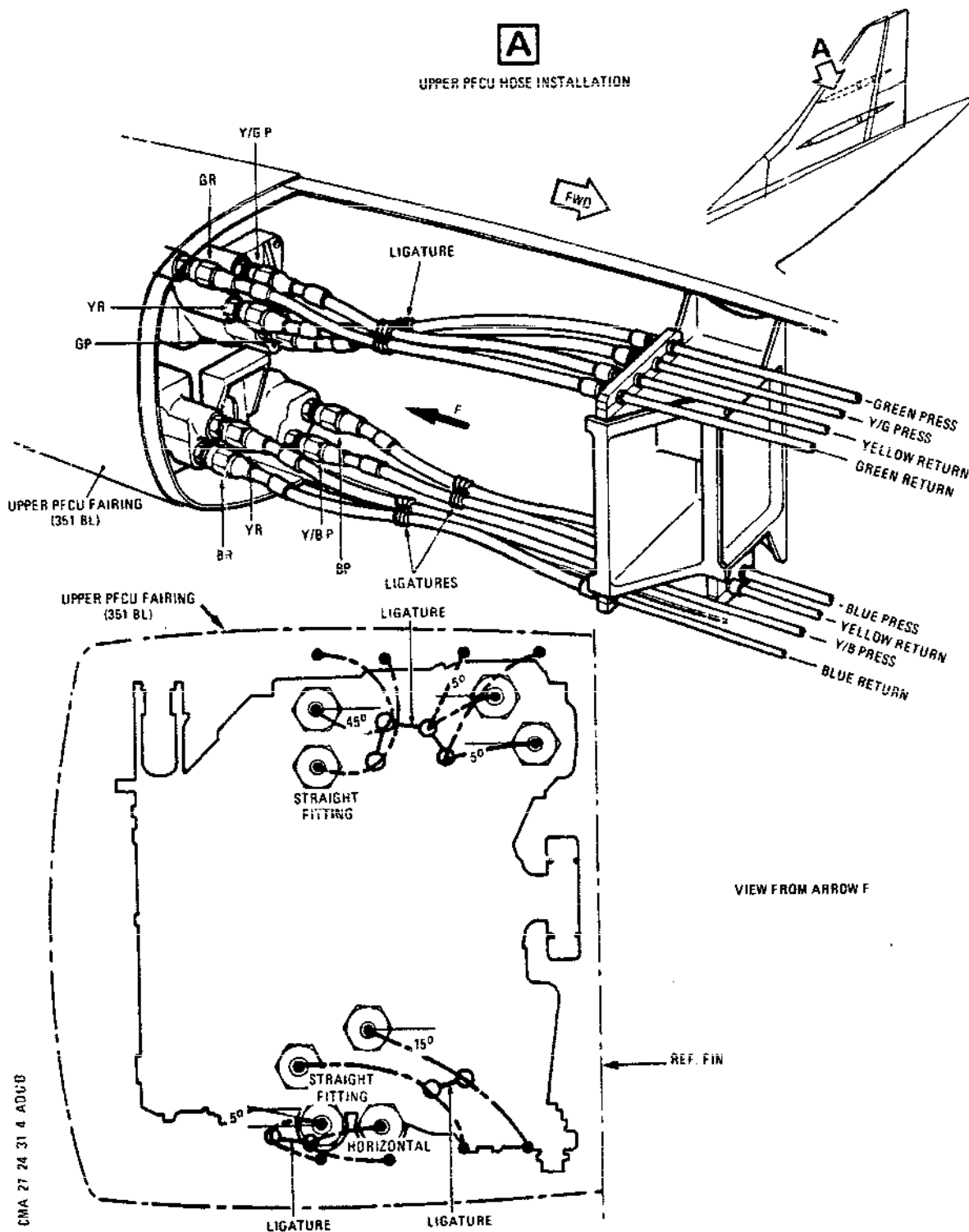
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PFCU Hydraulic Hose Installation (Upper)  
Figure 404

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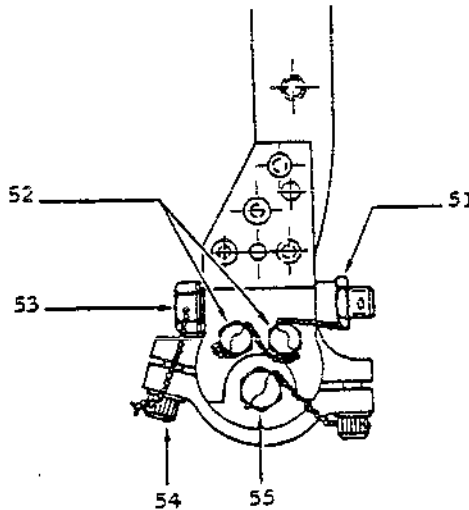


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- (10) Install resolver feedback link (10) on bolt attachment plate on structure with hollow pin (23) washer (22) and nut (21), do not tighten.
- (11) Check on protractor that rudder is still at neutral. (or check neutral with clinometer)
- (12) Adjust resolver electrical zero as follows.  
(Ref. Fig. 405 )
  - (a) Connect test set TE 3016000 cable loom to PFCU electrical connectors. Supply test set with 28VDC.
  - (b) On test set, place POWER JACKS AND NOSE WHEEL STEERING switch in BLUE CT CONTROL ELEVONS position.



Resolver Electrical Zero Setting  
Figure 405

- (c) Proceed with resolver electrical zero setting.
  - (c1) Unsafety bolts and nuts (51), (52), (54) and (55).

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- (c2) Slightly loosen bolts (52), (54) and (55)
  - (c3) Slacken nut (51) until bolt (53) can be turned with slight friction.
  - (c4) Turn bolt (53) until indicator pointer reads  $0^\circ$  plus or minus  $2'$ , simultaneously increase test set sensitivity until maximum is reached.
  - (c5) Tighten nut (51).  
Torque to between 0.15 and 0.17 m.daN (13 to 15 lbf. in.)
  - (c6) Make certain that electrical zero has not altered.
  - (c7) Tighten bolts (52) and (54).  
Torque to between 0.07 and 0.09 m.daN (6 and 8 lbf. in.).
  - (c8) Tighten bolt (55).  
Torque to between 0.259 and 0.282 m.daN (23 and 25 lbf. in.).
  - (c9) Safety with lockwire, bolts (52), (54) and (55) and nut (51) (Ref. 20-21-13).
- (13) Disconnect resolver feedback link from structure.
  - (14) Disconnect PFCU test set.
  - (15) Connect PFCU electrical connectors.
  - (16) Fully deflect rudder in both directions and check that in both PFCU stop positions feedback link can be connected easily to structure.

**WARNING** : IN BOTH PFCU STOP POSITIONS, MAKE CERTAIN, BEFORE CONNECTING FEEDBACK LINK TO STRUCTURE, THAT THERE IS A CLEARANCE OF AT LEAST 1 mm (0.039 in.) BEFORE RESOLVERS ACHIEVE THEIR INTERNAL STOPS.

- (17) Attach resolver feedback link (10) to structure with hollow pin (23) washer (22) nut (21) bolt (20).  
Torque nut (21) to between 1.12 and 1.24 m.daN (100 to 110 lbf. in.).  
Torque bolt (20) to between 0.13 and 0.16 m.daN (12 to 15 lbf. in.).  
Safety with cotter pins.

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- (18) Connect rod (13) to PFCU input lever with bolt (31) washers (32) and (33) and nut (34).  
Torque to between 0.31 and 0.37 m.daN (27.42 to 32.73 lbf.in.). Safety with cotter pin.
- (19) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (20) Check on protractor (or using a clinometer) that rudder is at neutral.  
If necessary, adjust length of PFCU control rod to set rudder to neutral.  
Tighten and safety control rod ends.
- (21) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
- (22) Remove rigging pin D925422000 from cable quadrant.
- (23) Remove rigging pin D925252002 from yaw resolvers and remove protractors.
- (24) Remove warning notices.
- (25) Remove safety clips and tags and set the circuit breakers.

### F. Tests

- (1) Carry out tests (Ref. 27-24-31, Adjustment/Test).
- (2) After tests, make certain that PFCU line connections are leak proof.
- (3) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Clean PFCU and adjacent area. Check that no traces of hydraulic fluid remain.
- (3) Install rudder and PFCU fairings of relevant PFCU.
- (4) Close access doors and panels 121FB, 151DB, 153BB.

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(5) Remove access platforms.

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## MAINTENANCE MANUAL

### 3. Power Flight Control Unit Removal without Test Set TE3016000

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Rudder - Locking Fixture	D925401000
Protractor - Elevon and Rudder or Clinometer	TE2012000
Tool Kit - Rudder - PFCU	E920111000
Handling Equipment - Rudder - PFCU	D935078000
Circuit Breaker Safety Clips	
Access Platform 11.25 m (36 ft. 11 in.)	
Warning Notices	
Lockwire Dia. 0.8 mm (0.032 in.) Corrosion Resistant Steel	
Standard Lubricants (Ref. 20-30-00, No.51)	

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Depending on PFCU to be removed, remove the following fairings :  
  
Upper PFCU : 352BR, CR, DR  
Lower PFCU : 351BL, CL, DL
- (3) If tool TE2012000 is to be used, install it on rudder.
- (4) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).

NOTE : If the blue CT is faulty, set Flight Controls in Green electrical mode.  
It will be necessary, when in the main base to proceed with readjustment by means of the rudder neutral setting jig.

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- (5) Fully deflect Flight Controls in both directions. Slowly release to neutral and note position of rudders on protractor (or with clinometer). Repeat this operation at least three times and average the readings taken in each direction. Zero reference position for readings on protractor (or on clinometer) will be the middle point of the range defined by the average values of deflection in both directions.
- (6) Disconnect actuating rod from PFCU input lever. Do not change the length of this rod.
- NOTE : For removing or installing attachment bolts it is necessary to press plunger on head of bolt to free the locking balls.
- (7) Open door 151DB, and depressurize Green, Blue and Yellow hydraulic systems (Ref. 29-11-00, Servicing ; 29-12-00, Servicing ; 29-21-00, Servicing).
- (8) Open door 153BB, and depressurize Green, Blue and Yellow hydraulic tanks (Ref. 29-13-00, Servicing).
- (9) Close and safety tank depressurization valves with lockpin.
- (10) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFCs INV GRN FAIL IND	1-213	1C 73	M15
PFCs INV GRN SUP		1C 66	P11
FLT CONT POSN IND 26 V 400 Hz SUP	2-213	C 84	B 4
PFCs INV BLUE SUP	5-213	2C 66	B14
PFCs INV BLUE FAIL IND		2C 73	E11
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22
HYD TANKS COMPR CONT	15-215	M 602	D 8

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

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WARNING: DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

WARNING: IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

C. Remove (Ref. Fig.401 and 402)

CAUTION: GREAT CARE MUST BE TAKEN WHEN HANDLING, REMOVING OR INSTALLING THE PFCUs BECAUSE OF THE RELATIVE FRAGILITY OF SOME OF THEIR COMPONENTS. ONLY FORWARD, REAR OR CENTRE ATTACHMENT POINTS MUST BE USED FOR ATTACHMENT OR SUPPORT PURPOSES.

CAUTION: CARE SHOULD BE TAKEN WHEN DISCONNECTING HOSE INSTALLATIONS, THAT ANY PREFORMED BEND TAKEN BY HOSE IN SERVICE IS NOT ALTERED BY UNDUE BENDING FOR CLEARANCE PURPOSES. ON RE-INSTALLATION ORIGINAL LINE TAKEN BY HOSE SHOULD BE MAINTAINED. THIS WILL AID HOSE LONGEVITY.

FAILURE TO COMPLY WITH THIS CAUTION MAY RESULT IN PREMATURE HOSE FAILURE.

- (1) Disconnect hydraulic lines as follows:
  - (a) Maintain adapter screwed in PFCU using appropriate wrench.
  - (b) Unscrew hydraulic line union nut and disengage the line.
  - (c) Cap open line ends.
- (2) Remove bonding strips.
- (3) Disconnect resolver control link (10) from structure.
  - (a) Remove cotter pins and bolt (20).
  - (b) Remove nut (21) hollow pin (23) and washer (22).

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- (4) Remove the two rods (12).

For each rod:

- (a) Remove cotter pin and nut (24) from PFCU trunnion, remove washer (25) and withdraw eccentric bush (26) by means of extractor D921226000.

NOTE: For installation or removal of eccentric bush press end of lever to release locking mechanism.

- (b) Remove cotter pin and nut (28) from rudder fitting. Retain washer (29) and remove bolt (30).

NOTE: For removing bolt it is necessary to press spring blade.

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RB

- (5) Separate ball joint assemblies (6), located at the end of sliding tubes, from structure.

For each ball joint assembly

- (a) Cut and remove lockwire and remove bolt (5).
- (b) Remove cotter pin and nuts (1), washers (2) (lockwire attachment washers for outer bolt) bolts (3) and washers (4).
- (6) Remove bolts attaching tracks (11) to structure. Cut and remove lockwire (9), remove screws (7), washers (8).
- (7) Attach PFCU lifting equipment bracket to fin at RIB13 (or RIB19 for upper PFCU). Assemble hoist arm of equipment D935078000 to brackets and attach to PFCU.
- (8) Support PFCU with lifting equipment winch.
- (9) Disconnect forward and rear PFCU attachment fittings on structure.
  - (a) Remove cotter pin and nuts (35) from the two attachment fittings and retain washer (36).
  - (b) Remove bolts (38) from the two attachment fittings.
  - (c) Disengage tracks (11) from their recess in the structure and lower PFCU carefully using the winch.

**CAUTION:** DO NOT DAMAGE TRACKS (11) AND SLIDER (27).

- (10) Position tool No.D925401000.

### D. Preparation of Replacement component

- (1) Remove equipment D925401000.
- (2) Install new PFCU on hoist of handling equipment D935078000.
- (3) Lightly grease tracks (11) with product No.51.
- (4) Using minilift winch, position PFCU, with tracks

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(11) correctly located on slider (27).

- (5) Circular scratches of less than 0.05 mm (0.00196 in.) deep are the only permissible damage on elevator control rod attachment bolts.

### E. Install

NOTE : Slightly coat attachment bolts with product No.51 before installation.  
During installation of PFCU/structure attachment bolts, make certain that pitch between PFCU attachment points corresponds to that of structural attachment points.  
The two bolts (coated with product No.51) must be inserted freely without force being applied (sliding fit).

- (1) Insert tracks (11) into their recess on the structure and insert bolts (38) in the two PFCU attachment fittings.
- (2) Attach tracks (11) to structure with screws (7) and washers (8) ; wirelock (as per 20-21-13).
- (3) Attach PFCU to its attachment fittings. Install washers (36) and nuts (35).  
Torque to between 5.6 and 7.9 m.daN (41.3 and 58.2 lbf.ft.).  
Safety with cotter pin.
- (4) Remove lifting tool from the PFCU.
- (5) Install ball joint assemblies (6) on structure with bolts (3) and (5), washers (2) and (4). Tighten nuts (1) and bolts (5).  
Nuts (1) : torque to between 0.28 and 0.34 m.daN (25 and 30 lbf.in.).  
Bolts (5) : torque to between 0.56 and 0.68 m.daN (50 and 60 lbf.in.).  
Safety bolts (5) with lockwire (Ref. 20-21-13)  
Safety nuts (1) with cotter pin.
- (6) Install upper control rod.
  - (a) Install rod (12) on PFCU trunnion, position eccentric bush (26) in neutral position.  
Install shim washer (25) and nut (24).  
Torque to between 3.3 and 4.5 m.daN (24.3 and 33.1 lbf.ft.).  
Safety with cotter pin.

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NOTE : For removal or installation of eccentric bush (26) press end of lever to release locking mechanism.

- (b) Install rod (12) on rudder fitting. Install bolt (30), washer (29) and tighten nut (28).  
Torque to between 18.6 and 20.2 m.daN (137.1 and 148.9 lbf.ft.).  
Safety with cotter pin.

NOTE : Attachment bolt (30) on rudder must be installed head downwards.

- (7) Install lower control rod.

- (a) Attach to rudder  
Install rod (12) on rudder fitting. Install bolt (30), washer (29), nut (28).  
Tighten nut (28).  
Torque to between 18.6 and 20.2 m.daN (137.1 and 148.9 lbf.ft.).  
Safety with cotter pin.

NOTE : To engage bolt (30), it is necessary to press spring blade.

- (b) Attach to PFCU  
Install rod (12) on PFCU trunnion, eccentric bush (26), shim washer (25), nut (24) without tightening.

NOTE : For removal or installation of eccentric bush, press spring retainer to release locking mechanism.  
Position eccentric bush so that rod (12) can be installed without forcing.  
If, exceptionally, the eccentricity of lower eccentric bush is not sufficient adjust upper eccentric bush so that rod can be easily installed.  
If necessary, adjust thickness of shim washers on trunnions to obtain required torque loading on attachment nuts.

- (c) Tighten nut (24) on trunnion.  
Torque to between 3.3 and 4.5 m.daN (24.3 and 33.1 lbf.ft.).  
Safety with cotter pin.

NOTE : Minimum clearance between rear attachment bolt lower end and upper part of rudder

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control rod must be 1 mm (0.039 in.) in all positions.

- R (8) Connect PFCU hydraulic lines as follows :  
(Ref. Fig.403 and 404)

WARNING 1 : WHEN A HOSE WITH A BEND RADIUS IS REMOVED FROM AN INSTALLATION, CARE SHALL BE TAKEN NOT TO STRAIGHTEN THE HOSE FROM ITS ACQUIRED SHAPE

IF REQUIRED FOR RE-INSTALLATION IT SHALL BE FITTED AS NEAR AS POSSIBLE TO THIS SHAPE WITHOUT ANY UNDUE FORMING

WARNING 2 : IN ORDER TO PREVENT DAMAGE TO HYDRAULIC HOSES ON PFCU, CHECK THAT THE LATTER DO NOT CONTACT ADJACENT STRUCTURE PRIOR TO INSTALLATION OF ACCESS PANELS 351CL AND 352CR.

- (a) Maintain adapter screwed in PFCU using appropriate wrench.
- (b) Torque tighten hydraulic line union nuts to the following values :

NOTE : Make certain that PFCU hoses are positioned as required

Blue pressure	: 2.43 to 2.76 m.daN (17.9228 to 20.3576 lbf.ft.)
Blue return	: 4.86 to 5.31 m.daN (35.8456 to 39.1645 lbf.ft.)
Green pressure	: 2.43 to 2.76 m.daN (17.9228 to 20.3576 lbf.ft.)
Green return	: 4.86 to 5.31 m.daN (35.8456 to 39.1645 lbf.ft.)
Yell/Blue pressure	: 2.43 to 2.76 m.daN (17.9228 to 20.3576 lbf.ft.)
Yell/Blue return	: 4.86 to 5.31 m.daN (35.8456 to 39.1645 lbf.ft.)
Yell/Green pressure	: 2.43 to 2.76 m.daN (17.9228 to 20.3576 lbf.ft.)
Yell/Green return	: 4.86 to 5.31 m.daN (35.8456 to 39.1645 lbf.ft.)

- (9) Connect bonding strips.

- (10) Connect PFCU electrical connectors.

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- (11) Fully deflect rudder in both directions and check that in both PFCU stop positions feedback link can be connected easily to structure.

**WARNING:** IN BOTH PFCU STOP POSITIONS MAKE CERTAIN, BEFORE CONNECTING FEEDBACK LINK TO STRUCTURE, THAT THERE IS A CLEARANCE OF AT LEAST 1 mm (0.039 in) BEFORE RESOLVERS ACHIEVE THEIR INTERNAL STOPS.

- (12) Attach resolver feedback link (10) to structure with hollow pin (23), washer (22), nut (21), bolt (20). Torque nut (21) to between 100 and 110 lbf in (1.13 and 1.24 mdaN). Torque bolt (20) to between 12 and 15 lbf in (0.13 and 0.17 mdaN). Safety with cotter pins.
- (13) Connect rod (13) to PFCU input lever with bolt (31), washers (32) and (33), nut (34). Torque to between 27.43 and 32.74 lbf in (0.31 and 0.37 mdaN). Safety with cotter pin.
- (14) Remove warning notices.
- (15) Remove safety clips and tags and set circuit breakers.
- B (16) Carry out neutral setting check, if incorrect:
- B (a) In mechanical mode, adjust PFCU input rod.
- B (b) In electrical mode, adjust PFCU resolver
- B adjustable lever. (Ref. Fig. 405).
- RB (17) Carry out neutral tolerance test (Ref. 27-21-00,
- B Adjustment/Test, paragraph 4).
- B (18) Remove protractors.

### F. Test

- (1) Carry out tests (Ref. 27-24-31, Adjustment/Test).
- (2) After tests, make certain that PFCU line connections are leak proof.
- (3) Before closing access doors and panels carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

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- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Clean PFCU and adjacent area. Check that no trace of hydraulic fluid remains.
- (3) Close access doors 121FB, 151DB, 153BB.
- (4) Install rudder and PFCU fairings of relevant PFCU.
- (5) Remove access platform.

### 4. Green or Blue Electrovalve Removal

#### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Circuit Breaker Safety Clips

Access Platform 11.25 m (36 ft. 11 in.)

Lockwire Dia. 0.5 mm (0.020 in.)

Corrosion Resistant Steel

Warning Notices

#### B. Prepare

- (1) Take the precautions described in the previous warning paragraph.
- (2) Open door 151DB, depressurize Green, Blue and Yellow hydraulic systems (Ref. 29-11-00, 29-12-00 and 29-21-00, Servicing).
- (3) Open door 153BB, depressurize Green, Blue and Yellow hydraulic tanks (Ref. 29-13-00, Servicing).
- (4) Depending on the relevant PFCU, remove one of the following fairings :  
  
Upper PFCU : 352CR  
Lower PFCU : 351CL
- (5) Depending on electrovalve to be replaced, trip safety and tag the following circuit breakers :  
  
(a) Green electrovalves

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RUDDER MON LOGIC GRN SUP	1-213	1C 63	N12
HYD TANKS COMPR CONT	15-215	M 602	D 8
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22
(b) Blue electrovalves			

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RUDDER MON LOGIC BLUE SUP	5-213	2C 63	C12
HYD TANKS COMPR CONT	15-215	M 602	D 8
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

C. Remove (Ref. Fig. 406 )

(1) Remove protective plate (60).

(a) Cut lockwire and remove screws (62). Retain washers (61) and remove plate (60).

(2) Disconnect electrical connector.

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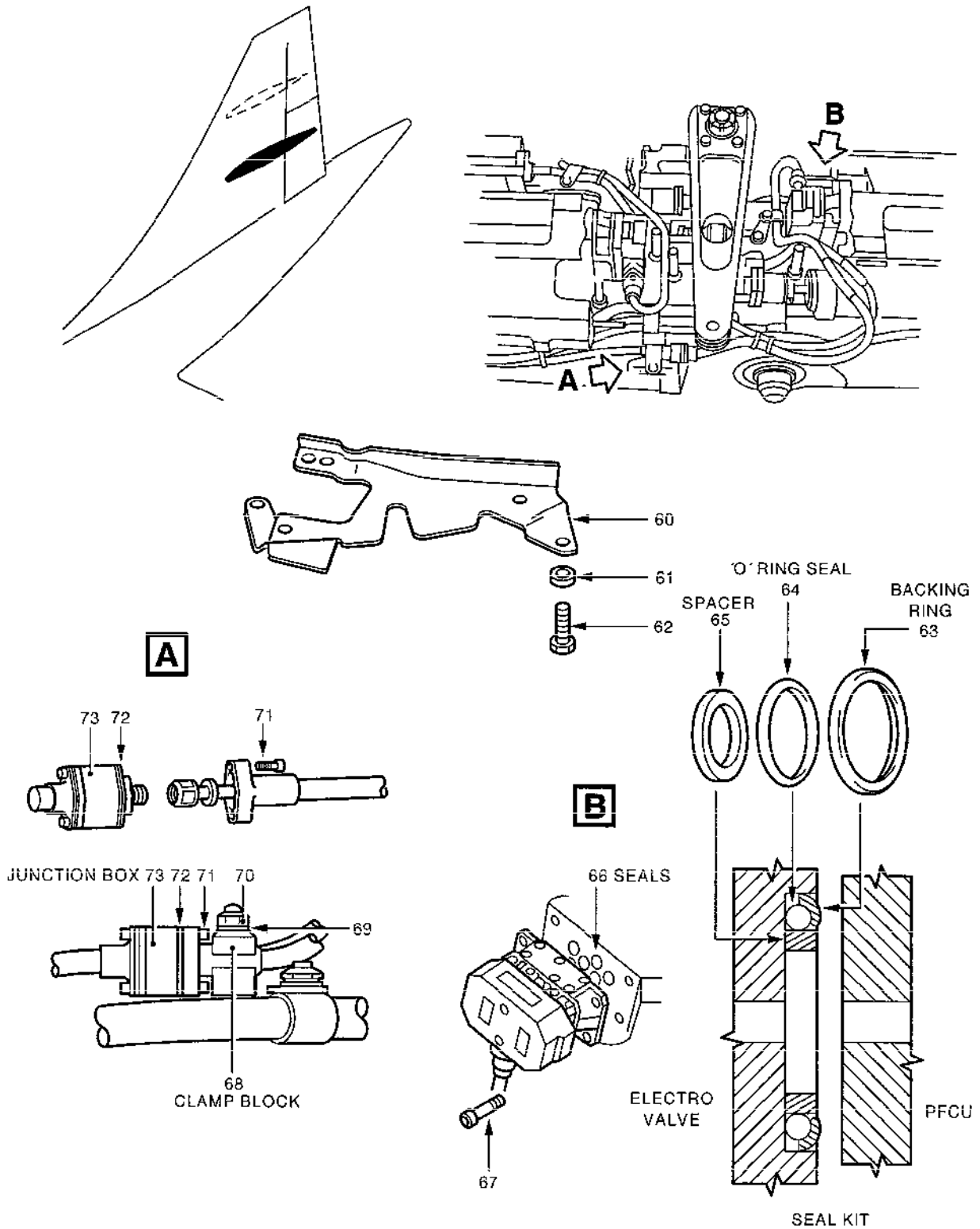
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Electrovalve  
Figure 406

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- (a) Remove straps and clamps attaching electrical leads.
  - (b) Remove clamp block (68) securing junction box (73), nut (70), washer (69).
  - (c) Remove lockwire and screws (71), separate the two sections of the junction box (73) then disconnect plug connector. Discard gasket (72).
- (3) Cut and remove lockwire, remove screws (67) then electrovalve with seal kits (66) or coaxial seals.

CAUTION: TAKE ALL NECESSARY PRECAUTIONS TO AVOID CONTAMINATION OF HYDRAULIC FLUID.

### D. Preparation of Replacement Component

- RB (1) If fitted, the transit protective plate is to be  
RB removed from the electrovalve seal face.
- RB (2) Check that the three replacement seal kits are  
RB correctly installed. Before fitting the seal  
RB assemblies into the electrovalve counterbore, a trial  
RB installation of the copper backing rings should be  
RB accomplished. If they do not fit into the counterbore  
RB the copper backing rings should be lightly dressed  
RB using a fine file until they do.
- RB (3) The order of assembly is O ring (64) first, then  
RB copper backing ring (63) with the concave surface  
RB facing the seal and finally the alloy spacer (65).  
RB Under pressure the O ring would distort, the light  
RB alloy spacer retains it concentrically in the  
RB counterbore and ensures seal loading is face to face,  
RB the copper backing ring precludes feathering of the  
RB O ring during its service life.

### E. Install

- R (1) Position electrovalve and secure with screws (67).  
R

CAUTION: WHEN POSITIONING ELECTROVALVE TAKE CARE THAT SEALS ARE NOT DISTURBED FROM COUNTERBORES.

Torque screws to between 20 and 22 lbf in (0.23 and 0.25 mdaN). Safety screws in pairs with lockwire (Ref. 20-21-13).

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- R (2) Connect electrical connector.

NOTE: Plugs are identified L for Blue electrovalves and F for Green electrovalves.  
Connect plugs and sockets bearing the same identification.

- (a) Install a new gasket (72).
- (b) Connect the two halves of connector then the two sections of junction box. Secure the two sections of junction box with screws (71). Safety screws with lockwire (Ref. 20-21-13).
- (c) Attach junction box with clamp block (68), washer (69), nut (70).
- (d) Attach lead clamps. Replace lead straps if necessary.

- R (3) Remove safety clips and tags and set circuit breakers.

- R (4) Pressurize Green, Blue and Yellow hydraulic tanks (Ref. 29-13-00, Servicing).

### F. Tests

- (1) Carry out test of electrovalve (Ref. Adjustment/Test).
- (2) Upon completion of test, check electrovalve for external leaks.
- (3) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Install protective plate (60) and secure with screws (62) and washers (61). Safety with lockwire (Ref. 20-21-13).
- (3) Install PFCU fairings and close access doors.
- (4) Remove warning notices and access platform.

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### 5. Synchro Pack Removal

Due to difficulty of access to attachments, synchro pack "in situ" removal is not possible.  
It is therefore necessary in the first place to remove the PFCU.  
In this case, synchro pack replacement is dealt with in the Overhaul Manual No. 27-24-31.

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### 6. Resolver Feedback Linkage Removal

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins - Synchro Pack	D925252000
Jig - Neutral Setting - Rudder	E920112000
Rigging Pin - Quadrant	D925422000
Circuit Breaker Safety Clip	
Access Platform 11.25 m (36 ft. 11 in.)	
Lockwire Dia. 0.80 mm (0.032 in.)	
Corrosion Resistant Steel	

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Remove the following relevant PFCU fairings :  
Upper PFCU : Fairing 352CR  
Lower PFCU : Fairing 351CL
- (3) Open access door 121FB and immobilize yaw resolvers using rigging pin D925252002.
- (4) Open access door 323NR ; immobilize cable quadrant in fin using rigging pin D925422000.
- (5) Install neutral setting jig E920112000 and set rudder to zero.
- (6) Open door 151DB, depressurize Green, Blue and Yellow hydraulic systems (Ref. 29-11-00, 29-12-00 and 29-21-00, Servicing).
- (7) Trip, safety and tag the following circuit breakers :

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT POSN IND 26 V 400 Hz SUP	2-213	C 84	B 4
RUDDER BLUE 26 V 1800 Hz CONT SUP		2C 76	D 4
RUDDER GRN 26 V 1800 Hz CONT SUP		1C 76	H 6

### C. Removal (Ref. Fig. 407 )

#### (1) Disconnect feedback link from synchro pack.

- (a) Unsafety and remove screw (86), retain washer (87).
- (b) Unsafety and remove screw (85), attaching bonding strip (84), slightly loosen the other screw (85).
- (c) Remove feedback lever from synchro pack splined shaft.

#### (2) Disconnect feedback link from aircraft structure.

- (a) Disconnect bonding strip.
- (b) Remove cotter pin and unscrew bolt (80).
- (c) Unscrew nut (81) ; remove hollow pin (83) and washer (82).

#### (3) Remove linkage.

### D. Preparation of Replacement Component

Not applicable.

### E. Install

#### (1) Connect linkage to synchro pack.

- (a) Connect adjustable lever to synchro pack splined shaft. Align datum marks.
- (b) Install washer (87) and screw (86).  
Torque to between 23 and 25 lbf.in. (0.259 and 0.282 m.daN).

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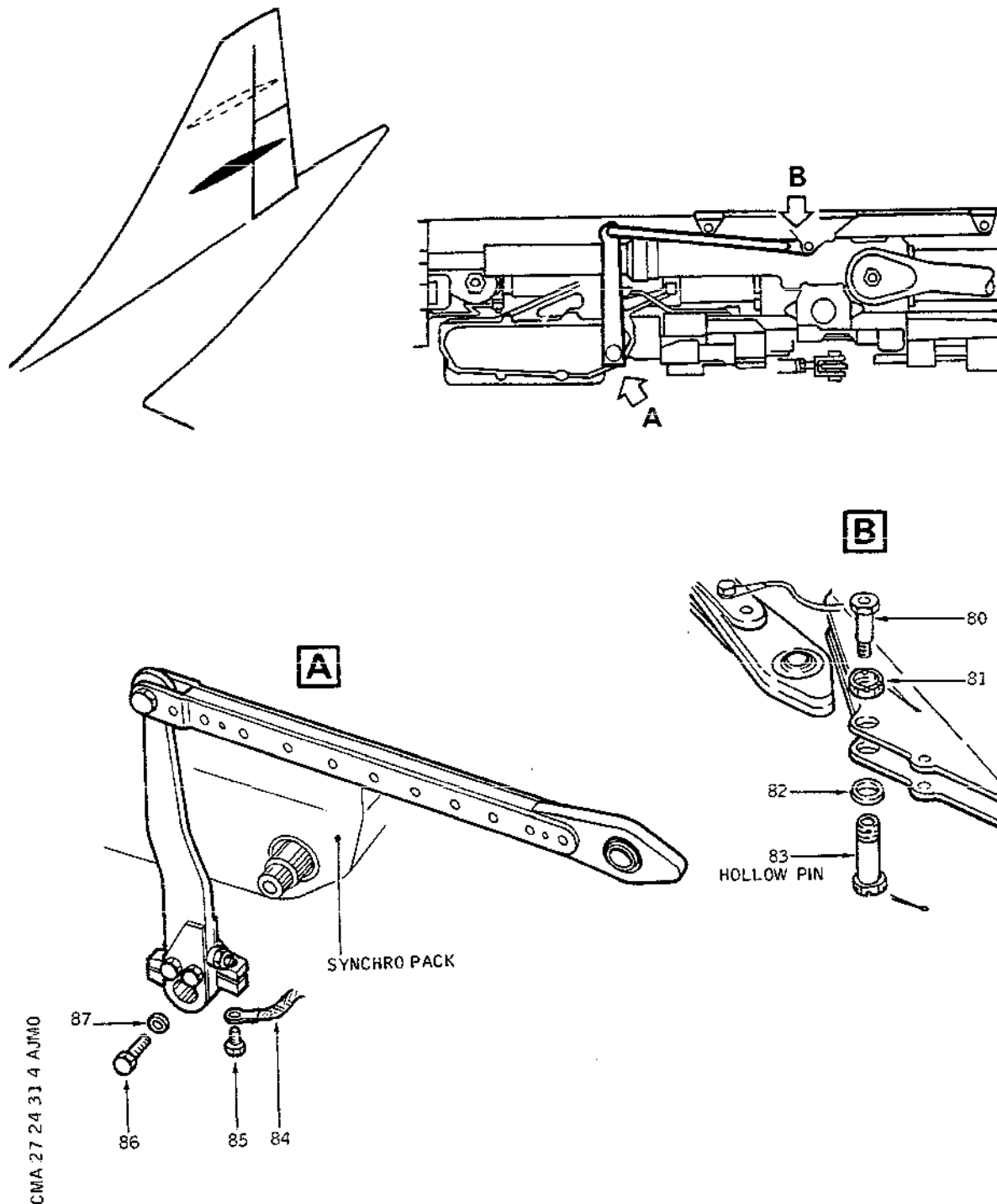
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Resolver Feedback Linkage  
Figure 407

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- (c) Install bonding strip (84) and slightly tighten screws (85).
- (2) Install link on aircraft structure.
  - (a) Install hollow pin (83), washer (82), nut (81).
- (3) Do not safety screws and nuts at this stage.
- (4) Proceed with adjustment of synchro packs electrical zero (Ref. paragraph 2).
- (5) Remove link from aircraft structure.
- (6) Disconnect test set from PFCU and connect electrical connector to PFCU.
- (7) Remove items of equipment E920112000 and D925252002.
- (8) Deflect rudder and check that in both fully deflected positions hollow pin (83) can be inserted freely in aircraft structure support.

CAUTION : A FURTHER CLEARANCE OF AT LEAST 1 mm (0.039 in.) MUST BE OBTAINED BEFORE RESOLVERS ACHIEVE THEIR INTERNAL STOPS.
- (9) Secure link to aircraft structure.
  - (a) Install hollow pin (83) with head directed downwards, washer (82) maintained by pin head and nut (81). Torque to between 1.12 to 1.24 m.daN (100 to 110 lbf.in.).
  - (b) Install bolt (80). Torque to between 0.13 to 0.16 m.daN (12 to 15 lbf.in.).
  - (c) Install cotter pins on bolts and nuts.
- (10) Remove safety clips and tags and reset the circuit breakers.
- (11) Remove rigging pins D925252002 and D925422000.
- (12) Close access doors 121FB and 323NR.

### F. Tests

- (1) Carry out a functional test (Ref. 27-24-31, Adjustment/Test).

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- (2) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access doors.
- (3) Install PFCU fairing and remove access platform.

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## MAINTENANCE MANUAL

### 7. Removal of Shuttle Valve Assembly

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Adapter Torque-Rudder PFCU	TL2.P237-45-2
Protection Sleeve - Elevon/Rudder PFCU	ST2.P235-45-18
Extraction Tool - Elevon/Rudder PFCU	ET1.P215-45-2
Bullet - Rudder PFCU	B1.P237-45-2
Bullet - Rudder PFCU	B2.P237-45-2
Circuit Breaker Safety Clip	
Access Platform 11.25 m (36 ft. 11 in.)	
Lockwire Dia. 0.8 mm (0.032 in.)	
Corrosion Resistant Steel	
Warning Notices	
Blanking Caps	

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Open access door 151DB and depressurize Green, Blue and Yellow hydraulic systems (Ref. 29-11-00, 29-12-00 and 29-21-00, Servicing).
- (3) Open access door 153BB and depressurize Green, Blue and Yellow hydraulic tanks (Ref. 29-13-00, Servicing).
- (4) Remove the following relevant PFCU fairings :  
  
Upper PFCU : fairing 352CR  
Lower PFCU : fairing 351CL
- (5) Trip, safety and tag the following circuit breaker :

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## MAINTENANCE MANUAL

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22
HYD TANKS COMPR CONT	15-215	M 602	D 8
<p><u>WARNING</u> : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.</p> <p>DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.</p> <p>IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.</p>			

C. Remove (Ref. Fig. 408 )

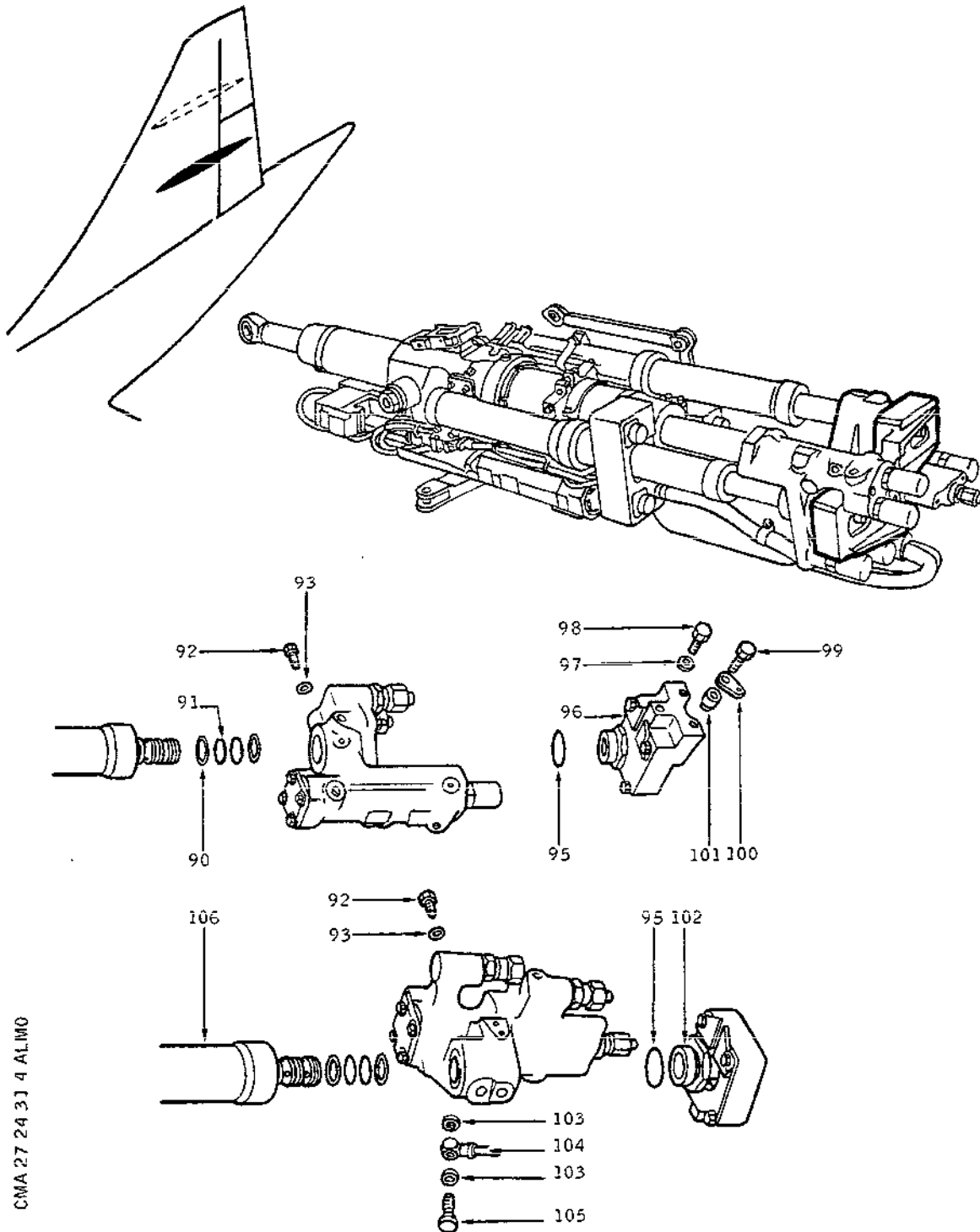
CAUTION : TAKE ALL NECESSARY PRECAUTIONS TO AVOID HYDRAULIC FLUID CONTAMINATION.

- (1) Disconnect hydraulic lines as follows :
  - (a) Maintain adapter screwed in PFCU using appropriate wrench.
  - (b) Loosen hydraulic line union nut and disengage the line.
  - (c) Cap open ends.
- (2) Unsafety and remove nuts (101), screw (98), retain washers (97) and plate (100).
- (3) Unsafety and, using equipment TL2-P237-45-2, unscrew spigot nut (102) until threaded end of sliding tube (106) is disengaged. Remove ball joint assembly (96). Discard seal (95).
- (4) For Green system shuttle valve only, unsafety and remove banjo bolt (105), disengage banjo union (104) with clam seals (103).

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Shuttle Valve Assembly  
Figure 408

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- (5) Remove anti-rotation peg (92) with clam seal (93).
- (6) Install equipment ST2-P235-45-18 on sliding tube threaded end, and by means of equipment ET1-P215-45-2 remove shuttle valve from sliding tube.
- (7) Remove and discard seals (91) and backing rings (90). Identify seals and backing rings location.

### D. Preparation of Replacement Component

Not applicable.

### E. Install

- (1) Position seals (91) and backing rings (90) on sliding tube according to their respective locations identified during removal procedure.  
Use items of equipment B1-B2 P237-45-2.  
Install a new seal (95) on spigot nut (102).
- (2) Install shuttle valve on sliding tube and remove equipment ST2-P235-45-18.
- (3) Align shuttle valve with hole in sliding tube and install anti-rotation peg (92) and clam seal (93). Ensure correct engagement of peg before tightening. Torque to between 53 and 55 lbf.in. (0.596 and 0.621 m.daN).
- (4) Install ball joint assembly (96) on shuttle valve and tighten spigot nut (102) using equipment TL2 P237-45-2.  
Torque to between 170 and 190 lbf.in. (1.92 and 2.15 m.daN).  
Safety spigot nut with lockwire as per 20-21-13.
- (5) For Green system shuttle valve, install banjo union (104) with clam seals (103) and banjo bolt (105).  
  
Torque to between 165 and 175 lbf.in. (1.86 and 1.98 m.daN). Safety with lockwire as per 20-21-13.  
  
NOTE : Position union so that synchro pack is clear of flexible line when ram body is in forward position.
- (6) Secure ball joint assembly (96) with bolts (99), nuts (101), washers (97), and lockplate (100) ; lockplate positioned under head of one bolt (99).  
Torque nuts (101) to between 0.28 and 0.34 m.daN

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(25 and 30 lbf.in.).  
Install and tighten screw (98) with washer (97).  
Torque screw (98) to between 0.56 and 0.68 m.daN  
(50 and 60 lbf.in.).  
Wirelock screw (98) to lockplate (100)  
(Ref. 20-21-13). Safety nuts (101) with cotter pin.

- (7) Connect hydraulic lines to shuttle valve assembly  
as follows :  
(Ref. Fig.403 and 404)

R.

WARNING 1 : WHEN A HOSE WITH A BEND RADIUS IS RE-  
MOVED FROM AN INSTALLATION, CARE  
SHALL BE TAKEN NOT TO STRAIGHTEN THE  
HOSE FROM ITS ACQUIRED SHAPE.

IF REQUIRED FOR RE-INSTALLATION IT  
SHALL BE FITTED AS NEAR AS POSSIBLE TO  
THIS SHAPE WITHOUT ANY UNDUE FORMING.

WARNING 2 : IN ORDER TO PREVENT DAMAGE TO HYDRAULIC  
HOSES ON PFCU, CHECK THAT THE LATTER DO  
NOT CONTACT ADJACENT STRUCTURE, PRIOR  
TO INSTALLATION OF ACCESS PANELS 351CL  
AND 352CR.

- (a) Maintain adapter screwed in PFCU using appro-  
priate wrench.  
(b) Torque tighten hydraulic line union nuts to the  
following values :

NOTE : Make certain that PFCU hoses are posi-  
tioned as required

Blue pressure	: 2.43 to 2.76 m.daN (17.9228 to 20.3576 lbf.ft.)
Blue return	: 4.86 to 5.31 m.daN (35.8456 to 39.1645 lbf.ft.)
Green pressure	: 2.43 to 2.76 m.daN (17.9228 to 20.3576 lbf.ft.)
Green return	: 4.86 to 5.31 m.daN (35.8456 to 39.1645 lbf.ft.)
Yell/Blue pressure	: 2.43 to 2.76 m.daN (17.9228 to 20.3576 lbf.ft.)
Yell/Blue return	: 4.86 to 5.31 m.daN (35.8456 to 39.1645 lbf.ft.)
Yell/Green pressure	: 2.43 to 2.76 m.daN (17.9228 to 20.3576 lbf.ft.)
Yell/Green return	: 4.86 to 5.31 m.daN

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(35.8456 to 39.1645 lbf.ft.)

- (8) Remove safety clip and tag and set circuit breaker.
- (9) Pressurize Green, Blue and Yellow hydraulic tanks (Ref. 29-13-00, Servicing).

### F. Tests

- (1) Carry out a functional test (Ref. 27-24-31, Adjustment/Test).
- (2) Upon completion of tests, check shuttle valve for external leaks.
- (3) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access doors.
- (3) Install PFCU fairings and remove access platform.

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### RUDDER POWER FLIGHT CONTROL UNIT - ADJUSTMENT/TEST

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN 24-00-00, SERVICING.

#### 1. General

Test of PFCU (Power Flight Control Unit) operation after Removal/Installation.

#### 2. Operational Test

##### A. Equipment and Materials

##### B. Prepare

(1) Take the precautions described in the previous WARNING paragraph

(2) On overhead panel

(a) On Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in OFF INV position and make certain that the O & M ELEVONS, IN ELEVONS and RUDDER switches are in MECH position.

(b) On SERVO CONTROLS unit make certain that the control switches are in NORMAL position

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- (c) On RELAY JACK unit, place switch in NORM position
- (3) On circuit breaker panels make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
INNER ELVN CONT. & MON. GRN SUP. 1	1-213	1C 53	M11
MID & OUTER ELVN CONT & MON GRN SUP.		1C 55	M12
OUTER ELEVON NEUTRLN GRN SUP.		1C 58	M13
INNER ELEVON CONT & MON GRN SUP. 2		1C 59	M14
P.F.C.S INV GRN FHIL IND.		1C 73	M15
AUDIO WARN SYS SUP. 1		W 371	M21
RUDDLER CONT. & MON GRN SUP.		1C 62	N11
RUDDER MON LOGIC GRN SUP.		1C 63	N12
P.F.C.S ALL SURFACES MON GRN SUP.		1C 54	N13
P.F.C.S INV BLUE FAIL SUP.		1C 67	N14
P.F.C.S INV GRN PROTN CONT, RELAY JACK HYD SEL. IND. & SUP.		1C 68	N15
P.F.C IND		C 281	N17
M.W.S SUP. 1		C 287	N18
P.F.C.S INV GRN SUP.		W 252	N21
YEL/GRN - GRN FAIL		1G 66	P11
YEL/BLUE BLUE FAIL		C 285	P16
YELL L.L.		C 286	P17
FLT CONT POSN IND CONT.		C 288	P18
		C 83	R11
LAT ACCELMTR 1 26 V SUPPLY	2-213	1C 42	A 4
FLT CONT POSN IND 26 V 400 Hz SUP		C 84	B 4
OUTER ELEVON AMP BLUE SUP		2C 44	C 1
INNER ELEVON BLUE CONT SUP		2C 94	C 2
MID ELEVON AMP BLUE SUP		2C 93	C 3
MID & OUTER ELEVON BLUE CONT SUP		2C 92	C 4
INNER ELEVON BLUE CONT SUP		2C 47	D 1
MIDDLE & OUTER ELEVON BLUE CONT SUP		2C 46	D 2
RUDDER MON BLUE SUP		2C 49	D 3
RUDDER BLUE 26 V 1800 Hz CONT SUP		2C 76	D 4

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFCs INV BLUE PROTN SUP		2C 71	D 5
OUTER ELEVON AMP GRN SUP		1C 44	E 1
AUTOSTAB 1 COMP SUP		1C 37	E 5
INNER ELEVON GRN CONT SUP		1C 94	F 1
MID ELEVON AMP GRN SUP		1C 93	F 2
INNER ELEVON AMP GRN SUP		1C 47	G 1
MIDDLE & OUTER ELEVON AMP GRN SUP		1C 46	G 2
RUDDER NON GRN SUP		1C 49	G 3
PFCs INV GRN PROTN SUP		1C 71	G 5
MID & OUTER ELEVON GRN CONT SUP		1C 92	H 5
RUDDER GRN 26 V 1800 Hz CONT SUP		1C 76	H 6
YELL L/LEVEL	3-213	C 282	A 8
YELL/GRN GRN FAIL		C 283	A 9
YELL/BLUE BLUE FAIL		C 284	A10
P.F.C.S INV BLUE SUP.	5-213	2C 66	B14
RUDDER CONT & MON		2C 62	C11
RUDDER MON LOGIC		2C 63	C12
P.F.C.S IN GRN FAIL SUP.		2C 67	C13
P.F.C.S INV BLUE PROTN CONT		2C 68	C14
AUDIO WARN SYS SUP. 2		W 372	C17
INNER ELEVON CONT & MON BLUE SUP 1		2C 53	D11
MID & OUTER ELEVON CONT & MON BLUE SUP.		2C 55	D12
OUTER ELEVON NEUTRLN BLUE SUP.		2C 58	D13
INNER ELEVON CONT & MON BLUE SUP. 2		2C 59	D14
M.W.S SUP 2		W 251	D15
P.F.C.S INV BLUE FAIL IND.		2C 73	E11
P.F.C.S ALL SURFACES MON BLUE SUP		2C 54	E12

- (4) On panel 2-213, set circuit breaker :  
FLT CONT & NAV BUS 14XS (X355, Map ref. H2)
- (5) Make certain that trim controls are set to zero.
- (6) Connect electrical ground power unit and energize

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the aircraft electrical network (Ref. 24-41-00, Servicing).

NOTE : During test, do not take into account the illumination of indicator and warning lights and aural warnings which are not mentioned.

### C. Test

- (1) Using electric pumps, pressurize yellow hydraulic system (Ref. 29-21-00, Servicing).
- (2) On overhead panel, on SERVO CONTROLS unit place lower switch in GREEN L-PRESS position.  
- Elevons must deflect up to position zero
- (3) Operate slowly rudder pedals from stop to stop in both directions.  
On ICOVOL indicator (flight control surface position indicator) check that :  
- Rudders deflect 30° to the right and to the left
- (4) On flight engineer's panel on unit GROUND HYD CHECK OUT place switch in G/B position
- (5) On overhead panel on SERVO CONTROLS unit place lower switch in NORMAL position
- (6) Operate again rudder pedals as in (3)  
- rudders must deflect accordingly
- (7) On overhead panel, on SERVO CONTROLS unit, place lower switch in BLUE L-PRESS position
- (8) On GROUND HYD CHECK OUT unit place switch in Y/Y position
- (9) Operate again rudder pedals as in (3)  
- Rudders must deflect accordingly
- (10) On overhead panel, on Flight Control Unit, place GREEN INVERTER and BLUE INVERTER switches in ON position and O & M ELEVONS, IN ELEVONS and RUDDER switches in BLUE position. Press and release the RESET push button located on RH side of each switch.  
- On ICOVOL indicator the 8 magnetic indicators must display B.
- (11) On overhead panel, on AUTO STAB 1 unit engage YAW switch.

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- This switch must remain engaged.
- (12) Turn handwheel up to stop, in both directions.  
On ICOVOL indicator, check that :  
While pointers corresponding to elevons displace in opposite direction for each wing, the pointers corresponding to rudders indicate a 4° deflection to the right or to the left according to control hand-wheel movement to the right or to the left.
- (13) On overhead panel, carry out the following procedure :
  - (a) On SERVO CONTROLS unit place lower switch in GREEN L-PRESS position  
On ICOVOL indicator the 8 magnetic indicators must display M
  - (b) On Flight Control Unit place the 3 switches in GREEN position, then press and release the RESET push buttons (RH side of switches)
    - On ICOVOL indicator the 8 magnetic indicators must display G
- (14) Repeat above procedure (12).  
Results must be identical.
- (15) On overhead panel, on AUTO STAB 1 unit disengage YAW switch.
  - This switch must indicate OFF.
- (16) Repeat above procedure (3)
  - identical results
- (17) On overhead panel, carry out the following procedure
  - (a) On SERVO CONTROLS unit place the lower switch in BLUE L-PRESS position.
    - On ICOVOL indicator the 8 magnetic indicators must display M
  - (b) On Flight Control Unit, place the 3 switches in BLUE position, then press and release the 3 RESET push-buttons.  
On ICOVOL indicator the 8 magnetic indicators must display B.
- (18) Repeat above procedure (3)
  - Identical results

D. Close up

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- (1) Shut down pressurization of yellow hydraulic system (Ref. 29-21-00, Servicing).
- (2) On overhead panel :
  - (a) On Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position and the 3 switches in MECH position
  - (b) On SERVO CONTROLS unit place lower switch in NORMAL position
- (3) De-energize the aircraft electrical network and remove electrical ground power unit (Ref. 24-41-00, Servicing).
- (4) On panel 2-213, trip, safety and tag circuit breaker FLT CONT & NAV BUS 14XS (X355, Map ref. H2).

### 3. Jamming Microswitch Functional Test

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Tool - Jamming Detector	ST4P285-45-002
Access Platform 9 ft. 8 in. (2.946 m)	
Access Platform 36 ft. 11 in. (11.252 m)	
Circuit Breaker Safety Clips	
Lockwire dia. : 0.032 in. (0.812 mm) Corrosion Resistant Steel	

#### B. Prepare

- (1) This test is carried out without hydraulic power :  
Depressurize Blue, Green and Yellow hydraulic systems (Ref. 29-12-00, Servicing ; 29-11-00, Servicing ; 29-21-00, Servicing).
- (2) On panel 1-213, trip, safety and tag the following circuit breaker :  
  
P.F.C. IND (C287, Map ref. N18)

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- (3) Open access door 151DB
- (4) At zone 151, disconnect connectors C290A and C292A from pressure switches C290 and C292.
- (5) On panel 1-213, remove safety clip and tag and set circuit breaker :
- P.F.C. IND (C287, Map ref. N18)
- (6) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFCs INV GRN FAIL IND	1-213	1C 73	M15
AUDIO WARN SYS SUP 1		W 371	M21
PFCs ALL SURFACES MON GRN SUP		1C 54	N13
MWS SUP 1		W 252	N21
AUDIO WARN SYS SUP 2	5-213	W 372	C17
MWS SUP 2		W 251	D15
PFCs INV BLUE FAIL IND		2C 73	E11
PFCs ALL SURFACES MON BLUE SUP		2C 54	E12
ROOF PNL LT TEST SUP	15-216	L1002	D13

- (7) Remove fairing :

352CR for test of upper rudder PFCU spool valve jamming microswitches.

351CL for test of lower rudder PFCU spool valve jamming microswitches.

- (8) On PFCU :

(a) Cut and remove lockwire safetying the attachment screws of protective plate between input lever and PFCU body.

(b) Unscrew and remove screws.

(c) Remove protective plate.

- (9) On overhead panel :

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- (a) On Flight Control Unit, place GREEN INVERTER and BLUE INVERTER switches in OFF INV position, and make certain that O & M ELEVONS, IN ELEVONS and RUDDER switches are in MECH position.
  - (b) On SERVO CONTROLS unit, make certain that both switches are in NORMAL position.
- (10) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

- Gong must sound.

On overhead panel :

- On Flight Control Unit, MECH JAM warning light must illuminate.
- On master warning panel, PFC warning light must illuminate.

NOTE : Do not take into account indications and visual or aural warnings which are not mentioned.

- (11) Press and release PFC warning light.

- It must go off.

- (12) On overhead panel, on SERVO CONTROLS unit, press and release T push button located below BLUE JAM caption light.

- Gong must sound.
- BLUE JAM caption light must illuminate, then go off.
- PFC warning light must illuminate.

- (13) Press and release PFC warning light

- It must go off.

- (14) On SERVO CONTROLS unit, press and release T push-button located below GREEN JAM caption light.

- Gong must sound.
- GREEN JAM caption light must illuminate, then go off.
- PFC warning light must illuminate.

- (15) Press and release PFC warning light

- It must go off

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### C. Test

- (1) Install equipment ST4-P285-45002 :
  - (a) For Blue spool valve jamming test :
    - (a1) On the rear section of PFCU, on the (Blue) springbox and microswitch assembly.
  - (b) For Green spool valve jamming test :
    - (b1) On the front section of PFCU, on the (Green) springbox and microswitch assembly.
- (2) Carefully turn equipment operating handle clockwise up to stop (Maintain in this position for at least one second)
  - Gong must sound
  - BLUE JAM (GREEN JAM) caption light must illuminate on SERVO CONTROLS unit, on overhead panel.
  - PFC warning light must illuminate on overhead panel.
- (3) Turn equipment operating handle counter-clockwise and remove equipment.
  - BLUE JAM (GREEN JAM) caption light and PFC warning light must remain illuminated.
- (4) Install test equipment on the second springbox and microswitch assembly.
- (5) Repeat operation (2) above until :
  - Gong sounds
  - GREEN JAM (BLUE JAM) caption light illuminates on SERVO CONTROLS unit (BLUE JAM (or GREEN JAM) caption light and PFC warning light must remain illuminated).
- (6) Turn equipment operating handle counter-clockwise and remove equipment.
  - No change occurs in above mentioned caption and warning lights.
- (7) Trip, safety and tag the following circuit breakers :

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SERVICE	PANEL	CIRCUIT BREAKER		MAP REF.
PFCs ALL SURFACES MON GRN SUP	1-213	1C	54	N13
PFCs ALL SURFACES MON BLUE SUP	5-213	2C	54	E12

- When tripping the second circuit breaker BLUE JAM, GREEN JAM, MECH JAM caption lights and PFC warning light must go off.

(8) Set either of the circuit breakers mentioned above in (7) :

- Gong must sound
- On overhead panel, PFC warning light and MECH JAM warning light must illuminate.

NOTE : Make certain that, on SERVO CONTROLS unit, BLUE JAM and GREEN JAM caption lights remain off.

(9) Set the second circuit breaker mentioned above in (7):  
- No results

### D. Close-Up

- (1) On overhead panel, on Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position.
- (2) On panel 1-213, trip, safety and tag circuit breaker : PFC IND (C287, Map ref. N18).
- (3) At zone 151, connect connectors C290A and C292A to pressure switches C290 and C292.
- (4) Close access door 151DB
- (5) On tested PFCU, install protective plate between input lever and PFCU body and engage attachment screws.
- (6) Tighten protective plate attachment screws.
- (7) Wirelock above mentioned screws.

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- (8) Install and secure tested PFCU fairing.
- (9) On panel 1-213, set circuit breaker :  
PFC IND (C287, Map ref. N18).
  - On SERVO CONTROLS unit, on overhead panel, make certain that BLUE L.PRESS and GREEN L.PRESS caption lights illuminate when above mentioned circuit breaker is set.
- (10) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

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### RUDDER POWER FLIGHT CONTROL UNIT - INSPECTION/CHECK

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The purpose of the procedure described in this topic is to check :

- PFCUs (Power Flight Control Unit) for external hydraulic leakage.
- PFCUs for internal hydraulic leakage between chambers.
- Permissible loads applied to end of input lever to initiate PFCU forward and rearward movement.
- General condition of PFCU component and attachments by visual inspection.

#### 2. PFCU External Hydraulic Leakage

##### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Access Platform 36 ft. 11 in. (11.25 m)	
--	--

##### B. Prepare

- (1) Remove PFCU fairings

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351, CL, DL ; 352, CR, DR.

- (2) Take the precautions described in the previous WARNING paragraph.
- (3) Set Flight Controls in Blue electrical mode (Ref. 27-00-00, Servicing).
- (4) Check that roll, pitch and yaw trim controls are set to zero.

### C. Check

- (1) Check on Flight Engineer's HYDRAULIC MANAGEMENT panel that hydraulic fluid temperature is between 30°C and 70°C (86°F and 158°F).  
If necessary carry out several deflections of rudders to reach the required temperature.

- (2) Wait 3 minutes for external leakage to stabilize and proceed with measurement of leak.

NOTE : During check, PFCUs must remain immobile and approximately set to zero position.

- (3) Permissible leak rate for PFCU assembly is 4 drops per minute.
- (4) Set Flight Controls in Green electrical mode and repeat the same operations.

### D. Close-Up

- (1) Shut down pressurization of hydraulic system (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in electrical mode).
- (2) Install fairings 351CL, DL ; 352CR, DR.
- (3) Remove access platforms.

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### 3. Internal Hydraulic Leakage Between Chambers of PFCUs

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 36 ft. 11 in. (11.25 m)	
Ground Power Unit - Hydraulic Power and Preliminary Testing (Qty : 2)	EMH398E
Flowmeters, 1 for each System (Qty : 2) These Flowmeters must have the following characteristics : Flow rate range : 0 to 25 l/mn Accuracy : 96% in flow rate range between 4 and 25 l/mn	

#### B. Prepare

- (1) Remove fairings 351, CL, DL ; 352, CR, DR.
- (2) Take the precautions described in the WARNING paragraph.
- (3) Set Flight Controls in mechanical mode.  
(Ref. 27-00-00, Servicing).

NOTE : Install flowmeters, listed in equipment and materials paragraph, on hydraulic ground power units.

- (4) Check that roll, pitch and yaw trim controls are set to zero.

#### C. Check

NOTE : Except Flight Controls, no other hydraulic services must operate during this check.

- (1) Check on Flight Engineer's HYDRAULIC MANAGEMENT panel, that hydraulic fluid temperature is between 30°C and 70°C (86°F and 158°F).  
If necessary, carry out several deflections of rudders to reach the required temperature.

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- (2) Wait two minutes approximately, then note flow rate per minute of each QB and QG flowmeter. Rudders are in neutral position.
- (3) Shut down pressurization of Blue and Green hydraulic systems.
- (4) With rudders in neutral position remove actuating rod from lower PFCU input lever.

NOTE : For removing bolts, it is necessary to press plunger on head of bolt in order to free the locking balls.

- (5) Manually position lower rudder at aircraft left hand side stop.
- (6) Position PFCU input lever at stop, towards nose of aircraft. Maintain the position on PFCU during test.
- (7) Pressurize Green and Blue hydraulic systems. Wait two minutes approximately, then note flow rate per minute of each QB1 and QG1 flowmeter.
- (8) Difference in flow rate between QB1 - QB and QG1 - QG must be smaller than 4 l/mn.
- (9) Shut down pressurization of Green and Blue hydraulic systems.
- (10) Position lower rudder to neutral.
- (11) Connect actuating rod to lower PFCU input lever. Bolt, special washer, flat washer nut. Torque to between 0.31 and 0.37 m.daN (27.42 and 32.73 lbf.in.). Safety with cotter pin.
- (12) Disconnect actuating rod from upper PFCU input lever. Manually position upper rudder at aircraft RH side stop and repeat operations described in above paragraphs (6), (7), (8), (9), (10) and (11).

### D. Close-Up

- (1) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
- (2) Install fairings 351CL, DL ; 352CR, DR.
- (3) Remove access platforms.

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### 4. Permissible Loads Applied to End of PFCU Input Lever

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Spring Scale from 0 to 20 N (0 to 4.48 lbf.)	
Access Platform 36 ft. 11 in. (11.25 m.)	
Rigging Pins - Synchro Pack	D925252000

#### B. Prepare

- (1) Remove fairings 351CL, 352CR.
- (2) Take the precautions described in the previous WARNING paragraph.
- (3) Set Flight Controls in mechanical mode.  
(Ref. 27-00-00, Servicing).
- (4) Check that roll, pitch and yaw trim controls are set to zero.

#### C. Load Measurement

- (1) Carry out several rudder deflections.
- (2) Open access door 121FB and immobilize yaw, pitch and roll resolvers with rigging pins D925252001, D925252002 and D925252003.
- (3) With rudders at neutral position, disconnect actuating rod from lower PFCU input lever.

NOTE : For removing bolts, it is necessary to press plunger on head of bolt to free the locking balls.

- (4) Proceed with measurements under following conditions :
  - Hydraulic fluid temperature  
40°C plus or minus 10°C.  
(104°F plus or minus 18°F).
  - Ambient temperature

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### 5. Visual Check of PFCU

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 36 ft. 11 in. (11.25 m)	

#### B. Prepare

- (1) Remove fairings 351DL, CL, BL.  
352DR, CR, BR.

#### C. Check

- (1) Control rods (rods between PFCU and rudder).
  - (a) Check that control rods are not ruptured.
  - (b) Apply a load to each end of rod to ensure that it is in working condition.
  - (c) Visually, and if required, with an inspection mirror, check the following components, for cracks, without removing them.
    - PFCU trunnions
    - Rod ends (PFCU side and rudder side)
    - Rod body
    - Fork end and pick up fitting on control surface.
  - (d) On front attachment point, check correct operation of eccentric bush by actuating locking lever. Make certain that it reverts to initial position when released.  
Check for presence of nut and safetying (cotter pin) on rear attachment.
- (2) PFCU and structural attachment points.
  - (a) Apply a load to PFCU, at rear and front attachment points to ensure there is no rupture of attachment.
  - (b) Check that PFCU does not jam in track by turning servo control both ways. Free movement of servo-control can thus be checked.

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- (c) Visually and, if required, using an inspection mirror check the following attachment points for cracks :
  - Front and rear attachment fittings on structure
  - PFCU piston ends (front and rear).
- (d) Check safetying (cotter pins) of front and rear attachments.

### (3) Feedback linkage.

- (a) Visually and, if required, using an inspection mirror, check the following components for traces of breakage or cracks :
  - Upper and lower sections of resolver box adjustable lever
  - Upper and lower sections of feedback link and bolt attachment plate to structure.

NOTE : Resolver box adjustable lever must be inspected with the greatest care, as a total rupture of this lever, during flight, may have catastrophic effects.

A typical crack on resolver box adjustable lever is illustrated as an example  
(Ref. Fig. 601 )

- (b) Check safetying and attachments of the following components :
  - Feedback link bolt attachment plate
  - Feedback link between bolt attachment plate and resolver box adjustable lever.
  - Resolver adjustment device
  - Bonding strips.

### (4) Electrical wiring and connection.

- (a) Check presence of bonding strip between :
  - Resolver box and adjustable lever
  - Adjustable lever and feedback link
  - Feedback link and bolt attachment plate to structure
  - PFCU forward eye end and structure
  - PFCU aft eye end and structure.
- (b) Make certain that the following connectors are correctly locked :

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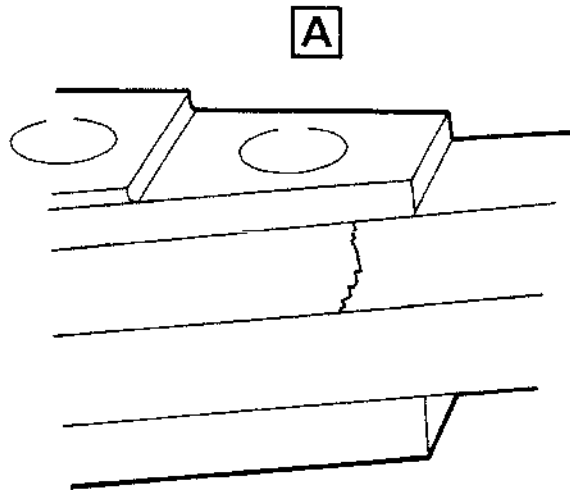
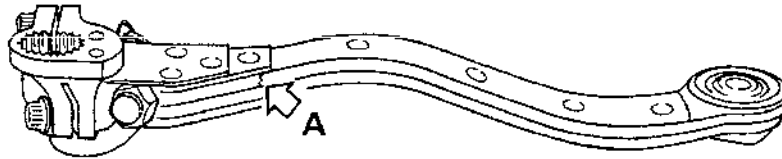
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CMA 27 24 31 6 AAM0

Resolver Box Adjustable Lever  
Typical crack  
Figure 601

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### Lower PFCU

Connector C79A  
Connector C79B  
Connector C79C  
Connector D and K

### Upper PFCU

Connector C78A  
Connector C78B  
Connector C78C  
Connector D and K

- (c) Make certain that cable looms are in good condition (Free of chafing, correct attachments).

### Lower PFCU

Loom UA3001  
UA3002  
UA3003  
P237 45 0110  
P237 45 0111  
P237 45 0114  
P237 45 0115  
P237 45 0116  
P267 45 0063  
P267 45 0064  
P287 45 0136  
P287 45 0137

### Upper PFCU

Loom UA3000  
UA3013  
UA3016  
P237 45 0110  
P237 45 0111  
P237 45 0114  
P237 45 0115  
P237 45 0116  
P267 45 0063  
P267 45 0064  
P287 45 0136  
P287 45 0137

## (5) Hydraulic system

- (a) Check that telescopic supply tubes and shuttle valve housings are free of cracks.
- (b) Check that telescopic tubes can move freely (a few degrees in rotation) and that anti rotation pegs are not peened.

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- (c) Check that flexible hoses are not in contact with structure or with other hoses. Check that they are free of chafing or dents.
- (d) On each electrovalve, check that safety disc is still present on side of housing and is not deformed (Safety disc is of a lighter colour than the electrovalve housing).
- (e) Take the precautions described in WARNING paragraph.  
Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).  
Check that visible surfaces of telescopic tubes and servocontrol piston are in good condition by operating controls to full travel in both directions.

### D. Close-Up

- (1) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
- (2) Install fairings 351DL, CL, BL.  
352DR, CR, BR.
- (3) Remove access platform.

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### 26 V, 1800 Hz GENERATION - DESCRIPTION AND OPERATION

#### 1. General

- An electrical generation system reserved solely for the supply of flight control electrical channels is necessary for the following reasons :
  - To provide a 26 V-1800 Hz AC current. This frequency is that which enables the resolvers on the various control and monitoring channels to operate at optimum performance.
  - To be independent of engine failure.
  - To be free from voltage fluctuations in the main aircraft network.
  - To avoid possible interference with the 400 Hz aircraft network.

This electrical operation is common to the three axes : pitch, roll and yaw.

- Two electrical control and monitoring channels are used ; each totally independent of and able to replace the other. Two 26 V-1800 Hz networks (Blue and Green) also totally independent of each other, though identical, are installed in the aircraft.

#### 2. Description (Ref. Fig. 001 )

- A 26 V-1800 Hz AC generation system consists of :
  - An inverter supplied with 28 VDC from the essential bus bars and produces 26 VAC 1800 Hz. The Blue and Green inverters supply the Blue and Green 26 V-1800 Hz bus bars respectively.
  - A protection unit which, in the event of over voltage, under voltage, over frequency or under frequency;
    - Cuts off the power supply to the inverter
    - Changes control channel (Ref. 27-16-00 and 27-17-00)
    - Operates the warning system (warning lights and aural warnings).
  - A control and indicating unit common to the two systems is located on the overhead panel in the flight compartments and consisting of :
    - A control switch and a FAIL caption light for each of the the Blue and Green inverters.  
(Pressing the FAIL caption light operates the aural and luminous warnings : "TEST FUNCTION")
    - Indicating relays which operate the FAIL caption light for a failed inverter and set off the master warnings (luminous and aural)

#### 3. Static Inverters

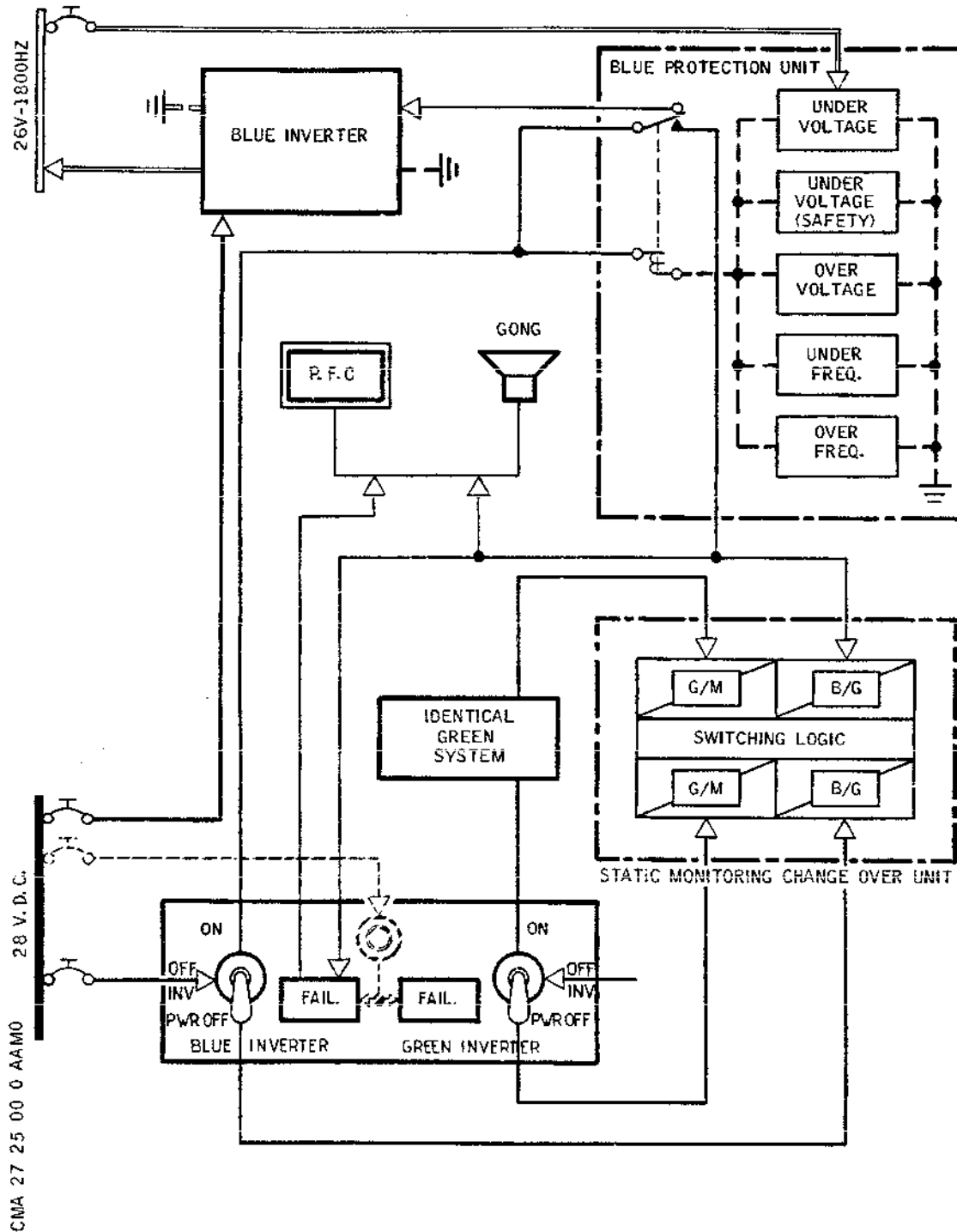
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## MAINTENANCE MANUAL



26 V, 1800 Hz AC Generation - Block Diagram  
Figure 001

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An inverter, of entirely static design, is supplied with 28 VDC from an essential bus bar. It delivers a nominal 300 VA at 26 VAC and 1800 Hz (single phase).

- For a supply voltage varying between 22 V and 30 VDC, the output voltage remains between 25.6 and 26.4 volts for a given power of between 75 and 150 VA.  
The frequency, under these circumstances, remains between 1782 Hz and 1818 Hz ( $1800 \pm 18$  Hz) for these conditions.

An inverter can provide 450 VA for a period of 5 mins, or 600 VA for a period of 10 seconds.

The level of conduction interference and spurious emission is reduced to a level which conforms to specification MIL.I.26600.

The general principles of operation are as follows :

The conversion from DC to AC voltage is achieved using two switching transistors and a transformer consisting of a centre-tapped primary winding and a secondary winding. The transistors receive alternate conduction and blocking signals in such a manner that the current passing through the two halves of the primary windings produce an AC voltage of square waveform at the secondary winding. After wave forming, the voltage is sent to the distribution bar, (bus bar).

#### 4. Protection Units

A protection unit is associated with each inverter, each unit consisting essentially of :

- A transformer, the primary winding of which is supplied by the inverter and the secondary windings in turn power the modules which detects :
  - An under voltage of  $20.5 \pm 0.5$  volts
  - An over voltage of  $30 \pm 0.4$  volts
  - An over frequency of  $1870 \pm 10$  Hz
  - An under frequency of  $1730 \pm 10$  Hz
  - An under voltage (safety) of  $18 \pm 1$  volts
- Two detection relays, one or other of which is energized when one of the above faults is detected.

#### 5. Control Unit

This unit forms part of the Flight Control Unit. It includes two control switches, BLUE INVERTER and GREEN INVERTER, each having three positions, ON, INV OFF and PWR OFF : also two FAIL caption lights which indicate the failure

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of one or other of the networks.

Various relays in the unit are controlled by signals from the protection unit and which in turn cause the FAIL caption light to illuminate or extinguish.

### 6. Operation (Ref. Fig. 002 )

- The BLUE INVERTER (GREEN INVERTER) control switch has three positions :
  - In PWR OFF position, the switch isolates the Blue system (Green system) 28 VDC bus bar and only supplies the Blue (Green) control and monitoring channels using this voltage. This position, used on the ground only, avoids the necessity of leaving the circuits not in use energized while the A/C network is energized by a ground power supply unit. For this position, corresponding FAIL indicator light is illuminated.
  - In OFF INV position the Blue system (Green system) 28 VDC bus bar is supplied but the corresponding inverter does not operate.
- By placing BLUE INVERTER (GREEN INVERTER) control switch in "ON", the inverter is supplied with 28 VDC if the Blue (or Green) protection unit so permits. This 28 VDC power can only be supplied if the voltage and frequency monitoring modules in the protection unit detect no fault in the 1800 Hz generation system. The protection unit is therefore supplied from bus bar which supplies the inverter, in order to monitor voltage and frequency. When a fault occurs, the relays in the protection unit close and cause :
  - The 28 VDC inverter control supply to be cut off.
  - The operation of the "Green (Blue) electrical generation system fault" logic circuit in the static monitoring changeover unit : this causes a changeover of control channel.
  - Blue channel to Green channel if the Green inverter operates
  - Green channel to mechanical system if the Green inverter is inoperative.

This control channel changeover is indicated by "G" or "M" displayed on the magnetic indicators of the flight control surface position indicator (ICOVOL).

- The supplying of Blue (Green) system indicating relays of the control and indicating unit, which causes :
  - FAIL - BLUE INVERTER (GREEN INVERTER) caption light to illuminate.
  - The gong to sound.
  - PFC warning light to illuminate on the master warning panel.

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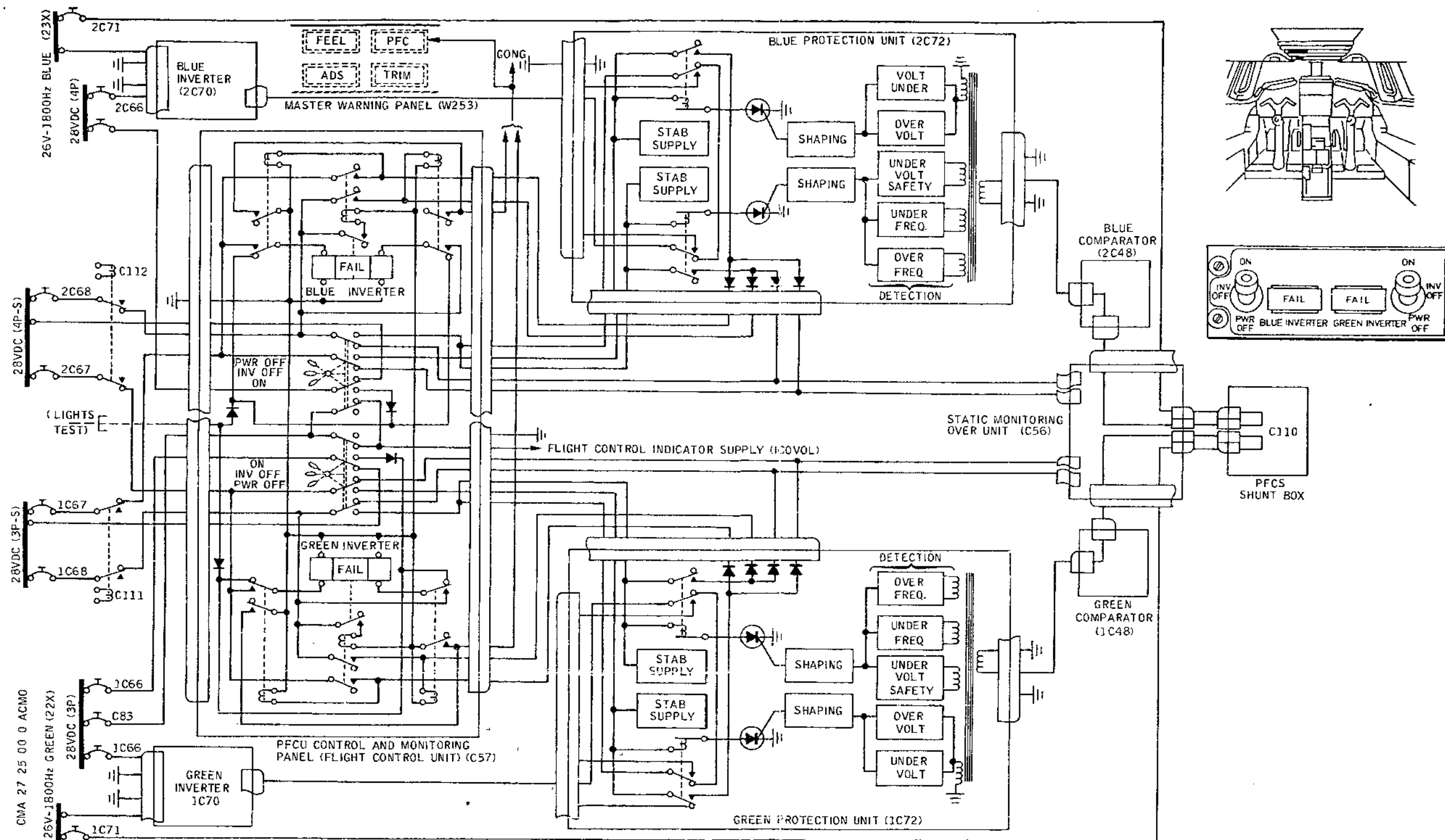
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Blue and Green 26 V, 1800 Hz Generation -  
Schematic  
Figure 002

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The 26 V 1800 Hz supply to the protection unit is possible only if the monitoring comparator and the static monitoring changeover unit are plugged in. This safety precaution prevents the flight control electrical generation from being operated, if the corresponding monitoring channel is not operating.

### 7. Electrical Power Supply

The Blue and Green system inverters are supplied with essential 28 VDC busbars.

The control system of each inverter is supplied with a 28 VDC bar (one for each inverter) ; this bar supplies only the flight control system.

Each inverter supplies a distribution bar with 26 V 1800 Hz current.

Details of supply and distribution busbars with their location are given in the following Table.

SERVICE	BUSBAR		C/B PANEL
Blue Inverter Power Supply	28 VDC B.ESS.4P		5-213
Green Inverter Power Supply	28 VDC A.ESS.3P		1-213
Blue Inverter Control System Power Supply	28 VDC B.ESS.4P.S		5-213
Green Inverter Control System Power Supply	28 VDC B.ESS.3P.S		1-213
Blue Distribution Bar	B. Flying Control 26 VAC - 1800 Hz	23X	2-213
Green Distribution Bar	A. Flying Control 26 VAC - 1800 Hz	22X	2-213

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## MAINTENANCE MANUAL

### 26V, 1800Hz GENERATION - TROUBLE SHOOTING

#### R 1. General

R The 26V, 1800Hz generation networks are common to the three axes  
R (pitch yaw and roll). Trouble shooting is detailed in Chapter  
R 27-15-00, Trouble Shooting.

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## MAINTENANCE MANUAL

### 26 V, 1800 Hz GENERATION - ADJUSTMENT/TEST

#### R 1. General

R 26V 1800Hz Blue and Green power generation networks supply the  
R Flight Control system in Blue and Green electrical modes.  
R Therefore, tests of 26V 1800Hz power generation are common  
R to the three Flight Control axes (Roll, Pitch and Yaw).  
R They are dealt with once only : refer to topic 27-15-00,  
R Adjustment/Test.

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### ELECTRICAL CONTROL CHANNELS - DESCRIPTION AND OPERATION

#### 1. General

Each of the two rudders is actuated by a powered flight control unit (PFCU) of a type similar to those used for the elevons :

- Either of the electrical channels (Blue channel and Green Channel) is used to control them. The Blue electrical channel is the channel normally used. The Green channel replaces the Blue channel in the event the latter fails. This channel change-over is caused by the Blue monitoring channel (Ref. 27-27-00, Description and Operation). If the Green channel fails after a failure of the Blue channel, the Green monitoring channel (Ref. 27-27-00, Description and Operation) will activate the control channel in mechanical mode.

An electrical channel (identical Blue and Green channel) translates the rudder pedal deflection into electrical signals which, after being processed, are applied to the PFCU corresponding servo valve (Blue or Green) actuating the upper and lower rudders.

The PFCUs then move, deflecting rudders to the extent and in the direction defined by the rudder bar.

#### A. Principle (Ref. Fig. 001 )

In the case of each channel, the rudder bar drives the rotor of a "CX" resolver, with a power supply of 26 V - 1800 Hz.

This rotor induces voltages in the stator that are proportional to the angle of deflection of the rudder bar.

These voltages are applied to a "CT" resolver, whose rotor is driven when a PFCU is deflected.

R If the rotor of the CT resolver does not occupy the same  
R position as the rotor of the control CX resolver, a voltage  
R is induced at the terminals of the rotor of this CT  
resolver.

This voltage, after amplification, is applied to the corresponding servo-valve of the PFCU, causing it to be deflected.

R When the rotor of the CT resolver, turning at an angle  
R proportional to the deflection of the PFCU, occupies the  
R same position, in relation to its stator, as the rotor of  
the CX resolver (also in relation to its stator), the  
voltage becomes nul at its terminals, and the PFCU stops at

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the required position.

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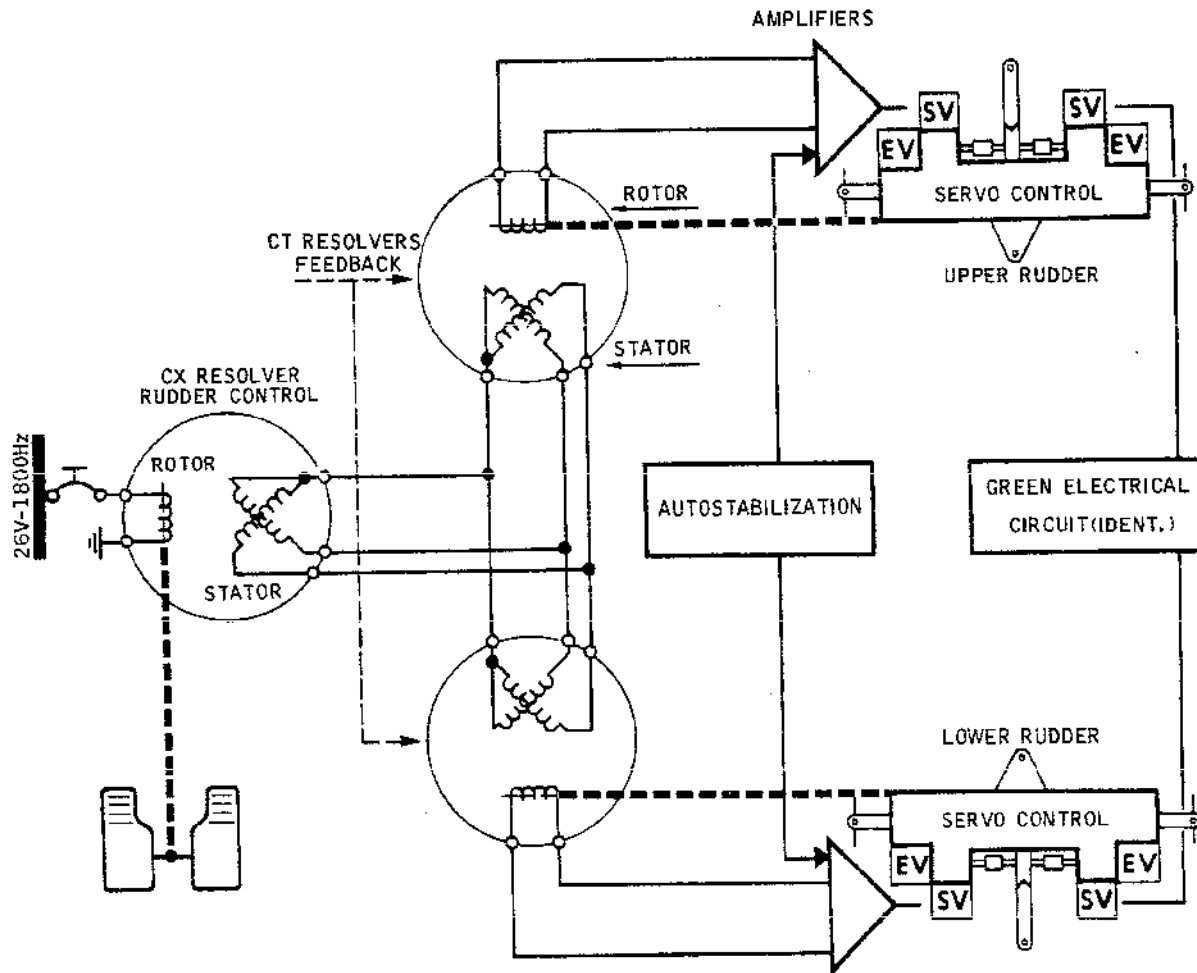
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Rudder Control Channel - Schematic Diagram  
Figure 001

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### 2. Description (Ref. Fig. 002 )

Since both rudders must always deflect by the same value and in the same direction, only one transmitting "CX" resolver (for a channel) driven by the rudder bar is required to transmit yaw orders to two "CT" resolvers each driven by a PFCU.

R The output signals of the CX resolver stator are applied to the stators of the two CTs connected in series.

R The output voltage, at the terminals of the rotor of each CT  
R resolver is applied to an amplifier (to which are also applied the autostabilization signals) (Ref. 22-22-00).

As for the elevons, the electrical control channels are operated from a common unit, placed on the overhead panel in the flight compartment.

The ICOVOL indicator (Flight Control Surface Position Indicator) on the First Officer's instrument panel, provides the crew with information on the position of the rudders and the control channel which is in operation.

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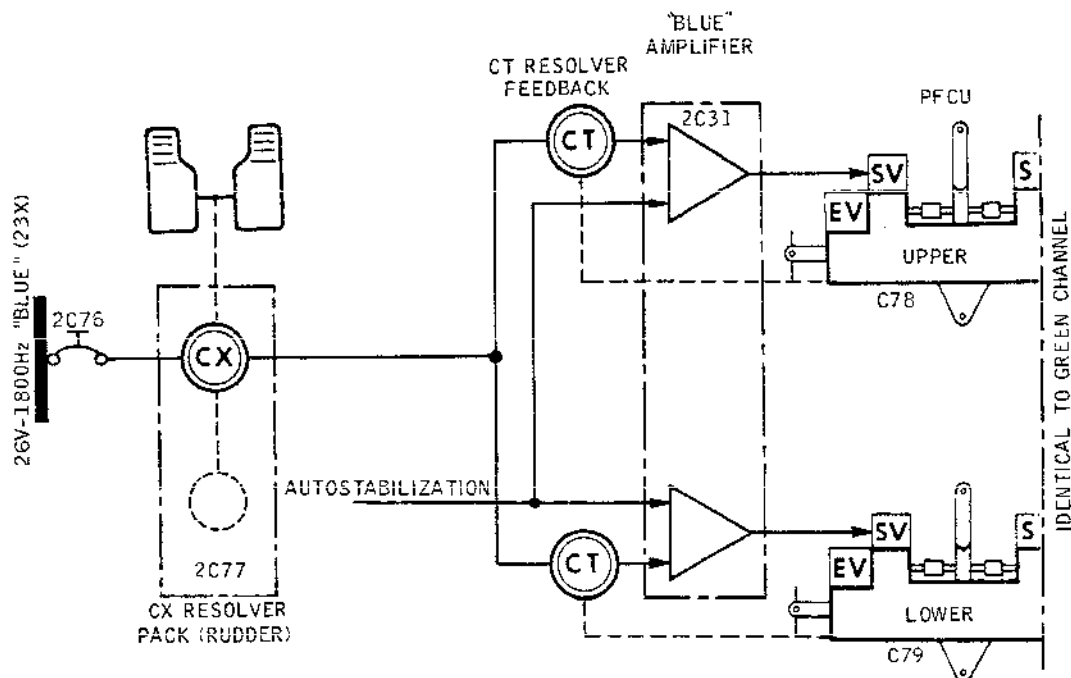
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CORRESPONDENCE	
CHANNELS	
GREEN	BLUE
1C76	2C76
1C77	2C77
1C31	2C31
22X	23X

Composition of Rudder Blue Electrical Control Channel (Identical to Green Channel)  
Figure 002

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### 3. Synchro Pack - Yaw Control (Ref. Fig. 003 )

R The CX resolver of each channel is contained in a single unit  
R including a further CX resolver which is used for the monitor-  
ing channel associated with the control CX resolver  
(Ref. 27-27-00).

These two single units are mounted opposite each other on the  
two opposing flanges of a frame known as the yaw "synchro  
pack".

R This facilitates control by a link actuated by the linkage of  
the rudder bar.

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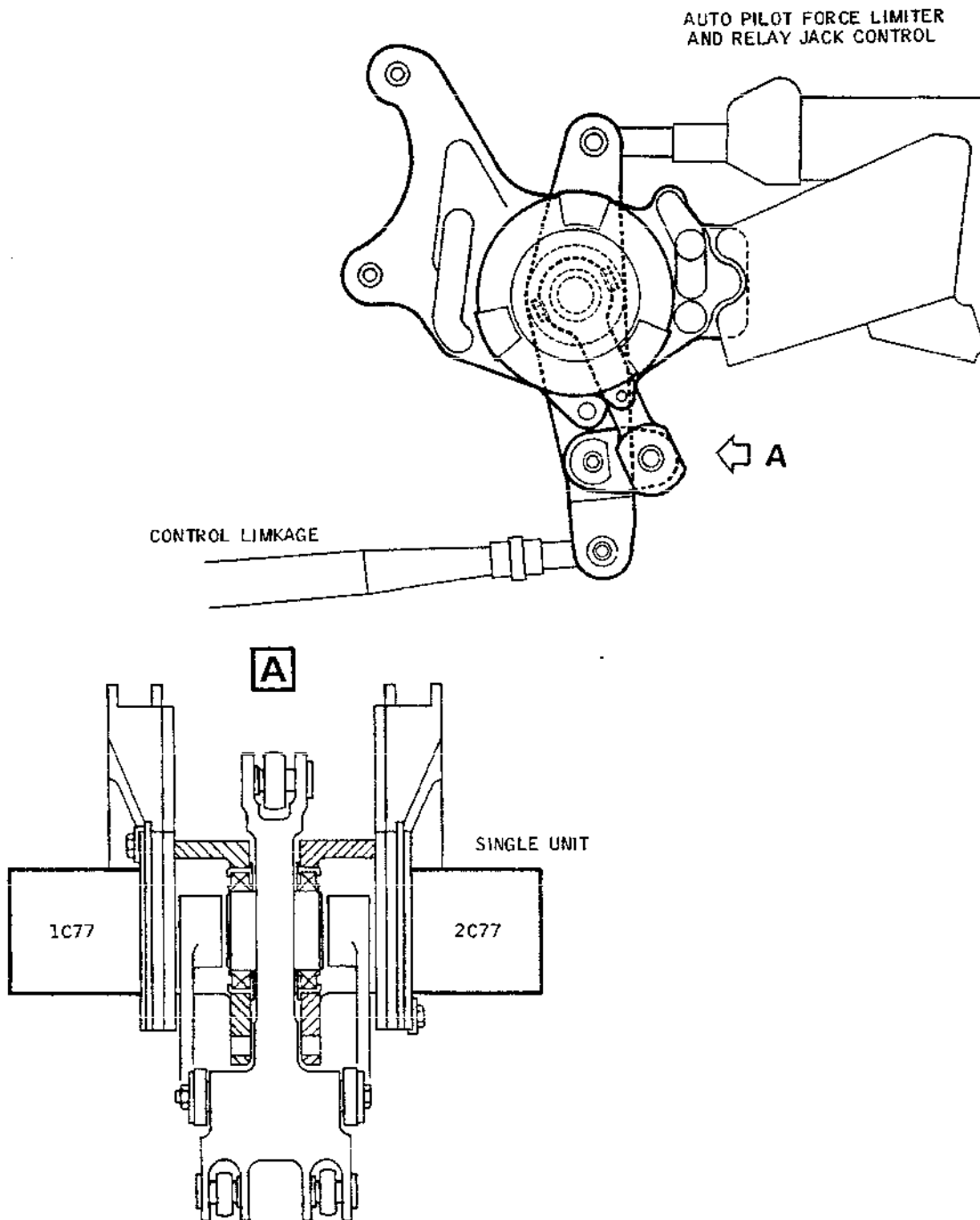
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CMA 27 26 00 0 AEM0

Rudder Synchro Pack  
Figure 003

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### 4. CT Receiver Resolvers on Servo-Controls

- R The CT resolver of the blue control channel and that of the green control channel are mounted in a unit integral with the body of each PFCU.

This unit also contains a resolver for the ICOVOL indicator, and two resolvers used for the monitoring system (Ref. 27-27-00)

The spindles of these resolvers are actuated simultaneously during movement of the body of the PFCU by a rod and lever system one of the ends of which is attached to the aircraft structure.

### 5. Amplifiers

- R Each of the blue and green servo valves of each PFCU for the upper and lower rudders is powered by an amplifier, the input signals of which are the output signals of each of the 4CT  
R resolvers (1 Blue and 1 Green for each of the two PFCUs).

- R The two Blue amplifiers and the two Green amplifiers are grouped  
R with the six Blue amplifiers and the six Green amplifiers connected to the PFCUs of the elevons.

The 8 Blue amplifiers and the 8 Green amplifiers are respectively installed in the Blue and Green auto-stabilization computers (2C31) and (1C31).

### 6. Panel - PFCU Control and Monitoring (Flight Control Unit) (Ref. Fig. 004 )

This unit, which is common to the elevons and the rudders, is situated on the overhead panel.

- R It includes the 26 V - 1800 Hz generation (Ref. 27-25-00), control elements.

The RUDDER selector switch has three positions : BLUE, GREEN and MECH, and in the BLUE position the Blue electrical channel has control in normal operation.

The GREEN and MECH positions are used to confirm the automatic operation of the Green control channel or that of the mechanical mode after detection by the monitoring channels (Ref. 27-27-00) of a defect in the Blue control channel, or the Green channel. A RESET push-button, located to the right of the control switch must be used to return to the Blue channel when a fault which has led to a change of channel has disappeared.

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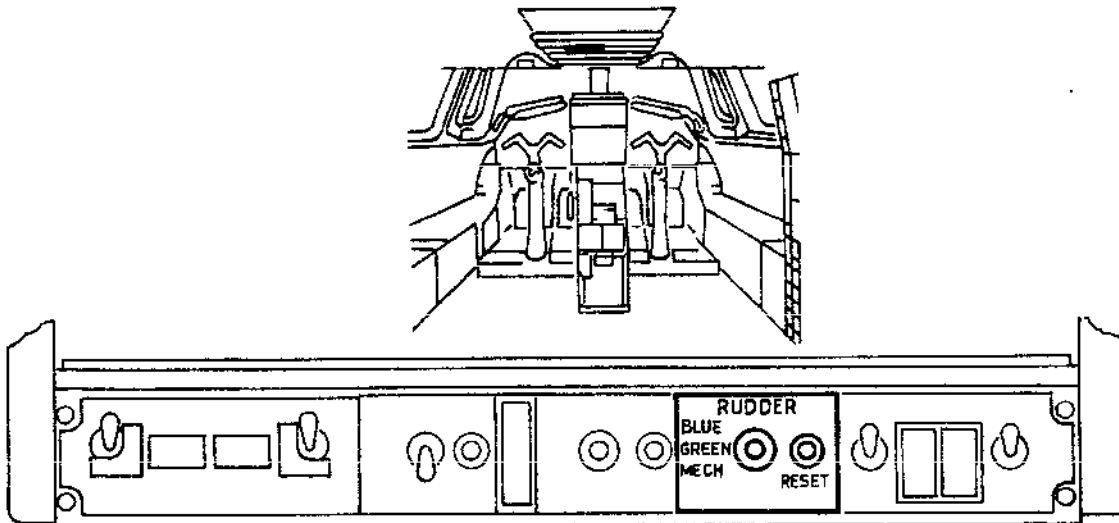
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CMA 27 26 00 0 AGM0



PFCU Control and Monitoring Panel (Flight Control Unit)  
Figure 004

- R 7. Indicator - Flight Control Surface Position.  
R (ICOVOL indicator)  
(Ref. Fig. 005 )

Located on the First Officer's instrument panel, the ICOVOL indicator gives the crew the following information :

- position of each rudder,
- control channel (Blue, Green or mechanical) in operation,
- light signal indicating a change of control channel occurring when the angle of deflection of the rudders differs by  $2^{\circ}75$  from the order given by the rudder bar,
- light signalling on detection of vibration in the rudders,
- two graduated horizontal scales enabling the extent and direction of deflection of the rudders to be checked.

Each pointer is driven by a resolver inside the ICOVOL indicator. The input signals applied to this resolver come from a resolver (associated to the ICOVOL indicator) located in the

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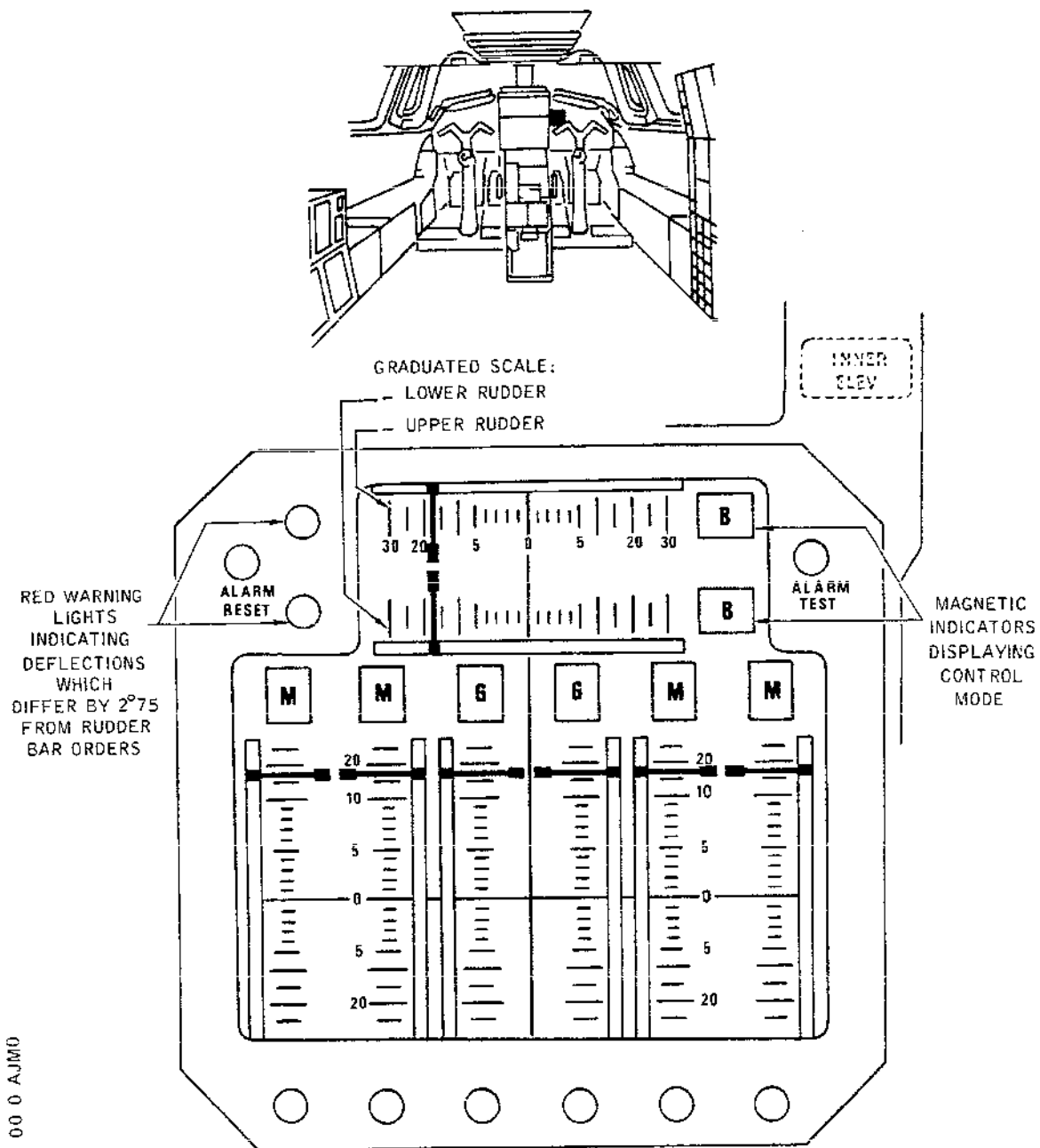
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CMA 27 26 00 0 AJM0

View of the Icovol Indicator  
Figure 005

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resolver unit integral with corresponding PFCU.

These resolvers are the only ones within the system to be powered by a 26 V - 400 Hz.

- two magnetic indicators indicate the control channel in operation (white letter B on blue background, white letter G on green background, or white letter M on red background). This information is always identical for both rudders,
- when the angle of deflection of the rudders differs by 2°75 from the order given by the rudder bar, the two red lights (situated at the end of the graduated scales) light up at the same time as the magnetic indicators indicate the control channel replacing the previous one. (Ref. 27-27-00),
- if vibration in excess of 8 Hz is detected on the rudders, the red lights flash at a frequency of approximately 2 Hz.
- an ALARM/TEST push-button enables the correct operation of the warning lights and the various internal parts of the ICOVOL indicator to be checked.

When this button is depressed, all the red lights on the ICOVOL indicator flash.

When it is released, the red lights remain illuminated,

- an ALARM RESET push-button enables the red lights to be extinguished, either after a change of channel which has caused some of them to illuminate, or after the ALARM TEST button has been operated.

### 8. Electrical Supply

The resolvers of the synchro detection channel of the ICOVOL are supplied with 26V - 400Hz.

The resolvers of each channel are supplied from a 26V - 1800Hz bar associated with the channel.

In the same way these bars supply the amplifiers of each channel. The following table gives the distribution of these bars in the various circuit breaker panels.

SERVICE	BUS BAR	C/B PANEL
Blue control channel amplifier and resolver supply	B.FLYING CONTROL 26VAC 1800Hz PFC52 - 23X	2-213
Green control channel amplifier and resolver supply	A.FLYING CONTROL 26VAC 1800Hz PFC51 - 22X	2-213
ICOVOL Synchro detection channel supply	26VAC - A ESS - 14X 28VDC - A ESS - 3P	2-213 1-213

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### ELECTRICAL CONTROL CHANNELS - TROUBLE SHOOTING

#### 1. General

This trouble shooting being common to the three sections (Roll, Yaw and Pitch), it is dealt with only once.

Refer to topic 27-16-00, Trouble Shooting

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### ELECTRICAL CONTROL CHANNELS - ADJUSTMENT/TEST

R 1. General

R Adjustment/Test of electrical control channels is described in  
R 27-16-00, Adjustment/Test :

R 1. Operational Test

R A. Flight Control System Test

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### SYNCHRO PACK - REMOVAL/INSTALLATION

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

Synchro packs transmit electrical orders to Power Flight Control Units (PFCU). They are located in zone 121 and access can be gained through panel 121FB.

#### 2. Synchro Pack

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins - Synchro Pack	D925252000
Rigging Template - Integral Trim	D921250000
Circuit Breaker Safety Clips	
Access Platform 3.22 m (10 ft. 7 in.)	

##### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.

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- (2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RUDDER MON BLUE SUP	2-213	2C 49	D 3
RUDDER BLUE 26V 1800HZ		2C 76	D 4
CONT SUP			
RUDDER MON GRN SUP		1C 49	G 3
RUDDER GRN 26V 1800HZ CONT		1C 76	H 6
SUP			

- (3) Make certain that yaw trim control is in zero position.
- (4) Open access panel 121DB and immobilize yaw artificial feel lever with equipment D921250000.
- (5) Open access door 151DB and depressurize the Green, Blue and Yellow hydraulic systems.

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT, PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (6) Open access panel 121FB allowing access to the synchro packs.
- (7) Remove AP force limiter (5) (Ref. 27-21-16, Removal/Installation).

### C. Remove

- (1) Disconnect electrical connectors and loosen clamps attaching wire bundle to chassis.
- (2) Remove cotters and unscrew nuts (6) ; remove washers (7) and bolts (8). Disconnect rods (9).

NOTE : For removing or installing attachment bolts, it

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is necessary to press plunger on head of bolt to free the locking system balls.

- (3) Remove cotters and unscrew nuts (10) ; remove washers (11) and bolts (12) : note the positions of the bolts.
- (4) Remove cotter and unscrew nut (1) ; remove washer (2).
- (5) Unscrew bolt (4).
- (6) Support synchro pack and remove bolts (3) and (4) ; note their position and remove synchro pack (13).

CAUTION : THIS COMPONENT MUST BE HANDLED WITH CARE.

### D. Preparation of Replacement Component (Ref. Fig. 402 )

Proceed with the following checks on replacement synchro pack.

- (1) Check that clearance B between input lever (21) and links (20) is within the following limits :  
Theoretical clearance : 3 mm (0.1181 in.)  
Minimum clearance : 0.508 mm (0.020 in.)
- (2) Check that clearance C between rods (22) and links (20) is not less than 0.381 mm (0.015 in.).

### E. Install

- (1) Position synchro pack (13) and install bolts (3) and (4) in their initial position. Install washer (2) and tighten nut (1). Torque to between 45 and 50 lbf. in. (0.52 and 0.56 m.daN). Safety with cotters.
- (2) Tighten bolt (4). Torque to between 125 and 136 lbf. in. (1.38 and 1.50 m.daN).
- (3) Install bolts (12) in their initial positions ; install washers (11) and tighten nuts (10). Torque to between 45 and 50 lbf. in. (0.52 and 0.56 m.daN)
- (4) Immobilize synchro pack in zero position by means of rigging pin D925252002.
- (5) Connect rods (9) ; install bolts (8), washers (7) and tighten nuts (6). Torque to between 27 and 32 lbf. in. (0.30 and 0.36 m.daN). Safety with cotters. If necessary adjust length of rods until they can be easily

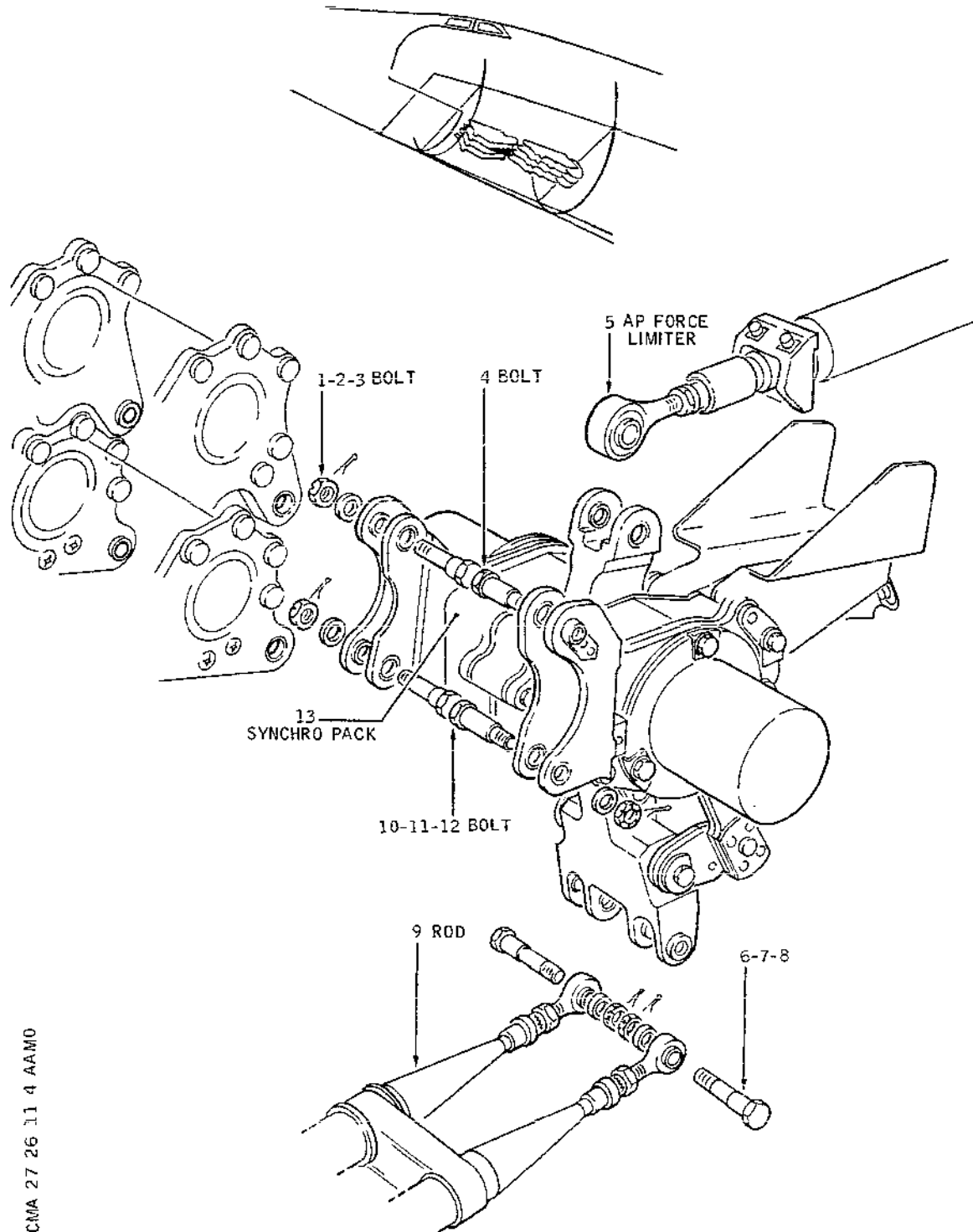
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Synchro Pack  
Figure 401

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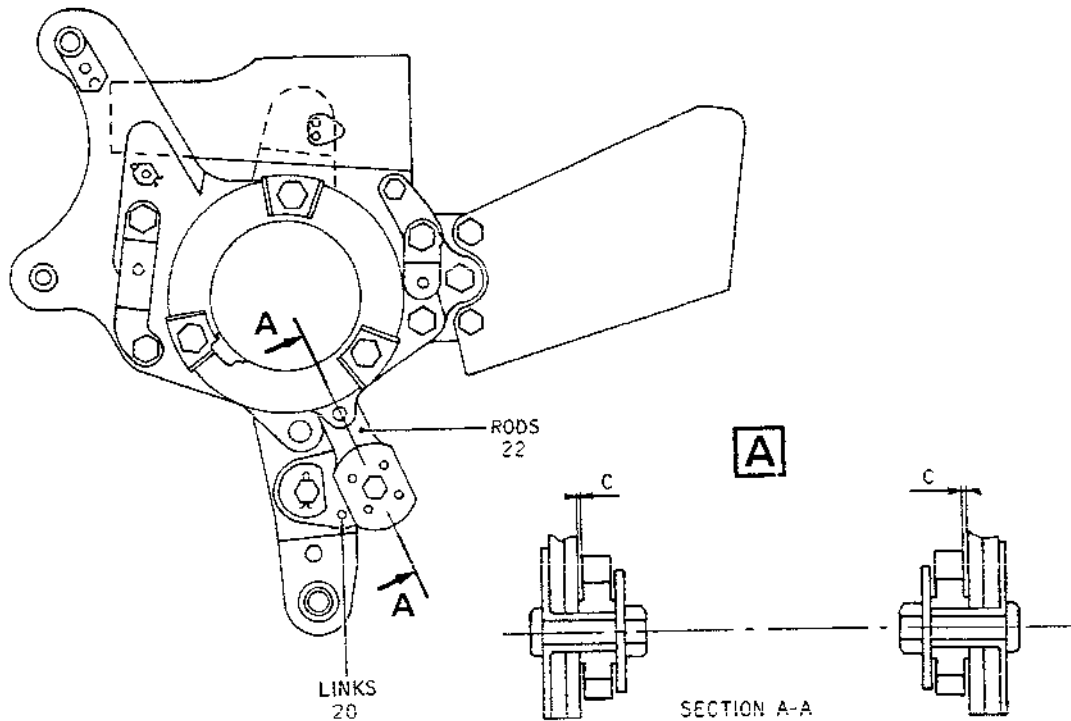
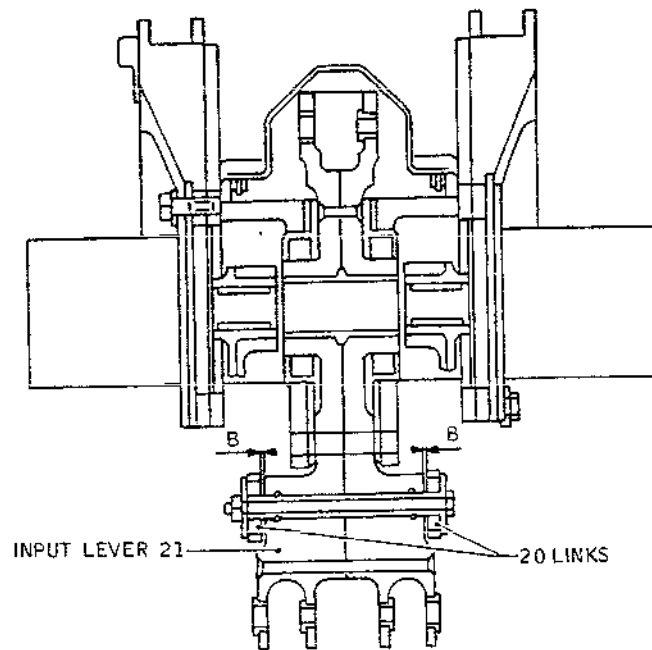
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Synchro Pack Assembly  
Figure 402

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connected.

- (6) Connect AP force limiter (5) (Ref. 27-21-16, Removal/Installation).
- (7) Tighten clamps attaching wire bundle to the chassis and connect electrical connectors.
- (8) Remove rigging pin D925252002. Make certain that it can be removed freely. If necessary proceed with a further adjustment of rod length.
- (9) Remove equipment D921250000.
- (10) Remove warning notices
- (11) Remove safety clips and tags and set the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER		MAP REF.
RUDDER MON BLUE SUP	2-213	2C	49	D43
RUDDER BLUE 26V 1800Hz		2C	76	D 4
CONT SUP				
RUDDER MON GRN SUP		1C	49	G 3
RUDDER GRN 26V 1800Hz		1C	76	H 6
CONT SUP				

### F. Tests

- (1) Carry out an operational test (Ref. 27-26-00, Adjustment/Test).
- (2) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### F. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access doors and panels 121DB, 151DB and 121FB.
- (3) Remove access platform.

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### SYNCHRO PACK - INSPECTION/CHECK

#### 1. General

The purpose of the following procedure is to check the yaw channel synchro pack.

#### 2. Synchro Pack

##### A. Equipment and Materials

DESCRIPTION	PART NO.
-------------	----------

Access Platform 3.672 m (12 ft)

##### B. Prepare

- (1) Open door 121FB, giving access to synchro pack.

##### C. Check

- (1) Check AP force limiter attachment to synchro pack bellcrank for absence of end play.
- (2) Check synchro pack attachment to structure for absence of end play.
- (3) Check twin rod attachment to synchro pack bellcrank for absence of end play.
- (4) Check electrical routing attachment on the unit.

##### D. Tests

##### E. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close door 121FB.
- (3) Remove access platform.

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### ELECTRICAL MONITORING CHANNELS - DESCRIPTION AND OPERATION

#### 1. General

##### A. Purpose

Two electrical monitoring channels (Blue channel and Green channel) are associated with the control channels. The purpose of the monitoring channel is to detect a fault in the associated control channel and to cause a channel change-over (This channel change-over only affects the associated control surface assembly : rudders in this case) The faults likely to affect a control channel are due to :

- faulty operation of electric or electronic components resulting in failure of rudders to achieve the order given by the rudder pedals.
- pressure drop of hydraulic system associated with the control channel in operation.
- a fault in the 26 V 1800 Hz generation network associated with the control channel in operation.

In the first case :

The Blue monitoring channel is operative when the Blue control channel operates : if the latter is faulty, the monitoring channel closes the Blue electrovalves and opens the Green electrovalves of the rudder PFCU's.

In the other two cases :

The monitoring channel closes the Blue electrovalves and opens the Green electrovalves of all PFCU's.

The Green monitoring channel is operative when the Green control channel operates : if the latter is faulty, the monitoring channel closes the Green electrovalves (The Blue ones being closed).

The electrical channels are then inhibited and the PFCU's are actuated in mechanical mode.

##### B. Principle

- In the event of a pressure drop in the Blue or Green hydraulic system, or a fault in the Blue or Green 26V, 1800Hz generation network, the Blue (or Green) monitoring channel closes the Blue (or Green) electrovalves on the 6 elevons and the 2 rudder PFCUs. The closing order is transmitted through the static monitoring change-over circuits controlled by :
  - The Blue or Green hydraulic system low pressure switches
  - The fault relay of the Blue or Green 26V, 1800Hz generation network.(At the same time, the Green electrovalves open if the Blue channel in operation is faulty).

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- In the case of a discrepancy between the position of one (or both) rudders and the position of the rudder pedals, the Blue and Green electrovalves on the PFCUs, (upper and lower rudder) close.  
However a  $2^{\circ} 75$  tolerance is permissible.
- The detection of any angular discrepancy is achieved by a synchro detection channel consisting of a transmitter resolver (CX) driven by the pedal assembly and which sends its output signal to the two detector resolvers (CT), each of which is driven by a PFCU.  
If the CT resolvers and consequently the PFCU are in the same position as the CX resolvers, there is no signal at the terminals of these CT resolvers.  
If at least one CT resolver is in a different position to that of a CX resolver, a signal is generated at the CT resolver terminals.  
The signal is fed to a comparator which controls a channel change-over by sending a signal to the static monitoring change-over unit. This unit causes the Blue electrovalves to close and the Green electrovalves to open if the Blue control channel is in operation, (or the closure of the Green electrovalves with the Blue valves remaining closed if the Green channel is in operation).

### C. Application of Principle (Ref. Fig. 001 )

The deflection of the rudder pedal assembly drives the rotor of a CX resolver for each channel. Each is supplied with 26 V 1800 Hz from the generation network associated with the channel.

- The CX output signal is applied to each of the two CT stators in parallel, the rotors of which are driven by the displacement of the upper and lower rudder PFCUs.  
If the displacement of the two PFCUs conforms to that "ordered" by the pedal assembly, there is no signal at the CT resolver output terminal.  
If the displacement of at least one of the PFCUs is incorrect (with respect to the pedal position), a signal is generated at the terminals of the corresponding CT resolver.
- This signal is applied to a comparator which checks that the signal is within the  $2^{\circ} 75$  tolerance permitted between the angle of deflection of the pedal assembly and the angle of rudder deflection (corresponding to a given PFCU displacement).
- If the signal is above tolerance, a switching signal is sent to the static monitoring change-over unit. This

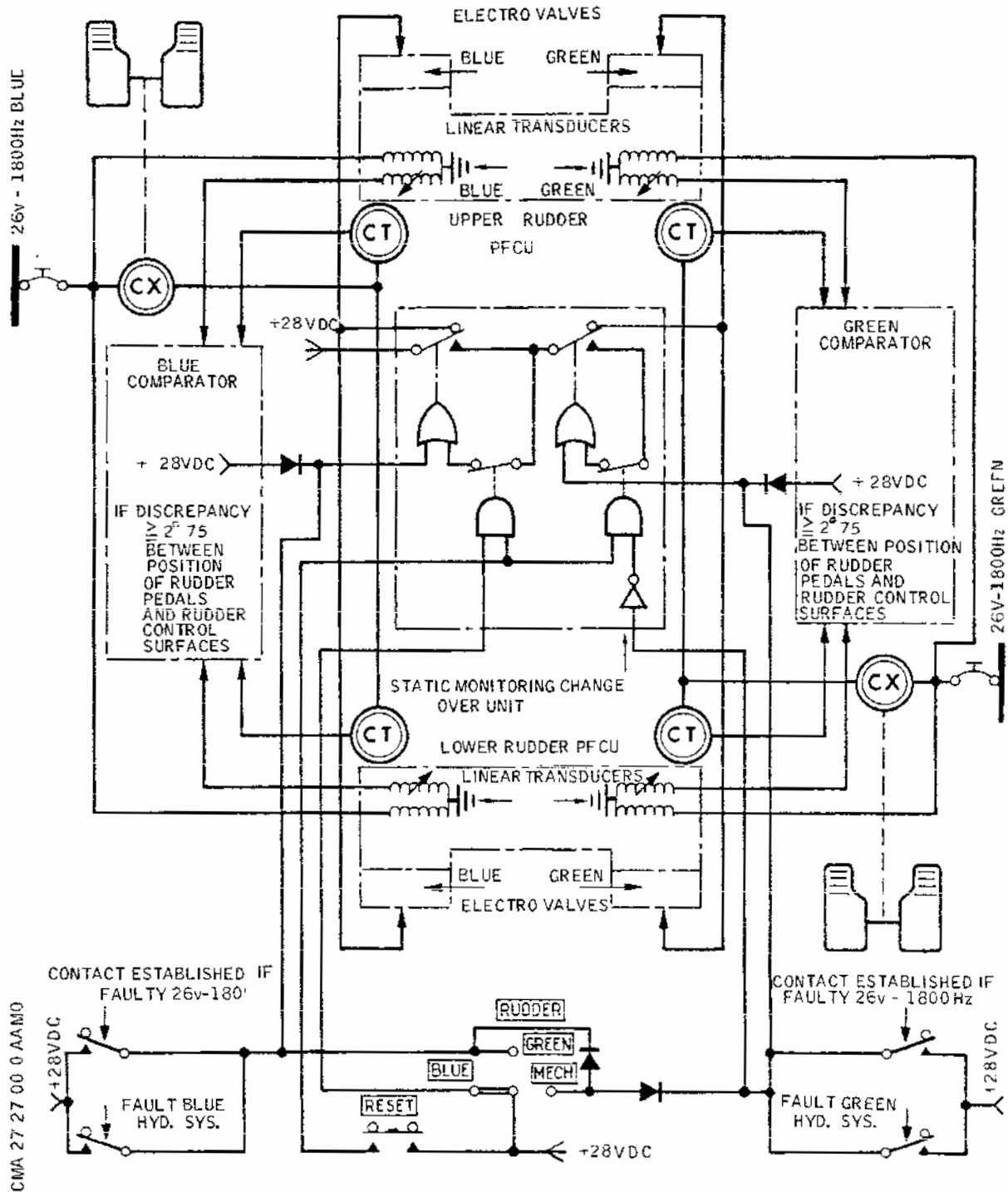
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Rudder Surfaces - Control Channel Switching  
Effected by Monitoring Channels  
Figure 001

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unit closes the Blue (or Green) electrovalves of the two rudder PFCUs, and, at the same time opens the Green electrovalves (if the faulty control channel is the Blue channel).

### 2. Description (Ref. Fig. 002 )

#### A. Monitoring Channel Make-Up

The monitoring channel mainly consists of a detection channel (composed of resolvers), comparators and a static monitoring change-over unit enabling the necessary switchings for control channel change-over.

The rudder monitoring channel, (detecting discrepancies between rudder pedal and actual rudder positions) consists of components (resolvers) similar to those of the corresponding control channel. The CX resolver of each channel is located in a single unit (which also contains the CX resolvers of the associated control channel).

The two single units are mounted on a rudder resolver pack. The output signal of each monitoring CX resolver is applied in parallel to the CT resolver of the monitoring channel, which is located in the housing integral with the upper rudder PFCU; and to the monitoring CT of the lower rudder PFCU.

If the position of at least one of the two rudders does not correspond to pedal deflection, the signal then present at the terminals of the corresponding CT resolver is applied to the rudder stage of the monitoring comparator.

This stage checks that the signal from the CT resolver of the faulty channel indicates a discrepancy between rudder and pedal position above the 2° 75 tolerance.

If this is the case, a switching order is sent to the rudder stage of the static monitoring change-over unit.

From this stage the signal is sent to close the electrovalves of the faulty channel (open the Green electrovalves if the faulty channel is the Blue channel).

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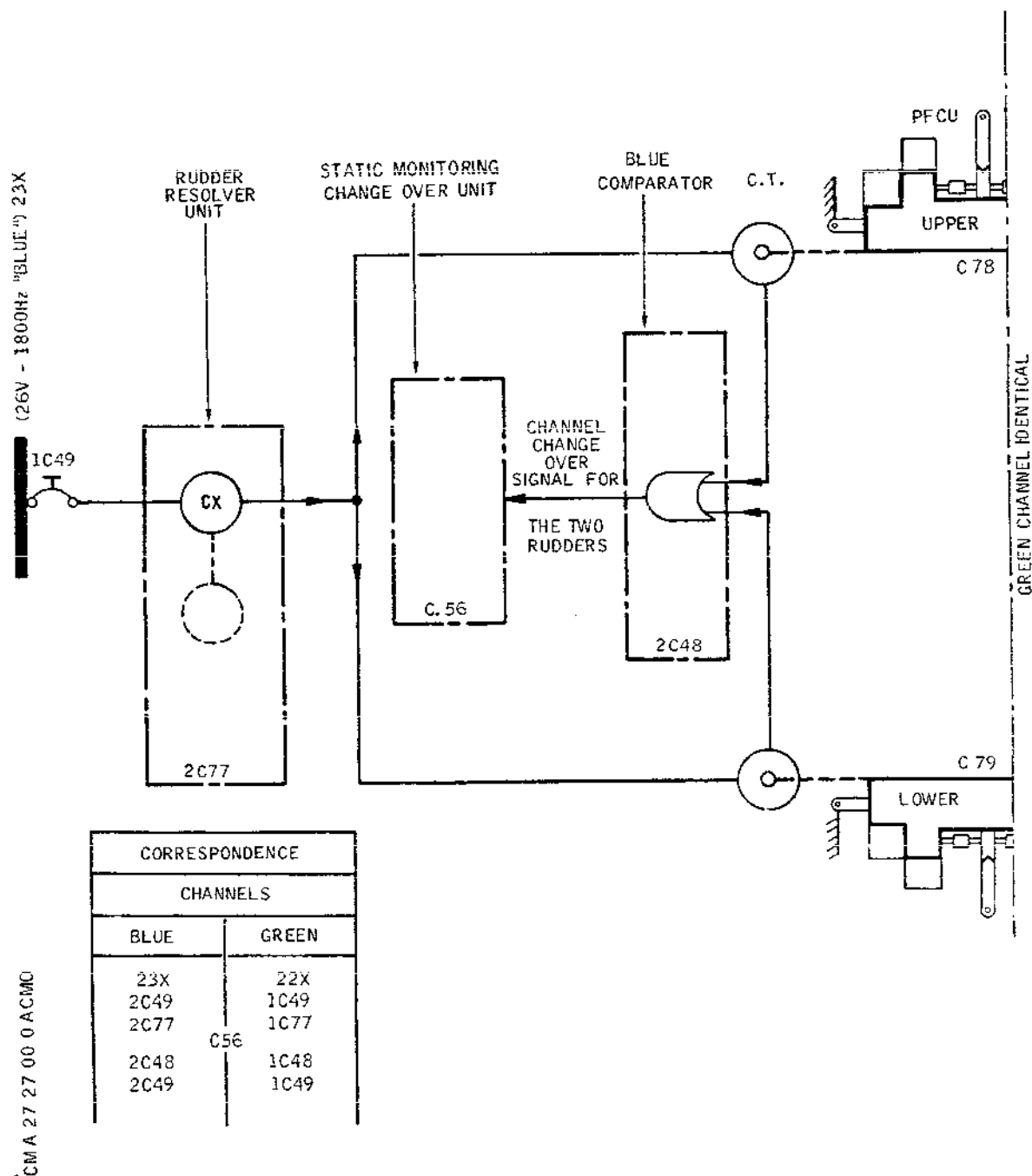
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Blue Monitoring Channel Diagram -  
(Green Channel Identical)  
Figure 002

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### B. Controls and Indicating

A control channel change-over induced by the associated monitoring channel is signalled by :

- Operation of the gong
- A change in indication of the two magnetic indicators of the ICOVOL (on First Officer's instrument panel) corresponding to the rudders.  
In addition, if this channel change-over follows the detection of a difference between the order, (deflection of the rudder pedals), and execution of that order, (corresponding deflection of the rudders), the two red lights (situated at the end of the rudder deflection scales of the ICOVOL) illuminate. (These red lights remain extinguished if the channel change-over follows a drop in hydraulic pressure or a low-voltage supply failure).
- Illumination of the PFC warning light on the master warning panel (the HYD warning light will also come on if there is a loss of hydraulic pressure).  
If the fault which caused a control channel change-over disappears, it is possible to return to the Blue control channel.  
To do this, the RUDDER selector switch on the Flight Control Unit must be placed in BLUE position, and the RESET push-button, located on the RH side of the selector switch must be depressed.  
Moreover, if vibrations above 8 Hz are detected on a rudder, the two red warning lights, (corresponding to the two rudders) on the ICOVOL indicator, flash at a frequency of 2 Hz approximately.

### 3. Resolvers

#### A. Rudder Synchro Pack (Ref. Fig. 003 )

The CX resolver of each channel is located in a single unit.

Each single unit also contains a second CX resolver assigned to the associated control channel.

These two single units, (the Blue unit and the Green unit), are mounted facing each other on the opposing flanges of the rudder synchro pack chassis.

This configuration enables the two groups of resolvers to be driven by a link actuated by the rudder pedal control linkage.

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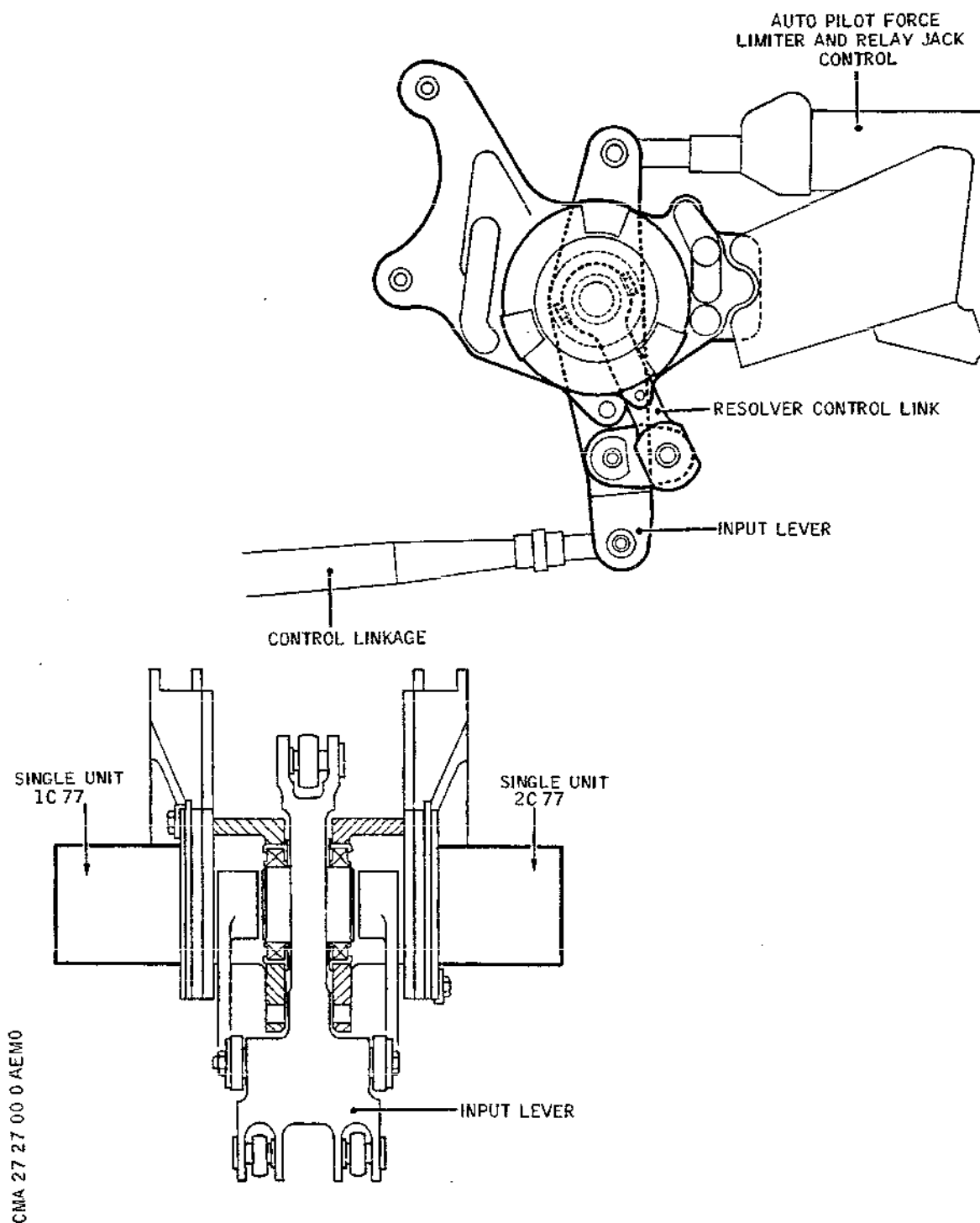
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Rudder Synchro Pack  
Figure 003

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### B. CT Resolvers on PFCUs

R The CT resolvers of the Blue monitoring channel and that  
R of the Green channel are grouped together in a unit integral  
R with the body of each of the two PFCUs.

R Each unit also contains a position transmitting resolver,  
R assigned to the ICOVOL indicator and the two CT resolvers  
R of the Blue and Green control channels.

R The spindles of these resolvers are simultaneously actuated  
R when the body of the PFCU moves by a rod and lever system.  
R The end of the rod is attached to the aircraft structure.

### 4. Transducer-Linear Displacement

R For each PFCU, a linear displacement transducer is associated  
R with each Blue and Green monitoring channel.

R A linear displacement transducer is an inductance, the value of  
R which varies according to the corresponding spool valve dis-  
R placement.

The main purpose of the linear displacement transducer is :

- R - to anticipate a control channel change-over during the de-  
R tection of a variation, equal to or greater than 2°75, bet-  
R ween deflection of rudder pedals and position of rudders.
- R - to prevent a control channel change-over in the event of a  
R variation between rudder pedal and rudder positions due to  
R excessive aerodynamic loads on rudders.

### R 5. Comparators R (Ref. Fig. 004 )

R A monitoring comparator is assigned to each channel.  
R The Blue comparator (2 C48) is located on shelf 8-216 and the  
R Green comparator (1 C48) on shelf 8-215.

R Each comparator controls channel change-over : the Blue com-  
R parator causes the change-over from Blue channel to Green chan-  
R nel. The Green comparator from Green channel to mechanical  
R mode.

R Each comparator contains electronic cards :

- R - some adapt the aircraft 28VDC voltage to the supply of the  
R cards in the comparator.
- R - others modulate the autostabilization signals by a 1800 Hz  
R signal. These signals are then applied to the comparison  
R cards, where they are summed with the CT resolver and the

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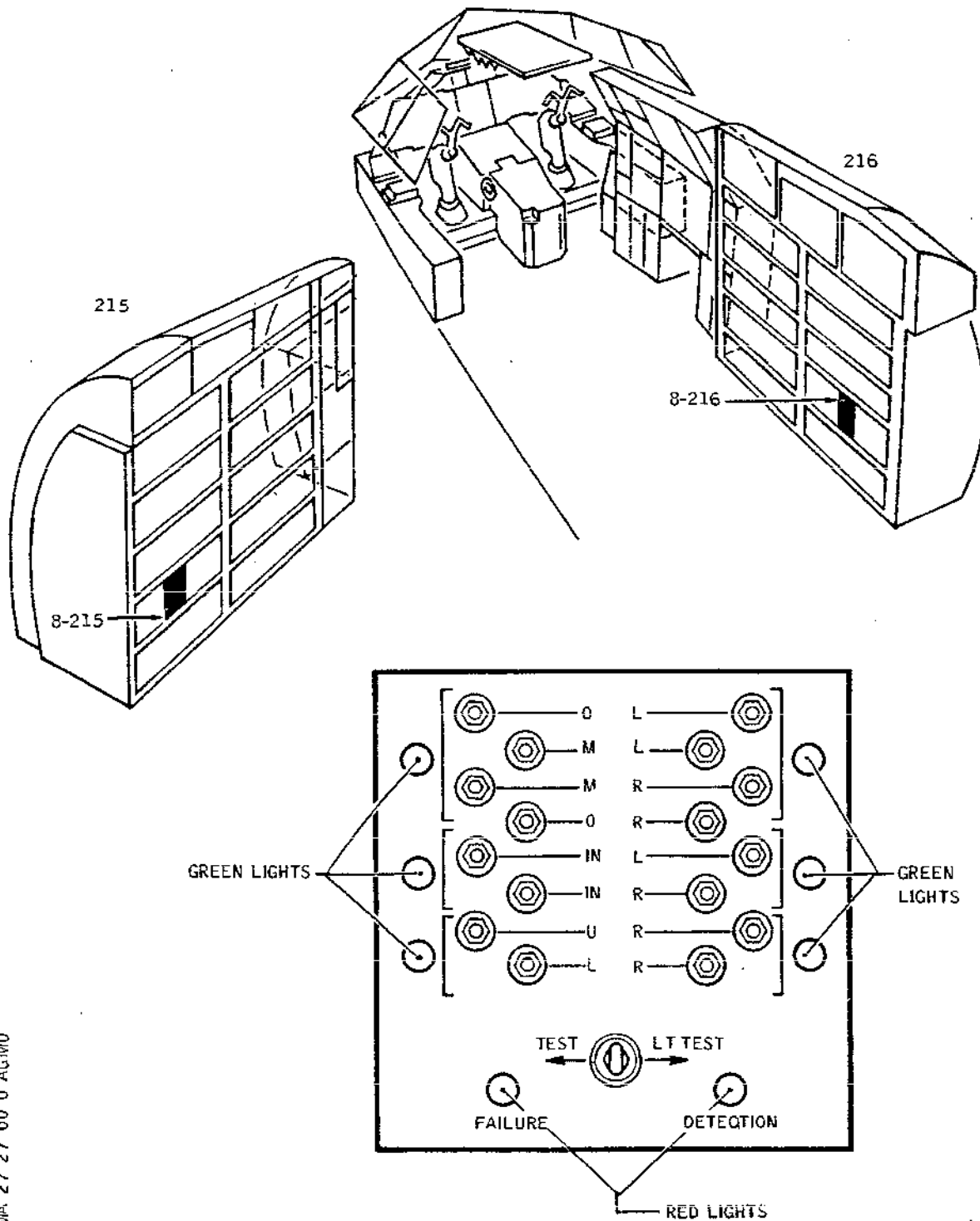
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Comparator - Location - Front View  
Figure 004

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linear transducer signals.

- 4 comparison cards : (each computer contains 16 comparison cards). Two of them are assigned to each rudder. One card would be sufficient, but as a safety measure a second is provided in case the first does not detect the fault. Each of these cards sums the CT resolver signal, the autostabilization signal and the linear transducer signal. If the resulting signal is greater than that (generated by each card) which would correspond to a variation of  $2^{\circ}75$  (deviation tolerance), a control channel change-over signal is sent to the static monitoring change-over unit. This unit then closes the blue electrovalves of the upper and lower rudder PFCU's (and opens the green electrovalves if the Blue control channel is in operation).

Inside the indicating unit installed on the front panel of the comparator are arranged the following items :

- Six Green indicator lights associated with 16 push buttons
  - A three-position switch with a self-holding intermediate position and two manually-held TEST and LT TEST positions
  - One red FAILURE and one red DETECTION warning light
  - Two Green indicator lights and four push buttons are associated with the rudders.
- A visual check of the lights before and after pressing the push buttons determines whether the control channel change-over is due to a comparator fault or to the malfunction of another monitoring channel component.
- When the switch is placed in LT TEST position, all lights must illuminate.
  - With switch held in TEST position, press successively each of the four push buttons to check the operation of both comparison cards associated with each rudder. When card operation is correct, the LH or RH green indicator light corresponding to rudders must illuminate.

### 6. Change-Over Unit - Static Monitoring (Ref. Fig. 005 )

The purpose of this unit is to close the Blue or Green electrovalves of the two rudder PFCUs when it receives signals from :

- The Blue or Green comparators
- The PFCU Blue or Green jam detection microswitches
- The Blue or Green hydraulic system low pressure switches
- The Blue or Green inverter protection units.

In the two last cases above, the channel change-over is effective on the 6 elevon PFCUs as well as the 2 rudder PFCUs.

This unit (C56) is located on shelf 8-216 ; it consists of 14 electronic cards, 8 of which are used for the rudder :

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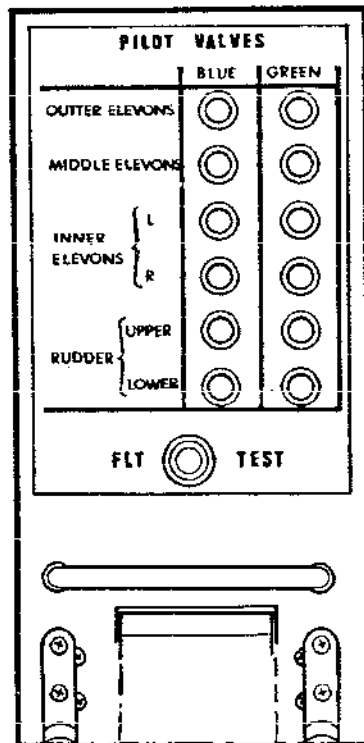
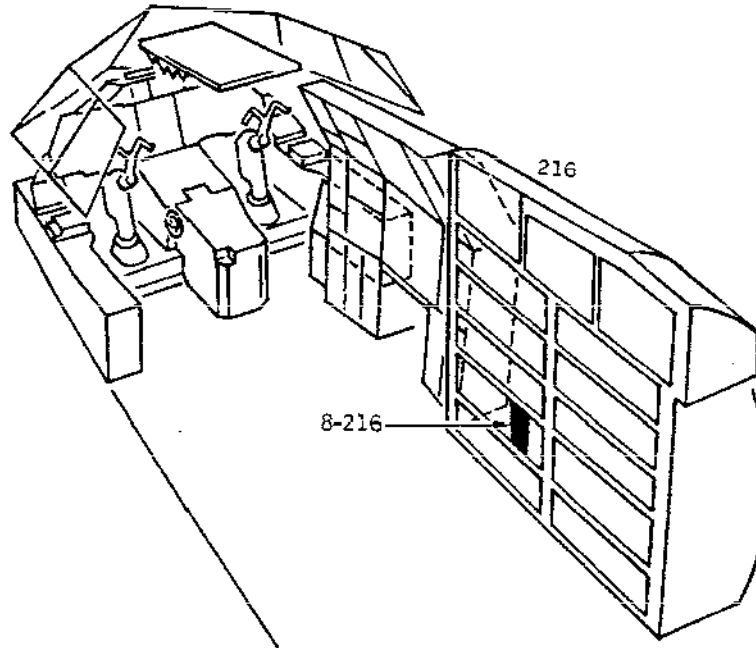
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Monitoring Change-Over Unit -  
Location - Front View  
Figure 005

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- A Blue power supply card
  - A Green power supply card
  - A Blue logic card
  - A Green logic card
  - A jam detection card
  - A power card
  - An ICOVOL card
  - An indicator light control card.
- The Blue and Green power supply cards receive a 28 VDC Blue and Green power supply respectively and adapt them for use in the other cards.
- Each logic card receives the fault signals previously mentioned and generates the output signals which are then applied to the power card, the ICOVOL card and the indicator light control card.
- Each power card generates the signal which controls the closing of the Blue electrovalves and the opening of the Green electrovalves of the rudder PFCUs, if the Blue channel is in operation ; or the closing of the Green electrovalves (the Blue electrovalves remaining closed) if the Green channel is in operation.
- From the ICOVOL card are sent the control channel change-over indicating signals (to magnetic indicators, and eventually, red warning lights).
- The indicator light control card causes the two indicator lights to illuminate thus indicating the opening of the Blue or Green electrovalves of the rudder PFCUs.
- These indicator lights are located in the indicating unit on the front face of the unit. Ten other indicator lights indicate Blue or Green elevon PFCU electrovalve opening.
- A test push-button, positioned close to these indicator lights, enables the indicator light filaments to be checked.

### 7. Indicator - Flight Control Surface Position (ICOVOL) (Ref. Fig. 006 )

The ICOVOL indicator, located on First Officer's instrument panel gives the crew information on :

- Which control channel is in operation, (by examination of the two magnetic indicators corresponding to the rudders). These indicators display "B" if the Blue monitoring channel detects no fault in the Blue control channel. The indicators display "G" if the Blue monitoring channel, after detecting a fault in the Blue control channel, has caused a channel change-over from Blue to Green.

If there is a further fault in the Green control channel, the Green monitoring channel changes the control channel : from Green to mechanical mode. The magnetic indicators then

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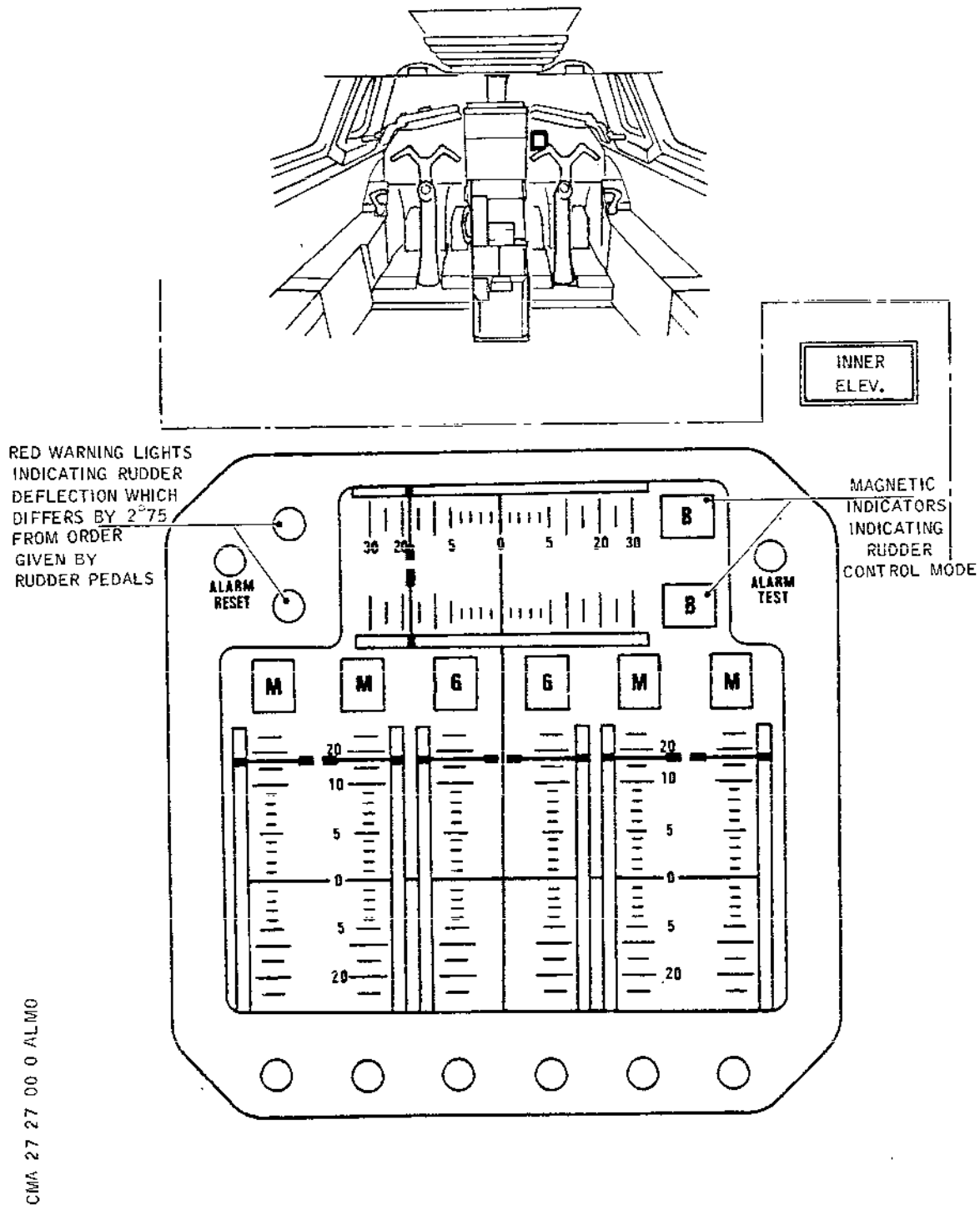
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View of ICVOL Indicator  
Figure 006

R

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display "M".

- R - The fact that channel change-over has been caused by a deflection of the rudders which differs from that called for by the rudder pedals. In this case, two red lights located at the end of the rudder deflection scales illuminate.
- R - The presence of rudder vibrations at a frequency greater than 8 Hz.
- R In this case the two corresponding red warning lights flash at a frequency of approx. 2 Hz.

### 8. Electrical Supply

- R The resolvers in each Blue or Green monitoring channel are powered by 26VAC, 1800Hz busbars.
- R The Blue and Green comparators and the static monitoring change over unit are powered by two 28VDC busbars.
- R The resolvers in the ICOVOL synchro detection channel are powered by a 26VAC, 400Hz busbar.
- R The ICOVOL indicator also receives a 28VDC power supply.
- R The following table gives the various locations of the busbars in circuit breaker panels.

SERVICE	BUSBAR	C/B PANEL
ICOVOL indicator	"A" ESSENTIAL, 28VDC, 3P	1-213
Green comparator and static monitoring change over unit	"A" ESSENTIAL, 28VDC, 3PS	1-213
Resolvers in Green monitoring channel	"A" FLYING CONTROL, 26VAC, 1800Hz, 22X	2-213
Resolvers in Blue monitoring channel	"B" FLYING CONTROL, 26VAC, 1800Hz, 23X	2-213
Resolvers in ICOVOL channel	"A" ESSENTIAL, 26VAC, 400Hz, 14X	2-213
Blue comparator and static monitoring change over unit	"B" ESSENTIAL, 28VDC, 4PS	5-213

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### ELECTRICAL MONITORING CHANNELS - TROUBLE SHOOTING

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEAR POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN 24-00-00, SERVICING.

#### 1. General

A. The following trouble shooting is common to the control and monitoring channels of yaw axis. It groups all "perceptible" faults of yaw electrical channels ; "concealed" faults are dealt with by means of the Flight Controls test set (P/N 31-56-100) in 27-10-00, Trouble Shooting. This trouble shooting is carried out assuming that :

- Flight Control hydraulic systems are correct (if not, Ref. 27-14-00, Trouble Shooting).
- 26 Volt 1800 Hz generation system is correct (If not, Ref. 27-15-00, Trouble Shooting).
- Control surface position indicating circuit is correct (If not, Ref. 27-16-00, Trouble Shooting).
- Rudder mechanical controls operate correctly (If not, Ref. 27-21-00, Trouble Shooting).

B. The following information is intended to enable faults found on the ground or in flight to be quickly rectified. This information is given in the form of fault analysis synoptic charts.

The defect can be isolated with the aid of the trouble

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shooting procedures and traced through OK and NOT OK paths to the appropriate charts or other specified rectification action as may be necessary.

If a defect occurs perform the appropriate rectification action, then repeat the operation at which the defect was encountered to ensure the operation is OK.

Bracketed numbers in the procedures and charts indicate items on the component identification table (at the end of topic). The table provides information, including component location, required for rectification.

Aircraft wiring is assumed serviceable (If the component fault is not detected, check wiring in accordance with the Wiring Diagram Manual).

However, when trouble shooting procedure leads to component removals which imply long Removal/Installation operations and long grounding period (Servo controls for example) wiring faults are considered and checked.

### 2. Prepare

A. Carry out "Prepare" paragraph of Procedure to set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).

B. Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LAT ACCELMTR 1 26 V SUP	2-213	1C 42	A 4
AUTOSTAB 1 COMP SUP		1C 37	E 5
LAT ACCELMTR 2 26 V SUP	13-216	2C 42	B16
AUTOSTAB 2 COMP SUP		2C 37	D17

C. Take the precautions described in the previous WARNING paragraph.

D. Pressurize Blue and Green hydraulic systems (Ref. 29-12-00 and 29-11-00, Servicing).

E. On overhead panel, on Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in ON position : The corresponding FAIL warning lights must go off.

F. On overhead panel, on AUTOSTAB unit No.2, engage YAW switch.

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### 3. Trouble Shooting

\*\*\*\*\*  
 \* Check on Flight Control Surface Position indicator\*  
 \* (ICOVOL indicator) (First Officer's instrument \*  
 \* panel) that yaw magnetic indicators display M and \*  
 \* that rudder position indication corresponds to \*  
 \* zero. \*  
 \*\*\*\*\*

OK	NOT OK---	Refer to trouble shooting procedure for control surface position indicating circuit (Ref. 27-16-00, Trouble Shooting) after making certain that control surfaces are at zero. If not refer to mechanical channel trouble shooting (Ref. 27-21-00, Trouble Shooting).
----	-----------	--

\*\*\*\*\*  
 \* On overhead panel, on Flight Control Unit, place \*  
 \* RUDDER switch in BLUE position then press and \*  
 \* release RESET push-button located on RH side. \*  
 \* On ICOVOL indicator (First Officer's instrument \*  
 \* panel) the 2 rudder magnetic indicators \*  
 \* must display B. \*  
 \*\*\*\*\*

OK	NOT OK---	Reset impossible : On ICOVOL indicator the 2 rudder magnetic indicators still display M. Ref. Chart 101
OK	NOT OK---	Reset impossible with comparison warning : on ICOVOL indicator the 2 rudder magnetic indicators display G (or M) and the 2 red warning lights are illuminated. Ref. chart 102
OK	NOT OK---	Reset impossible : for any other indication on ICOVOL indicator refer to trouble shooting procedure for the control surface position indicating circuit (Ref. 27-16-00, Trouble Shooting).

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||  
OK  
||

\*\*\*\*\*  
\* Operate Captain's RUDDER PEDAL ADJUST handle \*  
\* (LH side console) then First Officer's handle \*  
\* (RH side console) and check that pedal adjustment \*  
\* is possible. \*  
\*\*\*\*\*

OK	NOT OK---	Pedal adjustment handle (Captain's or First Officer's) jammed. Ref. Chart 103
OK	NOT OK---	Movement of adjustment handle possible without displacement of pedals. Check "Teleflex cable" [11] jack locking control and replace it if required (Ref. Figure).

\*\*\*\*\*  
\* Operate Captain's or First Officer's handwheel and \*  
\* check on ICOVOL indicator that rudders \*  
\* deflect (to the right for a right turn order). \*  
\*\*\*\*\*

OK	NOT OK---	No co-ordination in turn configuration :neither rudder deflects. On shelf 8-216, on front panel of static monitoring change over unit (C56), confirm fault by checking that PILOT VALVES-BLUE-RUDDER UPPER and LOWER indicator lights are illuminated. Replace autostabilization computer No.2 (2C31) [2].
OK	NOT OK---	With rudders in Blue electrical mode, one fails to deflect. Ref. Chart 104
	NOT OK---	With rudders in Blue electrical mode, one of them lags. Ref. Chart 105

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||  
OK  
||

\*\*\*\*\*  
\* Operate rudder pedals from stop to stop and check \*  
\* on ICOVOL indicator that both rudders \*  
\* deflect accordingly, without applying abnormal \*  
\* loads to pedals, and that return to neutral is \*  
\* correct. \*  
\*\*\*\*\*

			Load applied is abnormal. Refer to mechanical channel trouble shooting : paragraph "resistance encountered when moving Flight Controls" (Ref. 27-21-00, Trouble Shooting).
OK	NOT	OK---	
			Return to neutral incorrect. Refer to mechanical channel trouble shooting : paragraph "Rudders do not return to neutral" (ref. 27-21-00, Trouble Shooting).
OK	NOT	OK---	
			Incorrect deflection of rudders. If rudders do not deflect in required direc- tion or if travel is not correct refer to Flight Control adjustment procedure (Ref. 27-11-00, Adjustment/Test).
OK	NOT	OK---	

\*\*\*\*\*  
\* On overhead panel : \*  
\* - On AUTO STAB unit No.2 disengage YAW switch. \*  
\* - On AUTO STAB unit No.1 engage YAW switch. \*  
\* - On Flight Control Unit, place RUDDER switch in \*  
\* GREEN position. \*  
\* On ICOVOL indicator (First Officer's instrument \*  
\* panel) both rudder magnetic indicators must dis- \*  
\* play G. \*  
\*\*\*\*\*

			Change over to Green electrical channel incor- rect. On ICOVOL indicator both rudder magnetic indicators still display B. Ref. Chart 106
OK	NOT	OK---	

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OK	NOT OK---	Change over to Green electrical channel is incorrect, with comparison warning : On ICOVOL indicator both rudder magnetic indicators change from B to M and the two red warning lights are illuminated. Ref. Chart 107
OK	NOT OK---	Change over to Green electrical channel is incorrect. For any other indication on ICOVOL indicator refer to trouble shooting procedure for rudder position indicating circuit (Ref. 27-16-00, Trouble Shooting).

\*\*\*\*\*  
\* Operate Captain's or First Officer's handwheel and\*  
\* check on ICOVOL indicator that rudders \*  
\* deflect (to the right for a right turn order). \*  
\*\*\*\*\*

OK	NOT OK---	No co-ordination in turn configuration :Neither rudder deflects. On shelf 8-216, on front panel of static monitoring change over unit (C56) confirm fault by checking that PILOT VALVES-GREEN-RUDDER UPPER and LOWER indicator lights are illuminated. Replace autostabilization computer No.1 (1C31) [1].
OK	NOT OK---	With rudders in Green electrical mode, one fails to deflect. Ref. Chart 108
OK	NOT OK---	With rudders in Green electrical mode, one of them lags. Ref. Chart 109

\*\*\*\*\*  
\* Operate rudder pedals from stop to stop and check \*  
\* on ICOVOL indicator that both rudders \*  
\* deflect accordingly, without applying abnormal \*  
\* loads to pedals, and that return to neutral is \*  
\* correct. \*  
\*\*\*\*\*

OK NOT OK  
|| |

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OK	NOT OK---	Load applied is abnormal. Refer to mechanical channel trouble shooting : paragraph "resistance encountered when moving Flight Controls"(Ref.27-21-00,Trouble Shooting)
OK	NOT OK---	Return to neutral incorrect. Refer to mechanical channel trouble shooting : paragraph "Rudders do not return to neutral" (Ref. 27-21-00, Trouble Shooting).
OK	NOT OK---	Incorrect deflection of rudders. If rudders do not deflect in required direction or if travel is not correct refer to Flight Control adjustment procedure (Ref. 27-11-00, Adjustment/Test).

\*\*\*\*\*  
 \* On overhead panel : \*  
 \* - On AUTO STAB unit No.1 disengage YAW switch. \*  
 \* - On Flight Control Unit, place RUDDER switch in \*  
 \* MECH position. \*  
 \* On ICOVOL indicator (First Officer's instrument \*  
 \* panel) both rudder magnetic indicators must \*  
 \* display M. \*  
 \*\*\*\*\*

OK	NOT OK---	Change over to mechanical channel incorrect. On ICOVOL indicator both rudder magnetic indi- cators still display G. Ref. Chart 110
OK	NOT OK---	Change over to mechanical channel incorrect. For any other indication on ICOVOL indicator refer to trouble shooting procedure for rudder position indicating circuit (Ref. 27-16-00, Trouble Shooting).

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||  
OK  
||

\*\*\*\*\*  
\* Operate rudder pedals from stop to stop and check \*  
\* on ICOVOL indicator that both rudders \*  
\* deflect accordingly, without applying abnormal \*  
\* loads to rudder pedals, and check that return to \*  
\* neutral is correct. \*  
\*\*\*\*\*

OK

NOT

OK---

Load applied is abnormal.  
Refer to mechanical channel trouble shooting :  
paragraph "Resistance encountered when moving  
Flight Controls" (Ref. 27-21-00, Trouble  
Shooting).

OK

NOT

OK---

Return to neutral incorrect.  
Refer to mechanical channel trouble shooting :  
paragraph "rudders do not return to  
neutral" (Ref. 27-21-00, Trouble Shooting).

OK

NOT

OK---

Incorrect deflection of rudders  
If rudders do not deflect in required  
direction or if travel is no correct,  
refer to Flight Controls adjustment procedure  
(Ref. 27-11-00, Adjustment/Test).

\*\*\*\*\*  
\* End of YAW electrical channel perceptible fault \*  
\* trouble shooting. \*  
\*\*\*\*\*

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*****	
* RESET IMPOSSIBLE: ON ICOVOL INDICA-	* GROUND EQUIPMENT REQUIRED
* TOR BOTH RUDDER MAGNETIC	*
* INDICATORS STILL DISPLAY M.	* DESCRIPTION PART NO.
*****	
	CIRCUIT BREAKER
	SAFETY CLIPS
	MULTIMETER
*****	

\*\*\*\*\*  
\* On overhead panel, on Flight Control Unit, place \*  
\* INNER ELEVLONS switch in BLUE position, then press \*  
\* and release RESET push button located on RH side \*  
\* of switch. \*  
\* On ICOVOL indicator (First Officer's instrument \*  
\* panel), both inner elevon magnetic indicators \*  
\* must display B. \*  
\*\*\*\*\*

		-----	Check RESET push buttons 28 VDC supply through
			circuit breakers PFCS ALL SURFACES MON GRN
YES	NO----		SUP 1C54 and PFCS ALL SURFACES MON BLUE SUP
			2C54 (circuit breaker panels 1-213 and 5-213 :
			Map Ref. N13 and E12) also check grounding.
-----			

\*\*\*\*\*  
\* On shelf 8-216, remove static monitoring change \*  
\* over unit C56 [5]. \*  
\* On circuit breaker panels 1-213, remove safety clip \*  
\* and tag and set circuit breaker PFCS INV GRN FAIL \*  
\* IND 1C73 (Map Ref. M15). \*  
\* On rack connector C56, check by pressing \*  
\* RUDDER RESET push button on Flight Control Unit \*  
\* that voltage measured between pins C56 BA-33 and \*  
\* C56 BA-34 (ground) is 28 VDC. \*  
\*\*\*\*\*

		-----	Replace Flight Control Unit (C57) [6].
YES	NO----		

Sheet 2

Chart 101 (Sheet 1 of 2)

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||  
YES  
||

\*\*\*\*\*  
\* On rack connector C56, check that voltages \*  
\* measured between pins C56-BA-35 and C56-BA-14 \*  
\* (ground) then between pins C56-BA-32 and C56-BA-14\*  
\* (ground) are null. \*  
\*\*\*\*\*

		-----	
YES	NO----	Replace Flight Control Unit (C57) [7].	
		-----	
		-----	
-----		Replace static monitoring change over unit	
		C56 [6].	
		-----	

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\*\*\*\*\*  
 \* RESET IMPOSSIBLE WITH COMPARISON \*  
 \* WARNING : ON ICOVOL INDICATOR THE \*  
 \* TWO RUDDER MAGNETIC INDICA- \*  
 \* TORS DISPLAY G (OR M) AND THE TWO \*  
 \* RED WARNING LIGHTS ARE ILLUMINATED.\*  
 \*\*\*\*\*

GROUND EQUIPMENT REQUIRED

DESCRIPTION PART NO.

MULTIMETER \_\_\_\_\_  
 CIRCUIT BREAKER \_\_\_\_\_  
 SAFETY CLIPS \_\_\_\_\_  
 ACCESS PLATFORM \_\_\_\_\_  
 11.250m (36ft. 11in.) \_\_\_\_\_  
 ACCESS PLATFORM \_\_\_\_\_  
 3.220 m (10ft. 7in.) \_\_\_\_\_  
 FLIGHT CONTROLS \_\_\_\_\_  
 ELECTRICAL CIRCUITS \_\_\_\_\_  
 TEST SET 31-56-100

\*\*\*\*\*  
 \* On overhead panel, on AUTO STAB unit No.2 disen- \*  
 \* gage YAW switch. \*  
 \* On ICOVOL indicator (First Officer's instrument \*  
 \* panel) extinguish the two red warning lights by \*  
 \* pressing ALARM RESET push button. \*  
 \* On overhead panel, on Flight Control Unit, press \*  
 \* then release RUDDER RESET push button. \*  
 \* On ICOVOL indicator both rudder magnetic \*  
 \* indicators must display B. \*  
 \*\*\*\*\*

*****		*****
		* On overhead panel, on AUTO STAB unit No.2, *
		* engage YAW switch. *
NO	YES----	* On ICOVOL indicator both rudder magnetic indi- *
		* cators still display B and the two red warning *
		* lights are OFF. *
		*****
	YES	NO----
		Replace autostabilization
		computer No.2 2C31 [2].
		-----

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Sheet 2

Chart 102 (Sheet 1 of 11)

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Sheet 1

YES

\*\*\*\*\*  
\* On YAW TRIM knob (centre console) select 5 deg- \*  
\* rees. \*  
\* On ICOVOL indicator both rudder magnetic \*  
\* indicators still display B and the two red warn- \*  
\* ing lights are OFF. \*  
\*\*\*\*\*

YES

NO

\*\*\*\*\*  
\* On shelf 8-216, on front panel of the Blue \*  
\* monitoring comparator 2C48, the two green \*  
\* indicator lights corresponding to rudders \*  
\* are illuminated. \*  
\*\*\*\*\*

YES

NO

Sheet 6

Sheet 10

\*\*\*\*\*  
\* Slowly turn Captain's or First Officer's control \*  
\* handwheel. On ICOVOL indicator, both rudder \*  
\* magnetic indicators still display B, the two \*  
\* red warning lights are off and both rudders \*  
\* deflect when control is moved in roll \*  
\* configuration. \*  
\*\*\*\*\*

YES

NO

On ICOVOL indicator, both magnetic indicators  
change from B to G (or M), the two red warning  
lights illuminate and neither rudder deflects  
when control is moved in roll configuration.  
Replace autostabilization computer No.2 2C31[2]

YES

NO

On ICOVOL indicator both magnetic indicators  
change from B to G (or M), the two red warning  
lights illuminate and only one rudder  
deflects when control is moved in roll configura-  
tion.

Sheet 3

Sheet 4

Chart 102 (Sheet 2 of 11)

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Sheet 2

YES

NO

\*\*\*\*\*  
\* On ICOVOL indicator, both magnetic indicators \*  
\* change from B to G (or M), the two red warning \*  
\* lights illuminate and both rudders deflect \*  
\* when control is moved in roll configuration. \*  
\*\*\*\*\*

||

\*\*\*\*\*  
\* On shelf 8-216, replace Blue monitoring compa- \*  
\* rator 2C48 [4]. \*  
\* Repeat tests which led to the fault. \*  
\* On ICOVOL indicator both rudder magnetic indi- \*  
\* cators still display B. \*  
\*\*\*\*\*

YES

NO

-----  
| Replace autostabilization |  
computer No.2 2C31 [2].

-----  
| Replaced monitoring compa- |  
rator was faulty.

\*\*\*\*\*  
\* Connect Flight Controls Electrical Circuits Test \*  
\* set (31-56-100) and check that PFCU linear \*  
\* transducers operate correctly by carrying out \*  
\* the first test series. \*  
\* Ref. 27-20-00, Trouble/Shooting. \*  
\*\*\*\*\*

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## MAINTENANCE MANUAL

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\*\*\*\*\*  
\* On shelf 8-216, replace autostabilization computer\*  
\* No.2 2C31 [2]. \*  
\* Repeat tests which led to the fault. \*  
\* On ICOVOL indicator, both rudder magnetic \*  
\* indicators still display B. \*  
\*\*\*\*\*

		-----	
NO	YES---		Replaced autostabilization computer was faulty.
		-----	

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in \*  
\* 27-24-31, Removal/Installation. Depending on which\*  
\* rudder (upper or lower) does not deflect, open \*  
\* fairing 352CR or 351CL and disconnect connector \*  
\* B on PFCU C78 or C79 : \*  
\* 1) Check electrovalve impedance (approx. 1500ohms)\*  
\* measured between pins B-V and B-D then B-V and B-R\*  
\* 2) Check continuity between pins B-R and B-J. \*  
\*\*\*\*\*

		-----	
OK	NOT OK--		Replace Blue electrovalve on PFCU C78 [7] or
			C79 [8].
		-----	

\*\*\*\*\*  
\* On shelf 8-216, replace static monitoring change \*  
\* over unit C56 [5]. \*  
\* Repeat tests which led to the fault. \*  
\* On ICOVOL indicator, both rudder magnetic \*  
\* indicators still display B. \*  
\*\*\*\*\*

		-----	
YES	NO---		Check continuity between static monitoring
			change over unit C56 and the considered
			PFCU electrovalve (Ref. WDM : 27-27-01).
		-----	
-----			Replaced static monitoring change over unit
			was faulty.
		-----	

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Sheet 1

||  
NO  
||

\*\*\*\*\*  
\* On ICOVOL indicator, press and release ALARM RESET\*  
\* push button to extinguish the two red warning \*  
\* lights. \*  
\* On overhead panel, on Flight Control Unit, press \*  
\* and release RUDDER RESET push button, and at the \*  
\* same time check on ICOVOL indicator that one or \*  
\* the two rudders deflect during the reset. \*  
\*\*\*\*\*

||  
YES  
||

NO---\*\*\*\*\*  
\* On shelf 8-216, on front panel of the Blue \*  
\* monitoring comparator (2C48), the two Green \*  
\* indicator lights corresponding to rudders \*  
\* and the two FAILURE DETECTION warning \*  
\* lights are illuminated. \*  
\*\*\*\*\*

||  
YES  
||

NO---| Replace static monitoring |  
change over unit C56 [5].

Sheet 6

\*\*\*\*\*  
\* On shelf 8-216 replace autostabilization computer \*  
\* No.2 2C31 [2]. \*  
\* Repeat tests which led to the fault. \*  
\* On ICOVOL indicator, both rudder magnetic \*  
\* indicators display B. \*  
\*\*\*\*\*

||  
NO  
||

YES---| Replaced autostabilization computer was faulty. |  
-----

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Chart 102 (Sheet 5 of 11)

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YES

\*\*\*\*\*  
\* On shelf 8-216, replace Blue monitoring comparator\*  
\* 2C48 [4]. \*  
\* Repeat tests which led to the fault. \*  
\* On ICOVOL indicator, both rudder magnetic \*  
\* indicators display B. \*  
\*\*\*\*\*

NO

YES----| Replaced Blue monitoring comparator was faulty |

\*\*\*\*\*  
\* On shelf 8-216, on front panel of the Blue monito- \*  
\* ring comparator 2C48, press and release the two \*  
\* UPPER RUDDER (U.R.) push buttons. Both red \*  
\* FAILURE DETECTION warning lights go off. \*  
\*\*\*\*\*

NO

YES----| \*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed \*  
\* in 27-24-31, Removal/Installation. \*  
\* Open fairing 352CR and on PFCU C78 disconnect \*  
\* connector A, then : \*  
\* 1) Check resistance of Blue monitoring resol- \*  
\* ver rotor, measured between pins A-Z and A-Y : \*  
\* This resistance must be approximately 48 ohms. \*  
\* 2) Check resistance of Blue monitoring resol- \*  
\* ver stators, measured between pins A-L and A-M \*  
\* then A-a and A-K : This resistance must be \*  
\* approximately 35 ohms. \*  
\* 3) Check continuity between pins A-N and A-a. \*  
\*\*\*\*\*

OK

NOT OK--| Replace synchro pack on  
| PFCU C78 [7]. |

Sheet 7

Check aircraft wiring between synchro pack 2C77  
and PFCU C78 (Blue monitoring channel).  
Ref. WDM : 27-27-03

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Sheet 6

||  
NO  
||

\*\*\*\*\*  
\* On shelf 8-216, on front panel of Blue monitoring \*  
\* comparator (2C48), press and release both LOWER \*  
\* RUDDER (L.R.) push buttons. \*  
\* The two red FAILURE DETECTION warning lights \*  
\* go off. \*

\*\*\*\*\*

||  
NO  
||

YES----

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in \*  
\* 27-24-31, Removal/Installation. \*  
\* Open fairing 351CL and on PFCU C79, disconnect \*  
\* connector A, then : \*  
\* 1) Check resistance of Blue monitoring resol- \*  
\* ver rotor, measured between pins A-Z and A-Y : \*  
\* This resistance must be approximately 48 ohms. \*  
\* 2) Check resistance of Blue monitoring resol- \*  
\* ver stators, measured between pins A-L and A-M \*  
\* then A-a and A-K : this resistance must be \*  
\* approximately 35 ohms. \*  
\* 3) Check continuity between pins A-N and A-a. \*  
\*\*\*\*\*

||  
OK  
||

||  
NOT OK---  
||

-----  
Replace synchro pack  
on PFCU C79 [8].  
-----

-----  
Check aircraft wiring between synchro pack 2C77  
and PFCU C79 (Blue monitoring channel).  
Ref. WDM : 27-27-03  
-----

Sheet 8

Chart 102 (Sheet 7 of 11)

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

Continued From

Sheet 8

||  
YES  
||

\*\*\*\*\*  
\* On synchro pack 2C77, confirm fault of the Blue \*  
\* monitoring resolver by checking : \*  
\* 1) rotor resistance measured between pins 2C77-B- \*  
\* A and 2C77-B-B (This resistance must be approxima- \*  
\* tely 3.8 Ohms). \*  
\* 2) stator resistance measured between pins 2C77-B- \*  
\* G and 2C77-B-E then 2C77-B-D and 2C77-B-F \*  
\* (This resistance must be approximately 5 Ohms). \*  
\*\*\*\*\*

		-----
OK	NOT OK--	Replace synchro pack 2C77 [10].
		-----
		-----
		Check aircraft wiring between synchro pack 2C77
		and PFCU's C78 and C79 then between the
-----		resolvers on these PFCU's and the Blue
		monitoring comparator 2C48 (Blue monitoring
		channel) Ref. WDM : 27-27-03.
		-----

Chart 102 (Sheet 9 of 11)

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# Concorde

## MAINTENANCE MANUAL

Continued From

Sheet 5

NO

||

Continued From

Sheet 2

NO

|

\*\*\*\*\*

\* On ICOVOL indicator (First Officer's instrument \*  
\* panel) press and release ALARM RESET push button \*  
\* to extinguish the two red warning lights. \*

\* On overhead panel, on Flight Control Unit, press \*  
\* and release RUDDER RESET push button and check on \*  
\* ICOVOL indicator deflection of rudders. \*

\* Two cases are possible : \*

\* Case No.1 : Only one rudder deflects \*

\* Case No.2 : Both rudders deflect \*

\*\*\*\*\*

Case No.1

Case No.2--

\*\*\*\*\*

\* At zone 121, open access door 121 FB. Trip \*  
\* safety and tag circuit breakers listed in \*  
\* 27-26-11, Removal/Installation. \*

\* On synchro pack 2C77, disconnect connector A \*  
\* then : \*

\* 1) Check rotor resistance of Blue control \*  
\* resolver, measured between pins 2C77-A-A and \*  
\* 2C77-A-B (This resistance must be approximately \*  
\* 3.8 Ohms). \*

\* 2) Check stator resistance of Blue control \*  
\* resolver, measured between pins 2C77-A-G and \*  
\* 2C77-A-E, then between 2C77-A-D and 2C77-A-F \*  
\* (This resistance must be approximately 5 Ohms) \*

\*\*\*\*\*

OK

NOT OK--

Replace synchro pack 2C77  
[10].

Check aircraft wiring between synchro pack  
2C77 and PFCU's C78 and C79 (Blue control  
channel) Ref. WDM : 27-26-01.

Sheet 11

Chart 102 (Sheet 10 of 11)

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

Continued From

Sheet 10

||

Case No.1

||

\*\*\*\*\*  
\* Trip, safety and tag the circuit breakers listed \*  
\* in 27-24-31, Removal/Installation. Depending on \*  
\* which rudder does not deflect, open \*  
\* fairing 351CL or 352CR and on PFCU C79 or C78 \*  
\* disconnect connector B, then : \*  
\* 1) Check rotor resistance of the Blue control \*  
\* resolver, measured between pins B-L and B-M : This \*  
\* resistance must be approximately 23.3 ohms. \*  
\* 2) Check stator resistance of the Blue control \*  
\* resolver measured between pins B-P and B-N then \*  
\* B-U and B-A: This resistance must be approximately \*  
\* 35 ohms. \*  
\* 3) Check continuity between pins B-U and B-K. \*

\*\*\*\*\*

	OK	NOT OK---	Replace synchro pack on PFCU C79 [8] or C78 [7]
-----			Check aircraft wiring between PFCU C79 or C78 and autostabilization computer No.2 (2C31). Check synchro pack 2C77 (control resolver) and autostabilization computer No.2 2C31 power supply. Ref. WDM : 27-26-01

Chart 102 (Sheet 11 of 11)

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# Concorde

## MAINTENANCE MANUAL

```
*****
* PEDAL ADJUSTMENT HANDLE (CAPTAIN'S * GROUND EQUIPMENT REQUIRED
* OR FIRST OFFICER'S) JAMMED. *
***** DESCRIPTION PART NO.
*****
```

(Ref. Fig. 101 )

```
*****
* Disconnect control at pedal adjustment jack *
* (Ref. 27-21-15, Removal/Installation paragraph *
* 2-C-(1)) and check if control is jammed. *
*****
```

YES	NO--	Check that jamming is caused by the locking device of the pedal adjustment jack [12] and replace this component.
-----	------	--

```
*****
* Disconnect control at lever (Ref. 27-21-15, *
* Removal/Installation, paragraph 3-C-(1)) and check *
* if control is jammed. *
*****
```

YES	NO--	Replace lever of control [13].
		Replace locking control of jack (Teleflex cable) [11].

Chart 103 (Sheet 1 of 2)

EFFECTIVITY: ALL

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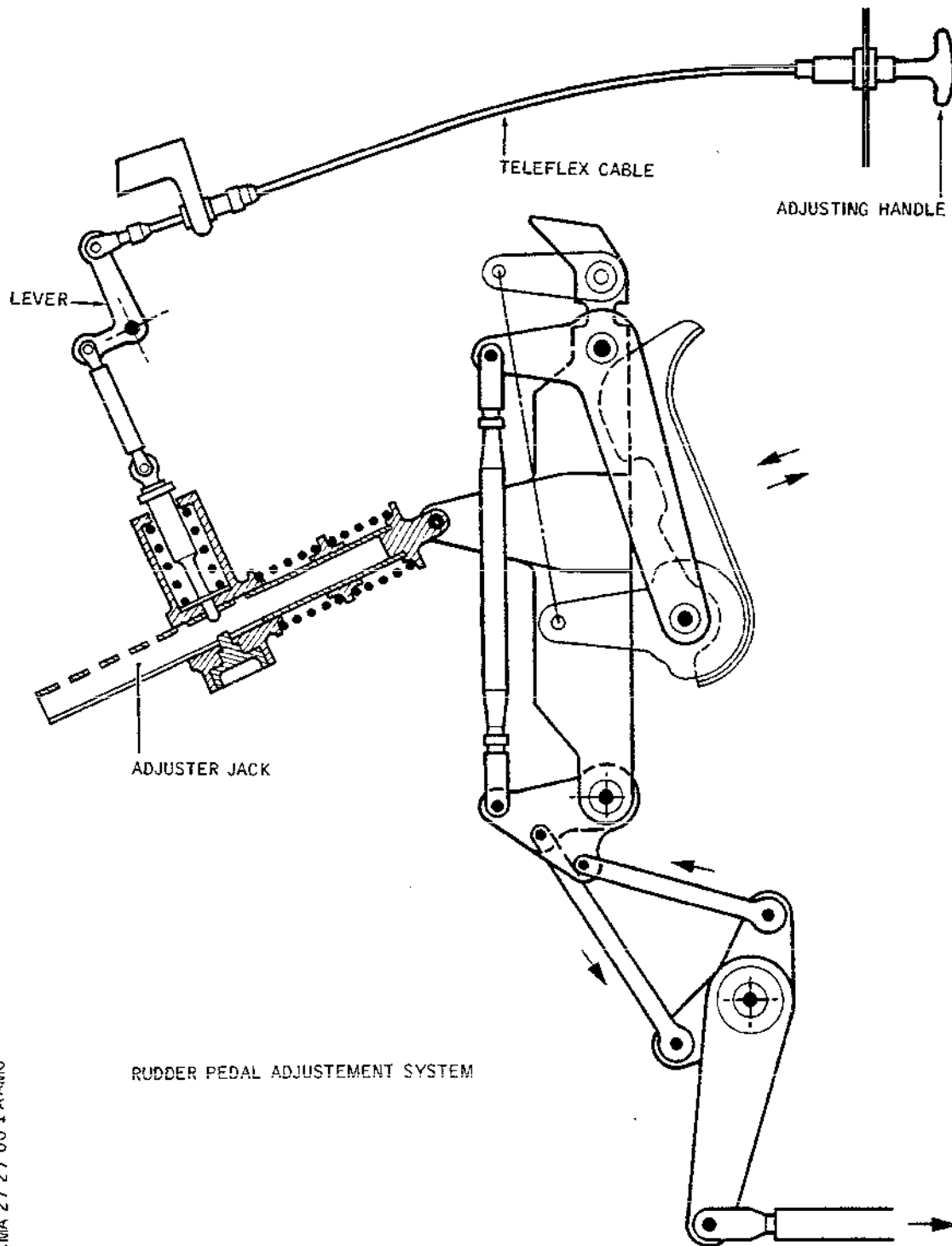
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## MAINTENANCE MANUAL



CMA 27 27 00 1AAN/0

Chart 103 (Sheet 2 of 2)  
Figure 101

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* WITH RUDDERS IN BLUE ELECTRICAL \*  
\* MODE, ONE FAILS TO DEFLECT. \*  
\*\*\*\*\*

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
MULTIMETER	_____
CIRCUIT BREAKER	_____
SAFETY CLIPS	_____
ACCESS PLATFORM	_____
11.250m (36ft. 11in.)	_____

\*\*\*\*\*  
\* On shelf 8-216, replace autostabilization computer\*  
\* No.2 2C31 [2]. \*  
\* Repeat tests which led to the fault. \*  
\* Both rudders deflect. \*  
\*\*\*\*\*

		-----
NO	YES--	Replaced autostabilization computer was faulty.
		-----

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in 27\*  
\* -24-31, Removal/Installation. Depending on which \*  
\* rudder (upper or lower) does not deflect, open \*  
\* fairing 352CR or 351CL and on PFCU C78 or C79, \*  
\* disconnect connector B, then : \*  
\* 1) Check electrovalve impedance (1500 ohms approx)\*  
\* measured between pins B-V and B-D then B-V and B-R\*  
\* 2) Check continuity between pins B-R and B-J. \*  
\*\*\*\*\*

		-----
OK	NOT OK--	Replace Blue electrovalve on PFCU C78 [7] or
		C79 [8].
		-----

Sheet 2

Chart 104 (Sheet 1 of 2)

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* On shelf 8-216, remove static monitoring change \*  
\* over unit C56 [5]. \*  
\* On circuit breaker panel 5-213, remove safety clip \*  
\* and tag and set circuit breaker PFCS INV BLUE \*  
\* FAIL IND 2C73 (Map Ref. E11). |  
\* Check that voltage measured (on rack connector) \*  
\* between pins C56-BA-29 and C56-BA-14 (ground) \*  
\* is 28 VDC. \*  
\*\*\*\*\*

		-----
YES	NO---	Replace circuit breaker RUDDER CONT & MON BLUE
		SUP 2C62 [16].
		-----

\*\*\*\*\*  
\* Check that voltage measured (on rack connector) \*  
\* between pins C56-BA-39 and C56-BA-14 (ground) \*  
\* is 28 VDC. \*  
\*\*\*\*\*

		-----
YES	NO---	Replace circuit breaker RUDDER MON LOGIC BLUE
		SUP 2C63 [17].
		-----
-----		Replace static monitoring change over unit C56
		[5].
		-----

Chart 104 (Sheet 2 of 2)

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## MAINTENANCE MANUAL

*****	
* WITH RUDDERS IN BLUE ELECTRICAL	* GROUND EQUIPMENT REQUIRED
* MODE, ONE OF THEM LAGS.	*
*****	
	DESCRIPTION PART NO.
*****	
	MULTIMETER
	CIRCUIT BREAKER
	SAFETY CLIPS
	ACCESS PLATFORM
	11.250 m (36 ft. 11 in.)
*****	

\*\*\*\*\*  
\* Repeat tests which led to the fault and visually \*  
\* check that rudder lags. \*  
\*\*\*\*\*

*****	
	Refer to trouble shooting procedure for rudder
YES NO----	position indicating circuit (Ref. : 27-16-00,
	Trouble Shooting).
*****	

\*\*\*\*\*  
\* On overhead panel : \*  
\* - On AUTOSTAB unit No.2, disengage YAW switch. \*  
\* - On Flight Control Unit, place RUDDER switch in \*  
\* MECH position (on ICOVOL indicator (First Offi- \*  
\* cer's instrument panel) both rudder magnetic \*  
\* indicators must display M). \*  
\* Deflect rudder pedals to right and left ; rudder \*  
\* lags. \*  
\*\*\*\*\*

YES NO----	Sheet 3

\*\*\*\*\*  
\* On overhead panel, on SERVO CONTROLS unit, place \*  
\* upper selector switch in GREEN JAM (BLUE ONLY) \*  
\* position. \*  
\* Deflect rudder pedals to right and left : rudder \*  
\* lags. \*  
\*\*\*\*\*

YES NO	
Sheet 2	

Chart 105 (Sheet 1 of 5)

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# Concorde

## MAINTENANCE MANUAL

Continued From Sheet 1

		*****	
		* Replace Green shuttle valve block on PFCU *	
		* associated with rudder which lags : C78 [7] or *	
YES	NO----	* C79 [8]. Deflect rudder pedals again to right *	
		* and left : rudder lags. *	
		*****	
			-----
		YES	NO----  Replaced Green shuttle
			valve block was faulty.
		-----	
		Replace PFCU associated with rudder which	
		lags : C78 [7] or C79 [8].	
		-----	
		*****	
		* On overhead panel, on SERVO CONTROLS unit, place *	
		* upper selector switch in BLUE JAM (GREEN ONLY) *	
		* position. *	
		* Deflect rudder pedals to right and left ; rudder *	
		* lags. *	
		*****	
		*****	
		* Replace Blue shuttle valve block on PFCU *	
		* associated with rudder which lags : C78 [7] or *	
YES	NO----	* C79 [8]. *	
		* Deflect rudder pedals again to right and left : *	
		* rudder lags. *	
		*****	
			-----
		YES	NO----  Replaced Blue shuttle valve
			block was faulty.
		-----	
		Replace PFCU associated with rudder which lags:	
		C78 [7] or C79 [8].	
		-----	

Chart 105 (Sheet 2 of 5)

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# Concorde

## MAINTENANCE MANUAL

Continued From Sheet 1

```
*****
* On overhead panel, on Flight Control Unit,      *
* place RUDDER switch in BLUE position, then      *
* press and release RESET push button on RH side *
* of switch.                                       *
* On ICOVOL indicator (First Officer's instrument*
* panel) the two magnetic indicators correspon-   *
NO----* ding to rudders must display B.           *
* When deflecting rudder pedals, check on PFCU   *
* associated with the rudder which lags that the *
* input lever is disengaged.                     *
* NOTE : For this check, refer to figure of sheet*
* 5 of 5 in this chart.                         *
*****
```

```
    ||      |
    NO      YES-----Sheet 4
    ||      |
```

```
*****
* On shelf 8-216, on front face of static monitoring*
* change over unit C56, check that PILOT VALVE BLUE *
* indicator light corresponding to rudder which lags*
* is illuminated.                                   *
*****
```

```
    ||      |
    YES      NO----| Replace static monitoring change over unit C56 |
    ||      |      | [5]. |
    ||      |      |-----|
```

```
*****
* Replace Blue electrovalve on PFCU associated with *
* the rudder which lags : C78 [7] or C79 [8].      *
* Deflect rudder pedals again and check on PFCU   *
* associated with rudder which lags that input lever*
* is disengaged.                                   *
*****
```

```
    ||      |
    YES      NO----| Replace PFCU associated with rudder which lags: |
    ||      |      | C78 [7] or C79 [8]. | |
    ||      |      |-----|
    ||      |      |
    ||      |      |-----| Replaced Blue electrovalve was faulty. |
    ||      |      |-----|
```

Chart 105 (Sheet 3 of 5)

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# Concorde

## MAINTENANCE MANUAL

Continued From Sheet 3

YES

\*\*\*\*\*  
\* Replace autostabilization computer No.2 2C31 [2] \*  
\* Repeat tests which led to the fault : rudder lags.\*  
\*\*\*\*\*

|| |  
YES NO----| Replaced autostabilization computer was faulty |  
|| |

\*\*\*\*\*  
\* Replace PFCU associated with rudder which lags \*  
\* C78 [7] or C79 [8] (faulty servovalve). \*  
\* Repeat tests which led to the fault : rudder lags.\*  
\*\*\*\*\*

|| |  
YES NO----| Replaced PFCU was faulty. |  
|| |

\*\*\*\*\*  
\* Check that there is no interference between the \*  
\* two Blue and Green 26V 1800Hz generation systems \*  
\* by cutting off the Green electrical generation \*  
\* system. \*  
\* Check wiring between rudder which lags and rudder \*  
\* pedals with reference to the WDM. \*  
\*\*\*\*\*

Chart 105 (Sheet 4 of 5)

EFFECTIVITY: ALL

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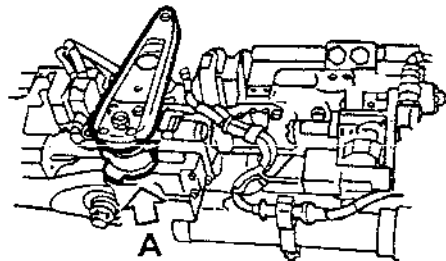
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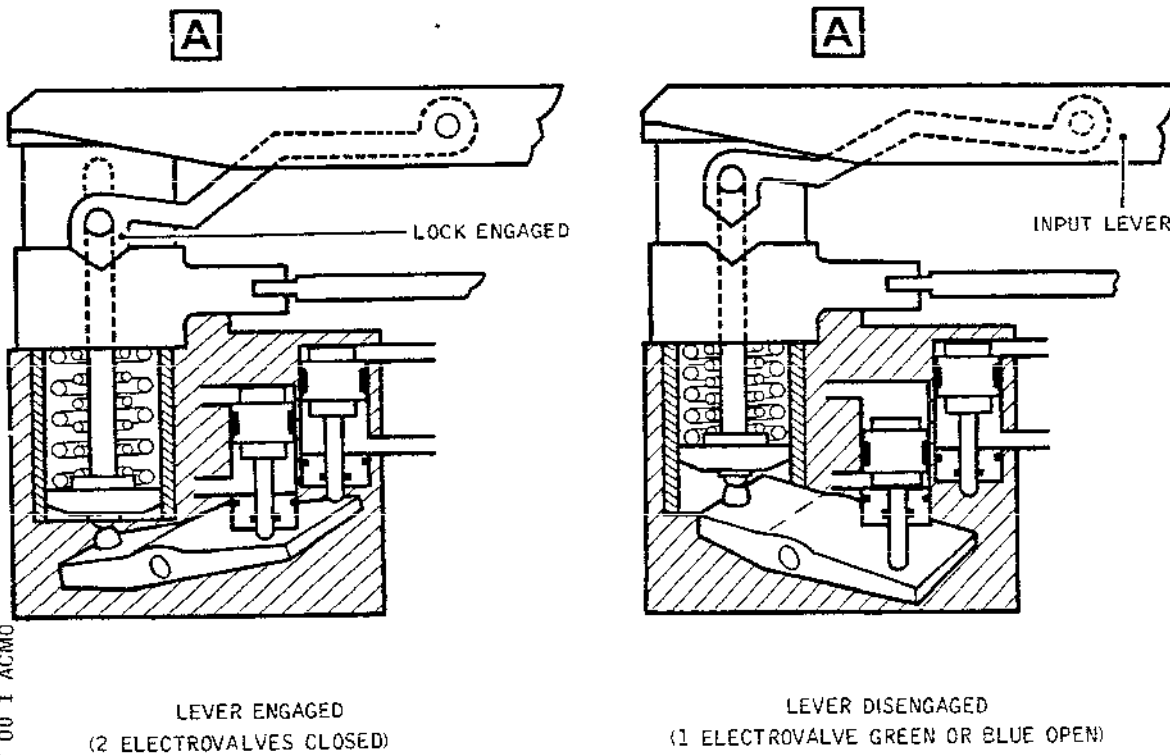
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## MAINTENANCE MANUAL



LOCATION



PFCU - ENGAGEMENT/DISENGAGEMENT OF INPUT LEVER

CMA 27 27 00 1 ACMO

Chart 105 (Sheet 5 of 5)  
Figure 102

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

\*\*\*\*\*  
 \* INCORRECT CHANGE OVER TO GREEN ELEC\*  
 \* -TRICAL CHANNEL. ON ICOVOL INDICAT-\*  
 \* OR BOTH RUDDER MAGNETIC INDICATORS \*  
 \* STILL DISPLAY B. \*  
 \*\*\*\*\*

GROUND EQUIPMENT REQUIRED

DESCRIPTION PART NO.

MULTIMETER  
 CIRCUIT BREAKER  
 SAFETY CLIPS

\*\*\*\*\*  
 \* On shelf 8-216, on front panel of static monitor- \*  
 \* ing change over unit C56, PILOT VALVE BLUE-UPPER \*  
 \* and LOWER RUDDER indicator lights are illuminated.\*  
 \*\*\*\*\*

YES	NO	GREEN indicator lights are illuminated. Replace static monitoring change over unit C56 [5].
-----	----	--

\*\*\*\*\*  
 \* On shelf 8-216, remove static monitoring change \*  
 \* over unit C56 [5]. \*  
 \* On circuit breaker panels 1-213 and 5-213, remove \*  
 \* safety clips and tags and set circuit breakers \*  
 \* PFCS INV GRN FAIL IND 1C73 and PFCS INV BLUE FAIL \*  
 \* IND 2C73 (Map Ref. M15 and E11). \*  
 \* On rack connector C56, check that voltage measur- \*  
 \* ed between pins C56-BA-26 and C56-BA-14 (ground) \*  
 \* then C56-BA-22 and C56-BA-14 (ground) is 28 VDC. \*  
 \*\*\*\*\*

NO	YES	Replace static monitoring change over unit C56 [5].
Replace Flight Control Unit C57 [6].		

Chart 106 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****		-----	
* INCORRECT CHANGE OVER TO GREEN ELEC*	*	GROUND EQUIPMENT REQUIRED	
* -TRICAL CHANNEL WITH COMPARISON	*	-----	
* WARNING. ON ICOVOL INDICATOR, THE	*	DESCRIPTION	PART NO.
* TWO RUDDER MAGNETIC INDICATORS	*	-----	
* CHANGE FROM B TO M AND THE TWO RED	*	MULTIMETER	_____
* WARNING LIGHTS ARE ILLUMINATED.	*	CIRCUIT BREAKER	_____
*****		SAFETY CLIPS	_____
		ACCESS PLATFORM	_____
		11.250m (36ft. 11in.)	_____
		ACCESS PLATFORM	_____
		3.220m (10ft. 7in.)	_____
		FLIGHT CONTROLS	_____
		ELECTRICAL CIRCUITS	_____
		TEST SET	31-56-100
		-----	

\*\*\*\*\*

\* On overhead panel, on AUTO STAB unit No1, disen- \*  
 \* gage YAW switch. \*

\* On ICOVOL indicator (First Officer's instrument \*  
 \* panel) extinguish the two red warning lights by \*  
 \* pressing and releasing ALARM RESET push button : \*  
 \* On overhead panel, on Flight Control unit, press \*  
 \* and release RUDDER RESET push button. \*

\* On ICOVOL indicator, both rudder magnetic \*  
 \* indicators must display G. \*

\*\*\*\*\*

NO	YES----	On overhead panel, on AUTO STAB unit No.1 engage YAW switch.
		On ICOVOL indicator, both rudder magnetic indicators still display G and the two red warning lights are off.
	YES	NO----
		Replace autostabilization computer No.1 1C31 [1].

Sheet 5

Sheet 2

Chart 107 (Sheet 1 of 11)

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# Concorde

## MAINTENANCE MANUAL

Continued From Sheet 1

YES

\*\*\*\*\*  
\* On YAW TRIM knob (centre console) select 5 deg- \*  
\* rees. \*  
\* On ICOVOL indicator, both rudder magnetic \*  
\* indicators still display B and the two red warn- \*  
\* ing lights are off. \*  
\*\*\*\*\*

YES

NO----

On shelf 8-215, on front panel of the Green monitoring comparator (1C48), the two green indicator lights corresponding to rudders are illuminated.

YES

NO

Sheet 6

Sheet 10

\*\*\*\*\*  
\* Slowly turn Captain's or First Officer's control \*  
\* handwheel. On ICOVOL indicator, both rudder \*  
\* magnetic indicators still display G, the two \*  
\* red warning lights are off and both rudders \*  
\* deflect when roll control is moved. \*  
\*\*\*\*\*

YES

NO----

On ICOVOL indicator, the two magnetic indicators change from G to M, the two red warning lights illuminate and neither rudder deflects during roll control displacement. Replace autostabilization computer 1C31 No.1 [1].

YES

NO----

On ICOVOL indicator both magnetic indicators change from G to M, the 2 red warning lights illuminate and only one rudder deflects during roll control displacement.

Sheet 3

Sheet 4

Chart 107 (Sheet 2 of 11)

EFFECTIVITY: ALL

**27-27-00**

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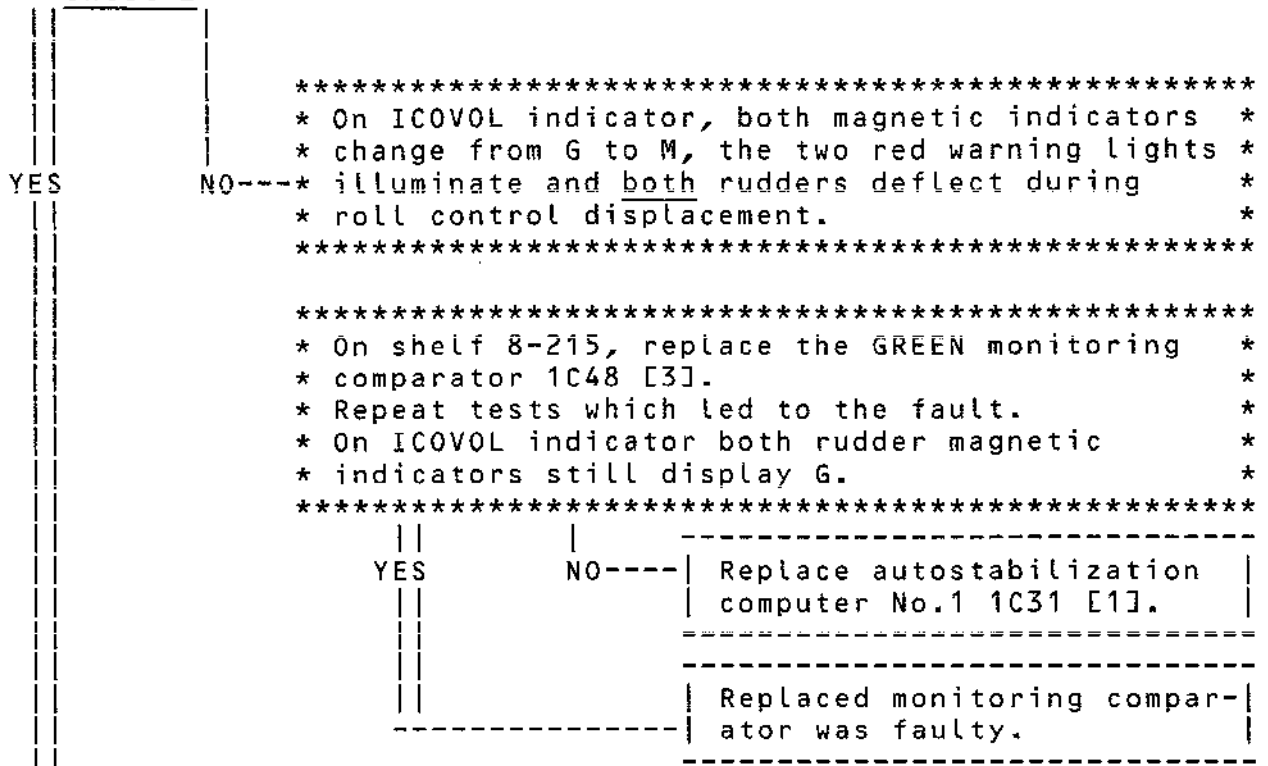
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# Concorde

## MAINTENANCE MANUAL

Continued From  
Sheet 2



\*\*\*\*\*  
\* Connect Flight Controls Electrical Circuits Test \*  
\* set (31-56-100) and check rudder PFCU \*  
\* linear transducers for correct operation by \*  
\* carrying out the first test series. \*  
\* Ref. 27-20-00, Trouble Shooting \*  
\*\*\*\*\*

Chart 107 (Sheet 3 of 11)

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# Concorde

## MAINTENANCE MANUAL

Continued From Sheet 2

\*\*\*\*\*  
\* On shelf 8-215, replace autostabilization computer\*  
\* 1C31 [1].\*  
\* Repeat tests which led to the fault.\*  
\* On ICOVOL indicator, both rudder magnetic\*  
\* indicators still display G.\*  
\*\*\*\*\*

NO	YES---	Replaced autostabilization computer was faulty.
----	--------	---

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in\*  
\* 27-24-31, Removal/Installation. Depending on which\*  
\* rudder (upper or lower) does not deflect, open\*  
\* fairing 352CR or 351CL and on PFCU C78 or C79\*  
\* disconnect connector C, then :\*  
\* 1) Check electrovalve impedance (approx.1500 ohms)\*  
\* measured between pins C-V and C-D then C-V and\*  
\* C-R.\*  
\* 2) Check continuity between pins C-R and C-J.\*  
\*\*\*\*\*

OK	NOT OK---	Replace Green electrovalve on PFCU C78 [7] or C79 [8].
----	-----------	--

\*\*\*\*\*  
\* On shelf 8-216, replace static monitoring change\*  
\* over unit C56 [5].\*  
\* Repeat tests which led to the fault.\*  
\* On ICOVOL indicator, both rudder magnetic\*  
\* indicators still display G.\*  
\*\*\*\*\*

YES	NO---	Check continuity between static monitoring change over unit and electrovalves of PFCU concerned (Ref. WDM : 27-27-01).
		Replaced static monitoring change over unit was faulty.

Chart 107 (Sheet 4 of 11)

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## MAINTENANCE MANUAL

Continued From

Sheet 1

NO

||

\*\*\*\*\*  
\* On ICOVOL indicator, extinguish the two red \*  
\* warning lights by pressing ALARM RESET push button\*  
\* On overhead panel, on Flight Control Unit, press \*  
\* and release RUDDER RESET push button, and at the \*  
\* same time check, on ICOVOL indicator, that one or \*  
\* two rudders deflect during the reset. \*  
\*\*\*\*\*

YES

NO---

On shelf 8-215, on front panel of the Green  
monitoring comparator 1C48, the two green  
indicator lights corresponding to rudders  
and the 2 red FAILURE DETECTION warning  
lights are illuminated.

||  
YES

NO---

Replace static monitoring  
change over unit C56 [5].

Sheet 6

\*\*\*\*\*  
\* On shelf 8-215, replace autostabilization computer\*  
\* No.1 1C31 [1]. \*  
\* Repeat tests which led to the fault. \*  
\* On ICOVOL indicator, both rudder magnetic \*  
\* indicators display G. \*  
\*\*\*\*\*

NO

YES---

Replaced autostabilization computer was faulty. |

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Chart 107 (Sheet 5 of 11)

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## MAINTENANCE MANUAL

Continued From Sheets 2 & 5

YES

\*\*\*\*\*  
\* On shelf 8-215, replace the Green monitoring \*  
\* comparator 1C48 [3]. \*  
\* Repeat tests which led to the fault. \*  
\* On IC0VOL indicator, both rudder magnetic indicat-\*  
\* ors display G. \*  
\*\*\*\*\*

NO

YES----

Replaced Green monitoring comparator was faulty|

\*\*\*\*\*  
\* On shelf 8-215, on front panel of the Green \*  
\* monitoring comparator 1C48, press and release the \*  
\* two UPPER RUDDER (U.R.) push buttons. The two red \*  
\* FAILURE DETECTION indicator lights go off. \*  
\*\*\*\*\*

NO

YES----

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in\*  
\* 27-24-31, Removal/Installation. \*  
\* Open fairing 352CR and on PFCU C78, disconn-\*  
\* ect connector A, then : \*  
\* 1) Check rotor resistance of Green monitoring \*  
\* resolver, measured between pins A-E and A-F : \*  
\* this resistance must be approximately 48 ohms. \*  
\* 2) Check stator resistance of Green monitoring \*  
\* resolver, measured between pins A-C and A-V \*  
\* then A-W and A-G : this resistance must be \*  
\* approximately 35 ohms. \*  
\* 3) Check continuity between pins A-U and A-W. \*  
\*\*\*\*\*

OK

NOT OK---

Replace synchro pack on  
PFCU C78 [7].

Sheet 7

Check aircraft wiring between synchro pack 1C77|  
and PFCU C78 (Green monitoring channel).|  
Ref. WDM : 27-27-02|

Chart 107 (Sheet 6 of 11)

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# Concorde

## MAINTENANCE MANUAL

Continued From

Sheet 6

||  
NO  
||

\*\*\*\*\*  
\* On shelf 8-215, on front panel of the Green \*  
\* monitoring comparator (1C48), press and release \*  
\* the 2 LOWER RUDDER (L.R.) push buttons. \*  
\* The 2 red FAILURE DETECTION indicator lights go \*  
\* off. \*  
\*\*\*\*\*

||  
NO  
||

YES----

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in\*  
\* 27-24-31, Removal/Installation. \*  
\* Open fairing 351CL and on PFCU C79, disconnect \*  
\* connector A, then : \*  
\* 1) Check rotor resistance of Green monitoring \*  
\* resolver, measured between pins A-E and A-F : \*  
\* This resistance must be approximately 48 ohms. \*  
\* 2) Check stator resistance of Green monito- \*  
\* ring resolver, measured between pins A-C and \*  
\* A-V then A-W and A-G : This resistance must be \*  
\* approximately 35 ohms. \*  
\* 3) Check continuity between pins A-U and A-W. \*  
\*\*\*\*\*

||  
OK  
||

NOT OK---

-----  
Replace synchro pack on  
PFCU C79 [8].  
-----

Sheet 8

-----  
| Check aircraft wiring between synchro pack 1C77 |  
| and PFCU C79 (Green monitoring channel). |  
Ref. WDM : 27-27-02

Chart 107 (Sheet 7 of 11)

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

Continued From

Sheet 7

||  
NO  
||

\*\*\*\*\*  
\* On shelf 8-215, remove the Green monitoring \*  
\* comparator (1C48) [3]. \*  
\* On rack connectors, shunt pins 1C48-AA-62 and 1C \*  
\* 48-AB-60. \*  
\* On circuit breaker panel 1-213, remove safety clips \*  
\* and tags and set circuit breakers PFCS INV GRN \*  
\* FAIL IND 1C73 and PFCS INV GRN SUP 1C66 (Map Ref. \*  
\* M15 and P11). \*  
\* On rack connector 1C48-AA, voltage measured \*  
\* between pins 58 and 13 must be 26 VAC 1800 Hz \*  
\*\*\*\*\*

	YES		NO----	Replace circuit breaker RUDDER GRN 26 V 1800 Hz
		CONT SUP 1C76 [18].		
		-----		

\*\*\*\*\*  
\* At zone 121, open access door 121FB. Trip, safety \*  
\* and tag circuit breaker RUDDER MON GRN SUP 1C49 on \*  
\* circuit breaker panel 2-213 (Map Ref. G3). \*  
\* On synchro pack 1C77, disconnect connector B. \*  
\* Remove safety clip and tag and set circuit \*  
\* breaker tripped previously. \*  
\* Check that voltage measured between pins 1C77-B-A \*  
\* and 1C77-B-B is 26 VAC 1800 Hz. \*  
\*\*\*\*\*

	YES		NO---	Replace circuit breaker RUDDER MON GRN SUP 1C49
		[19]		
		-----		

||  
Sheet 9

Chart 107 (Sheet 8 of 11)

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## MAINTENANCE MANUAL

Continued From

Sheet 8

||  
YES  
||

\*\*\*\*\*  
\* On synchro pack 1C77, confirm fault of Green \*  
\* monitoring resolver by checking : \*  
\* 1) rotor resistance measured between pins 1C77-B-A\*  
\* and 1C77-B-B (this resistance must be \*  
\* approximately 3.8 Ohms). \*  
\* 2) stator resistance measured between pins 1C77-B-\*  
\* G and 1C77-B-E then 1C77-B-D and 1C77-B-F. \*  
\* (this resistance must be approximately 5 Ohms). \*  
\*\*\*\*\*

		-----
OK	NOT OK--	Replace synchro pack 1C77 [9]
		-----
		-----
-----		Check circuit wiring between synchro pack 1C77 and PFCU's C78 and C79 then between the resolvers on these PFCU's and the Green monito- ring comparator 1C48 (Green monitoring channel) Ref. WDM : 27-27-02.
		-----

Chart 107 (Sheet 9 of 11)

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## MAINTENANCE MANUAL

Continued From  
Sheet 5

NO

Continued From  
Sheet 2

NO

\*\*\*\*\*  
\* On ICOVOL indicator (First Officer's instrument \*  
\* panel) press and release ALARM RESET push button \*  
\* to extinguish the two red warning lights. \*  
\* On overhead panel, on Flight Control Unit, press \*  
\* and release RUDDER RESET push button and note \*  
\* deflection of rudders on ICOVOL indicator. \*  
\* Two cases are possible : \*  
\* Case No.1 : Only one rudder deflects \*  
\* Case No.2 : Both rudders deflect \*  
\*\*\*\*\*

Case No.1

Case No.2-

\*\*\*\*\*  
\* At zone 121, open access door 121FB ; trip, \*  
\* safety and tag circuit breakers listed in \*  
\* 27-26-11, Removal/Installation. \*  
\* On synchro pack 1C77, disconnect connector A \*  
\* then : \*  
\* 1) Check rotor resistance of Green control \*  
\* resolver, measured between pins 1C77-A-A and \*  
\* 1C77-A-B (this resistance must be approximately \*  
\* 3.8 Ohms) \*  
\* 2) Check stator resistance of Green control \*  
\* resolver, measured between pins 1C77-A-G and \*  
\* 1C77-A-E then 1C77-A-D and 1C77-A-F (This \*  
\* resistance must be approximately 5 Ohms) \*  
\*\*\*\*\*

OK

NOT OK--

Replace synchro pack 1C77  
[9]

Check aircraft wiring between resolvers 1C77  
and PFCU's C78 and C79 (Green Control channel)  
Ref. WDM : 27-26-01

Sheet 11

Chart 107 (Sheet 10 of 11)

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# Concorde

## MAINTENANCE MANUAL

Continued From

Sheet 10

Case No.1

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in \*  
\* 27-24-31, Removal/Installation. Depending on \*  
\* which rudder does not deflect open : \*  
\* fairing 351CL or 352CR and on PFCU C79 or C78 \*  
\* disconnect connector C, then : \*  
\* 1) Check rotor resistance of Green control resol- \*  
\* ver, measured between pins C-L and C-M : This \*  
\* resistance must be 23.3 Ohms approximately. \*  
\* 2) Check stator resistance of Green control resol- \*  
\* ver measured between pins C-P and C-N then C-U \*  
\* and C-A : This resistance must be 35 Ohms approxi- \*  
\* mately. \*  
\* 3) Check continuity between pins C-U and C-K. \*

\*\*\*\*\*

OK	NOT OK---	Replace synchro pack on PFCU C79 [8] or C78 [7]
-----		
Check aircraft wiring between PFCU C79 or C78 and autostabilization computer No.1 (1C31). Check synchro pack 1C77 (control resolver) and autostabilization computer No.1 1C31 power supply. Ref. WDM : 27-26-01		

Chart 107 (Sheet 11 of 11)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* WITH RUDDERS IN GREEN ELECTRICAL \*  
\* MODE, ONE FAILS TO DEFLECT. \*  
\*\*\*\*\*

GROUND EQUIPMENT REQUIRED

DESCRIPTION PART NO.

MULTIMETER \_\_\_\_\_  
CIRCUIT BREAKER \_\_\_\_\_  
SAFETY CLIPS \_\_\_\_\_  
ACCESS PLATFORM \_\_\_\_\_  
11.250m (36ft. 11in.) \_\_\_\_\_

\*\*\*\*\*  
\* On shelf 8-215, replace autostabilization computer\*  
\* No.1 1C31 [1]. \*  
\* Repeat tests which led to the fault \*  
\* Both rudders deflect. \*  
\*\*\*\*\*

|| |  
NO YES----| Replaced autostabilization computer was faulty.|  
||

\*\*\*\*\*  
\* Trip, safety and tag circuit breakers listed in \*  
\* 27-24-31 Removal/Installation. Depending on which \*  
\* rudder (upper or lower) does not deflect, open \*  
\* fairing 352CR or 351CL and on PFCU C78 or C79 \*  
\* disconnect connector C, then : \*  
\* 1) Check electrovalve impedance (1500 ohms \*  
\* approximately) measured between pins C-V and C-D \*  
\* then C-V and C-R. \*  
\* 2) Check continuity between pins C-R and C-J. \*  
\*\*\*\*\*

|| |  
OK NOT OK---| Replace Green electrovalve on PFCU C78 [7]  
| or C79 [8].  
||

Sheet 2

Chart 108 (Sheet 1 of 2)

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* On shelf 8-216, remove static monitoring change \*  
\* over unit C56 [5]. \*  
\* On circuit breaker panel 1-213, remove safety clip\*  
\* and set circuit breaker PFCS INV GRN FAIL IND 1C73\*  
\* (Map Ref. M15). \*  
\* Check that voltage measured (on rack connector) \*  
\* between pins C56-BA-47 and C56-BA-14 (ground) \*  
\* is 28 VDC. \*  
\*\*\*\*\*

 YES 	 NO==	----- Replace circuit breaker RUDDER CONT & MON GRN SUP 1C62 [20]. -----
-------------	----------	---

\*\*\*\*\*  
\* Check that voltage measured (on rack connector) \*  
\* between pins C56-BA-36 and C56-BA-14 (ground) \*  
\* is 28 VDC. \*  
\*\*\*\*\*

 YES 	 NO--	----- Replace circuit breaker RUDDER MON LOGIC GRN SUP 1C63 [21]. -----
-----		----- Replace static monitoring change over unit C56 [5]. -----

Chart 108 (Sheet 2 of 2)

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# Concorde

## MAINTENANCE MANUAL

*****	
* WITH RUDDERS IN GREEN ELECTRICAL	* GROUND EQUIPMENT REQUIRED
* MODE, ONE OF THEM LAGS.	*
*****	
DESCRIPTION	PART NO.
MULTIMETER	_____
CIRCUIT BREAKER	_____
SAFETY CLIPS	_____
ACCESS PLATFORM	_____
11.250 m (36 ft. 11 in.)	

\*\*\*\*\*  
 \* Repeat tests which led to the fault and visually \*  
 \* check that rudder lags. \*  
 \*\*\*\*\*

YES	NO----	Refer to trouble shooting procedure for flight control surface indicating circuit (Ref. 27-16-00, Trouble Shooting).

\*\*\*\*\*  
 \* On overhead panel : \*  
 \* - on AUTO STAB unit No.1 disengage YAW switch. \*  
 \* - on Flight Control Unit, place RUDDER switch in \*  
 \* MECH position (on ICOVOL indicator (First \*  
 \* Officer's instrument panel) both rudder magnetic \*  
 \* indicators must display M). \*  
 \* Deflect rudder pedals to right and left : rudder \*  
 \* lags. \*  
 \*\*\*\*\*

YES	NO----	Sheet 3

\*\*\*\*\*  
 \* On overhead panel, on SERVO-CONTROLS unit, place \*  
 \* upper selector switch in GREEN JAM (BLUE ONLY) \*  
 \* position. Deflect rudder pedals to right and \*  
 \* left : rudder lags. \*  
 \*\*\*\*\*

YES	NO	
Sheet	2	

Chart 109 (Sheet 1 of 5)

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## MAINTENANCE MANUAL

Continued From Sheet 1

YES	NO----	***** * Replace shuttle valve block on PFCU associated * * with the rudder which lags, C78 [7] or C79 [8] * * Deflect rudder pedals again to left and right ; * * rudder lags. * *****	
	YES	NO----	Replaced Green shuttle valve block was faulty
-----			
Replace PFCU associated with rudder which lags C78 [7] or C79 [8].			
-----			
***** * On overhead panel, on SERVO CONTROLS unit, place * * upper selector switch in BLUE JAM (GREEN ONLY) * * position. Deflect rudder pedals to right and left ; * * rudder lags. * *****			
YES	NO----	***** * Replace Blue shuttle valve block on PFCU * * associated with rudder which lags C78 [7] * * or C79 [8]. * * Deflect rudder pedals again to right and left ; * * rudder lags. * *****	
	YES	NO----	Replaced Blue shuttle valve block was faulty.
-----			
Replace PFCU associated with rudder which lags C78 [7] or C79 [8].			
-----			

Chart 109 (Sheet 2 of 5)

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

Continued From Sheet 1

\*\*\*\*\*  
\* On overhead panel, on Flight Control Unit, \*  
\* place RUDDER switch in GREEN position, then \*  
\* press and release RESET push button on RH side \*  
\* of switch. On ICOVOL indicator (First Officer's \*  
\* instrument panel) both rudder magnetic \*  
NO----\* indicators must display G. \*  
\* When deflecting rudder pedals, check, on PFCU \*  
\* associated with rudder which lags that input \*  
\* lever is disengaged. \*  
\* NOTE : For this check, refer to figure of \*  
\* sheet 5 of 5 in this chart. \*  
\*\*\*\*\*

||  
NO YES-----Sheet 4  
||

\*\*\*\*\*  
\* On shelf 8-216, on front face of the static \*  
\* monitoring change over unit C56, check that PILOT \*  
\* VALVES GREEN indicator light corresponding to the \*  
\* rudder which lags is illuminated. \*  
\*\*\*\*\*

||  
YES NO----| Replace static monitoring change over unit C56 |  
| [5]. |  
||

\*\*\*\*\*  
\* Replace Green electrovalve on PFCU associated with \*  
\* the rudder which lags C78 [7] or C79 [8] \*  
\* Deflect rudder pedals and check on PFCU associated \*  
\* with the rudder which lags that input lever is \*  
\* disengaged. \*  
\*\*\*\*\*

||  
YES NO----| Replace PFCU associated with the rudder which |  
| lags : C78 [7] or C79 [8]. |  
||  
-----| Replaced Green electrovalve was faulty. |  
-----

Chart 109 (Sheet 3 of 5)

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## MAINTENANCE MANUAL

Continued From

Sheet 3

YES

\*\*\*\*\*  
\* Replace autostabilization computer No.1 1C31 [1] \*  
\* Repeat tests which led to the fault ; rudder lags.\*  
\*\*\*\*\*

		-----
YES	NO----	Replaced autostabilization computer was faulty
		-----

\*\*\*\*\*  
\* Replace PFCU associated with rudder which lags ; \*  
\* C78 [7] or C79 [8] (faulty servovalve). \*  
\* Repeat tests which led to the fault ; rudder lags.\*  
\*\*\*\*\*

		-----
YES	NO----	Replaced PFCU was faulty.
		-----

\*\*\*\*\*  
\* Check that there is no interference between the \*  
\* two Blue and Green 26V 1800Hz generation systems \*  
\* by cutting off the Blue generation system. \*  
\* Check wiring between rudder which lags and rudder \*  
\* pedals with reference to the Wiring Diagram \*  
\* Manual. \*  
\*\*\*\*\*

Chart 109 (Sheet 4 of 5)

EFFECTIVITY: ALL

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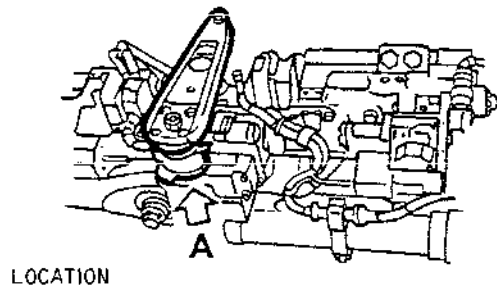
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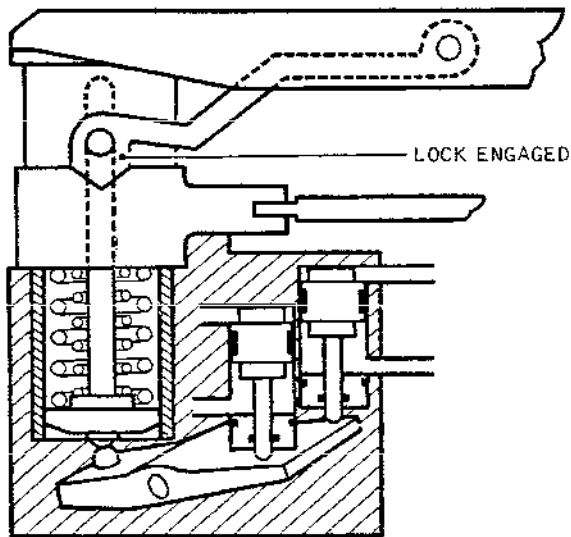
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## MAINTENANCE MANUAL

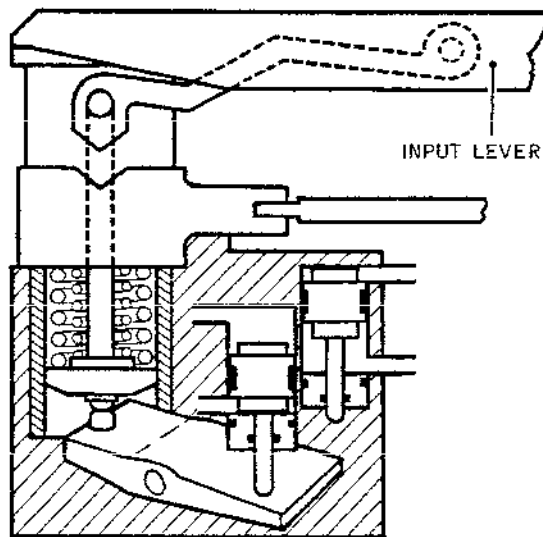


A



LOCK ENGAGED

A



INPUT LEVER

LEVER ENGAGED  
(2 ELECTROVALVES CLOSED)

LEVER DISENGAGED  
(1 ELECTROVALVE GREEN OR BLUE OPEN)

PFCU - ENGAGEMENT/DISENGAGEMENT OF INPUT LEVER

CMA 27 27 00 1 ALMO

Chart 109 (Sheet 5 of 5)  
Figure 103

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## MAINTENANCE MANUAL

*****		-----
* INCORRECT CHANGE OVER TO GREEN	*	GROUND EQUIPMENT REQUIRED
* MECHANICAL CHANNEL ; BOTH RUDDER	*	-----
* MAGNETIC INDICATORS STILL	*	DESCRIPTION PART NO.
* DISPLAY G.	*	-----
*****		MULTIMETER
		CIRCUIT BREAKER
		SAFETY CLIP
		-----

\*\*\*\*\*  
 \* On shelf 8-216, on front panel of static monitor- \*  
 \* ing change over unit (C56), PILOT VALVE GREEN- \*  
 \* UPPER and LOWER RUDDER indicator lights are illu- \*  
 \* minated. \*  
 \*\*\*\*\*

		-----
YES	NO---	No indicator light is illuminated.
		Replace static monitoring change over unit C56
		[5].
-----		

\*\*\*\*\*  
 \* On shelf 8-216, remove static monitoring change \*  
 \* over unit C56 [5]. \*  
 \* On circuit breaker panels 1-213 and 5-213, remove \*  
 \* safety clips and set circuit breakers PFCS INV GRN\*  
 \* FAIL IND 1C73 and PFCS INV BLUE FAIL IND 2C73 \*  
 \* (Map Ref. M15 and E11). \*  
 \* On rack connector C56, check that voltage \*  
 \* measured between pins C56-BA-35 and C56-BA-14 \*  
 \* (ground) then C56-BA-32 and C56-BA-14 (ground) \*  
 \* is 28 VDC. \*  
 \*\*\*\*\*

		-----
NO	YES---	Replace static monitoring change over unit C56
		[5].
-----		
		-----
-----		Replace Flight Control Unit C57 [6].
-----		

Chart 110 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[1] Autostabilization computer No.1	215-AS	8-215	1C31	Electronics rack - LH	22-22-11 R/I	27-26-01
[2] Autostabilization computer No.2	216-AS	8-216	2C31	Electronics rack - RH	22-22-11 R/I	27-26-01
[3] Green monitoring comparator	215-AS	8-215	1C48	Electronics rack - LH	27-37-11 R/I	27-27-02
[4] Blue monitoring comparator	216-AS	8-216	2C48	Electronics rack - RH	27-37-11 R/I	27-27-03
[5] Static monitoring change over unit	216-AS	8-216	C56	Electronics rack - RH	27-37-12 R/I	27-27-01
[6] Flight control unit	-	4-211	C57	Overhead panel	27-36-15 R/I	27-27-01
[7] PFCU	352-CR	352	C78	Vertical stabilizer	27-24-31 R/I	27-26-01 27-27-02 27-27-03
[8] PFCU	351-CL	351	C79	Vertical stabilizer	27-24-31 R/I	27-26-01 27-27-02 27-27-03
[9] Synchro pack	121-FB	121	1C77	Flight compartment- Under floor	27-26-11 R/I	27-26-01 27-27-02
[10] Synchro pack	121-FB	121	2C77	Flight compartment- Under floor	27-26-11 R/I	27-26-01 27-27-03
[11] Teleflex cable		211 212		Under rudder pedals	27-21-15 R/I	

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## MAINTENANCE MANUAL

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[12] Adjuster jack		211 212		Under rudder pedals	27-21-15 R/I	
[13] Control lever		211 212		Under rudder pedals	27-21-15 R/I	
[14] Circuit breaker 26 VAC		2-213	2C76	Map Ref. D4	24-50-00 R/I	27-26-01 27-27-03
[15] Circuit breaker 26 VAC		2-213	2C49	Map Ref. D3	24-50-00 R/I	27-27-03
[16] Circuit breaker 28 VDC		5-213	2C62	Map Ref. C11	24-50-00 R/I	27-27-01
[17] Circuit breaker 28 VDC		5-213	2C63	Map Ref. C12	24-50-00 R/I	27-27-01
[18] Circuit breaker 26 VAC		2-213	1C76	Map Ref. H6	24-50-00 R/I	27-26-01 27-27-02
[19] Circuit breaker 26 VAC		2-213	1C49	Map Ref. G3	24-50-00 R/I	27-27-02
[20] Circuit breaker 28 VDC		1-213	1C62	Map Ref. N11	24-50-00 R/I	27-27-01
[21] Circuit breaker 28 VDC		1-213	1C63	Map Ref. N12	24-50-00 R/I	27-27-01

Component Identification  
Table 101

### 4. Close-Up

Carry out close-up operations of Procedure to set Flight Controls in Electrical Mode (Ref. 27-00-00, Servicing).

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# *Concorde*

## MAINTENANCE MANUAL

### R        MONITORING CHANNELS - ADJUSTMENT/TEST

#### R    1.   General

R        Adjustment/Test procedures of Monitoring Channels are descri-  
R        bed in 27-17-00, Adjustment/Test.

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**END OF THIS  
SECTION**

**NEXT**

# *Concorde*

## MAINTENANCE MANUAL

### PITCH CONTROL - DESCRIPTION AND OPERATION

#### 1. General (Ref. Fig. 001 )

##### A. Manual Control

The control columns transmit their movement by cranks and rods and through the artificial feel system (AF) to :

- the powered flight control (PFCU) electrical control channel resolvers,
- the control lever of the relay jack which drives the PFCU mechanical controls.

The trim control wheels located on the centre pedestal operate :

- the PFCU resolvers,
- the relay jack,

without affecting the AF.

The relative elevon deflections are obtained by :

- electrical control via the resolvers,
- mechanical control via a mechanical system known as the mixing unit.

##### B. Auto Pilot

The aircraft is equipped with two auto pilot systems (APs). These two systems (AP1 and AP2) independent and electrically control the relay jack which drives in turn, via an auto pilot force limiter :

- the PFCU electrical control channel resolvers,
- the relay jack mechanical control linkage.

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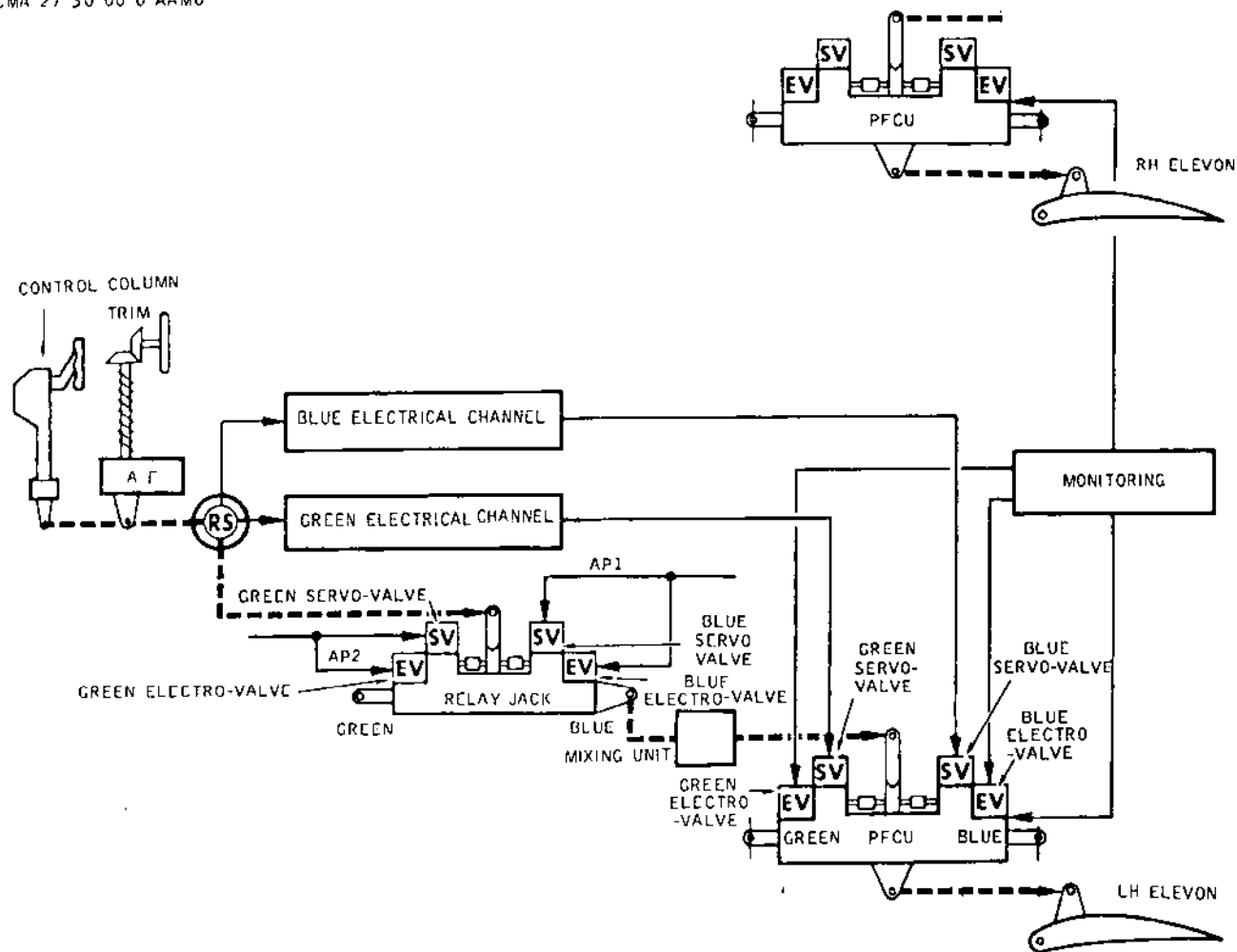
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# Concorde

## MAINTENANCE MANUAL

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Control Principles - Schematic  
Figure 001

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### 2. Operation

#### A. PFCU Electrical Control (Ref. Fig. 002 )

After leaving the resolvers, the control of the PFCUs is divided into two channels. The Blue channel and the Green channel. The Blue channel takes priority.

Each PFCU, comprises a body which is mechanically linked to the elevons and is moved by two jacks in tandem attached to the aircraft structure.

Each half of the PFCU body contains an electrically controlled spool valve which is associated with a servo-valve and an electro-valve.

The hydraulic pressure in each half of the body is controlled by the spool valve and the electro-valve.

By analogy with the hydraulic system which supplies them, the components of each body-half are termed Blue if they use the Blue system and Green if they use the GREEN system.

If nothing abnormal is disclosed by the electrical monitoring system, the Blue electro-valve opens and pressure is admitted to the Blue servo-valve. The Green electro-valve remains closed.

Electrical signals, transmitted by the Blue channel, control the proportional opening of the servo valve.

The signal regulated servo-valve receives the hydraulic pressure admitted by the electro-valve.

The regulated pressure displaces the Blue spool valve which being mechanically linked to the Green spool valve, moves the latter.

The Blue and Green hydraulic pressures at the spool valves are directed to the annular section of the jacks and the PFCU body then moves in the same direction as the spool valves.

The movement stops when the PFCU body finds a position of rest relative to the new position of the spool valves thus blocking the hydraulic pressure inlet ports.

EFFECTIVITY: ALL

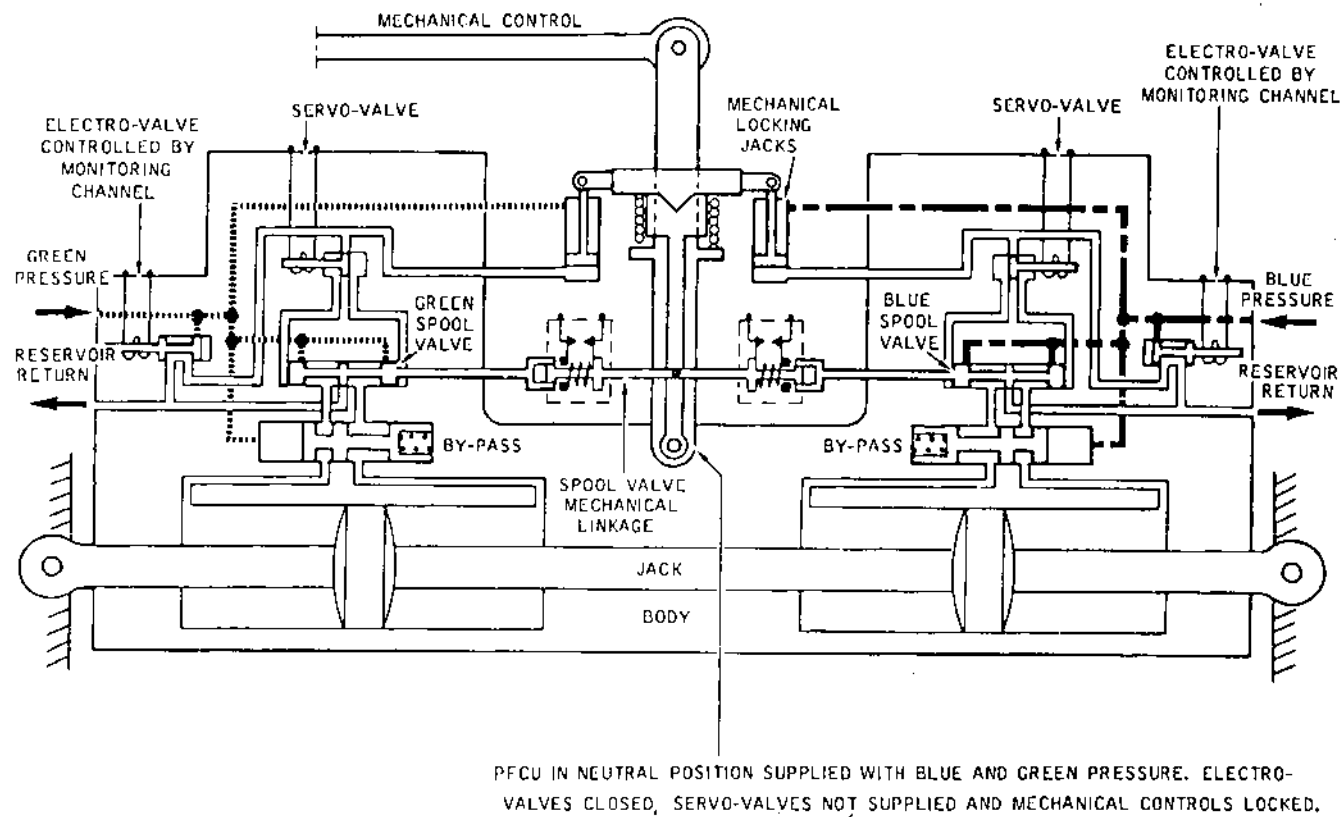
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CMA 27 30 00 0 ACMO



PFCU Control Principles - Schematic  
Figure 002

**27-30-00**

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# *Concorde*

## MAINTENANCE MANUAL

### B. Monitoring Channel

The Blue and Green electro-valves are controlled by an electronic monitoring system.

In normal control, when this system detects a fault during flight phase it automatically closes the Blue electro-valve and opens the Green electro-valve.

The Green servo-valve is then controlled by the Green electrical channels and activates the Green spool valve.

If the monitoring system detects a new fault, it closes the Green electro-valve.

An internal hydraulic system in the PFCU then locks the spool valve mechanical control lever.

### C. Mechanical Control (Ref. Fig. 003 )

The relay jack, mechanically controlled by the flight controls, operates the PFCU spool valves by means of cables rods and bellcranks.

Each relay jack comprises a body attached to the PFCU spool valve control linkage.

The body is moved by two jacks in tandem which are attached to the aircraft structure.

Each half of the body contains an electrically controlled spool valve which is associated with a servo-valve and an electro-valve.

Hydraulic power in each half of the body is held back by the spool valve and the electro-valve, and locks the relay jack control lever on the spool valves.

This lever, mechanically operated by the flight controls, moves the spool valves.

The Blue and Green hydraulic pressures are then directed to the annular sections of the jacks and the relay jack body moves in the same direction as the spool valves.

The movement stops when the body finds a position of rest relative to the new position of the spool valves, thus blocking the hydraulic pressure inlet ports.

EFFECTIVITY: ALL

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**27-30-00**

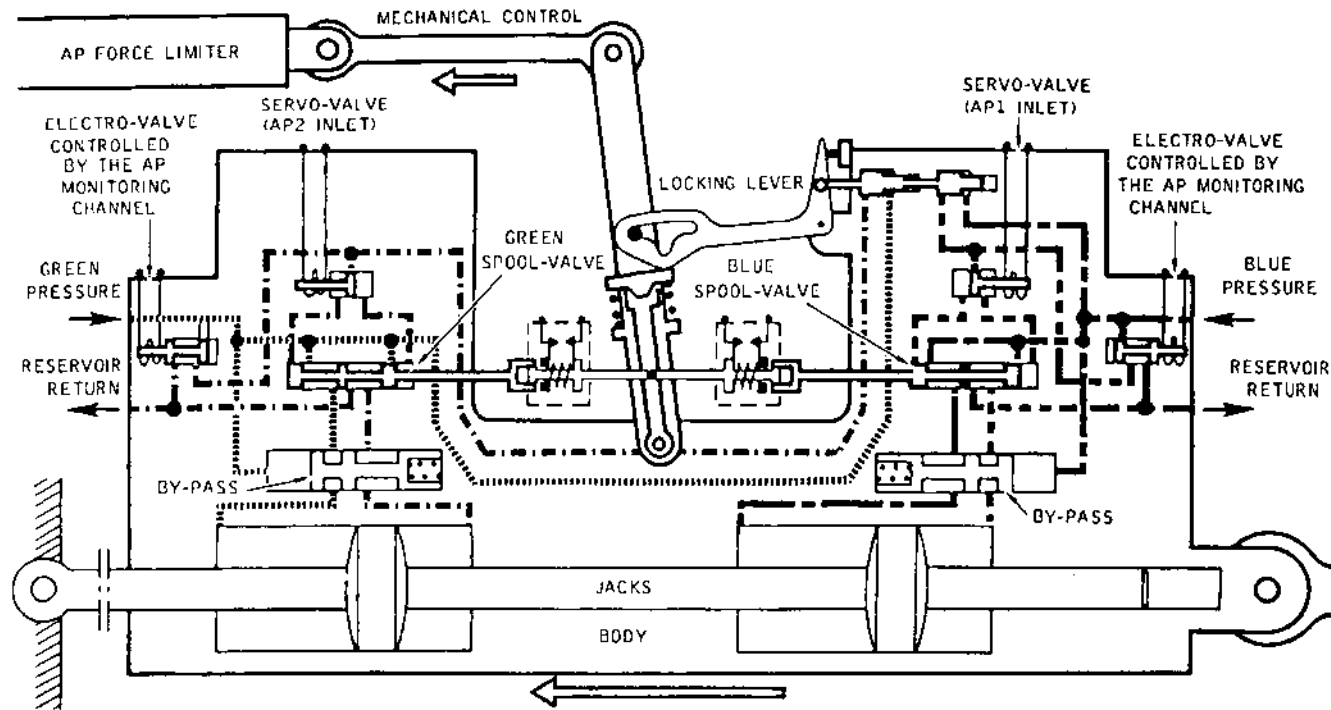
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# Concorde

## MAINTENANCE MANUAL

CMA 27 30 00 0 AEMU

RELAY JACK IN MECHANICAL MODE,  
LEVER LOCKED ON SPOOL VALVES



Relay Jack Control Principles - Schematic  
Figure 003

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## MAINTENANCE MANUAL

### D. Auto Pilot (AP)

By analogy with the hydraulic pressure which supplies them, the components of each body half are called Blue if they use the Blue system and Green if they use the Green system.

AP1 electrically controls the relay jack by the Blue servo-valve, AP2 by the Green servo-valve.

If nothing abnormal is disclosed by the AP electronic monitoring system, the Blue electro-valve opens, Blue hydraulic pressure is admitted to the Blue servo-valve and operates on the servo-valve mechanical control lever locking system.

This hydraulic locking jack unlocks the control lever from the spool valves and locks it on to the relay jack body.

The AP1 control signal opens the Blue servo-valve proportionally which regulates the hydraulic pressure admitted to the electro-valve.

This regulated pressure moves the Blue spool valve which, being mechanically attached to the Green spool valve, is also moved.

The Blue and Green hydraulic pressures held back by the spool valves are now directed to the annular sections of the jacks, the relay jack body moves in the same direction as the spool valves thus blocking the pressure inlet ports.

The relay jack displacement moves the input lever, which is locked on to its body, together with the PFCU mechanical control linkage.

The input lever displacement controls the PFCU electrical control resolvers and the manual flight controls via the AP force limiter.

In the AP1 mode, the relay jack monitoring system is supplied and opens the Blue electro-valve.

When the system detects a fault during flight phase, it automatically closes the Blue electro-valve and trips AP1.

The input lever is again locked on to the spool valves thus re-establishing manual control. If the pilot wishes to continue his flight in AP, he must switch on AP2, which functions in the same way as AP1 but using the Green hydraulic system.

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## MAINTENANCE MANUAL

### PITCH CONTROL - TROUBLE SHOOTING

#### 1. General

Trouble shooting is carried out by means of the FLIGHT CONTROLS ELECTRICAL CIRCUITS TEST SET (Ref.. 31-56-100).

This trouble shooting being common to the three sections ; 27-10-00 (Roll), 27-20-00 (Yaw), and 27-30-00 (Pitch), it is dealt with only once.

Refer to topic 27-10-00, Trouble Shooting

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## MAINTENANCE MANUAL

### MECHANICAL CONTROL - DESCRIPTION AND OPERATION

#### 1. General

R The mechanical control linkage between the flight compartment  
R and the PFCU is a stand-by system used in the event of electrical channel failure.

#### 2. Description (Ref. Fig. 001 )

The mechanical control channel comprises the following equipment :

- Control columns
- Torque tubes
- R - Shock absorber
- Control rods
- R - Artificial feel and integral trim assembly
- Synchro packs
- R - Autopilot force limiter
- Relay Jack
- Load limiting mechanism
- Jam detection strut
- Cable tension regulator
- Control cables
- Mixing unit
- Spring rod for outer and middle elevons, rigid rod for inner elevons
- Pressure seal bulkhead connection
- R - Control rods and bellcranks in wings
- R - Power flight control units (PFCU's)
- R - Elevons 1-2-3-4-5-6 for each wing

EFFECTIVITY: ALL

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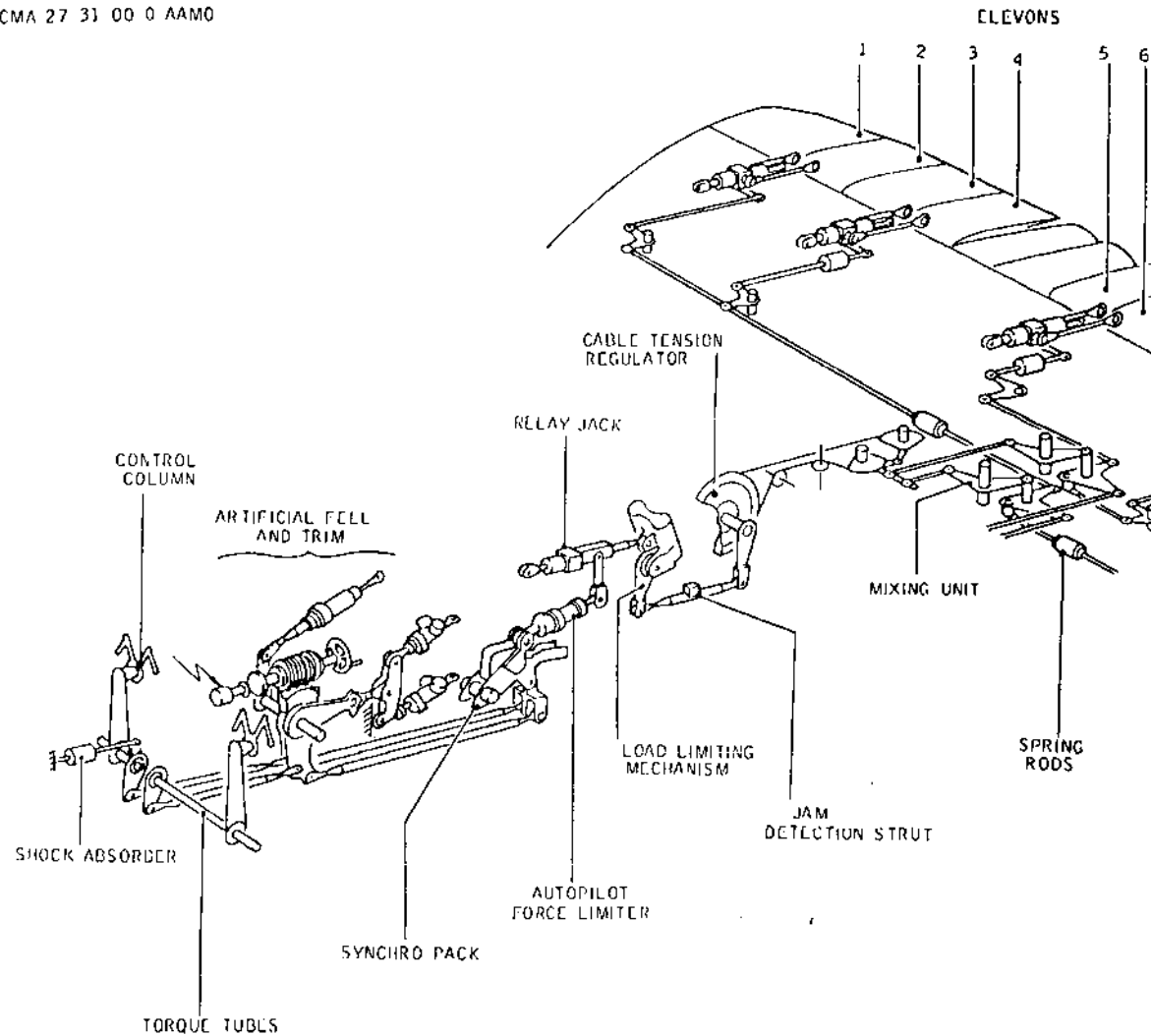
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## MAINTENANCE MANUAL

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Mechanical Pitch Control  
Figure 001

R

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## MAINTENANCE MANUAL

### 3. Shock Absorber (Ref. Fig. 002 )

The flight control movement shock absorber is connected by swivel joints, at the body end to the floor structure and at the piston end to a lever attached to the First Officer's torque tube.

It consists of a self-contained unit possessing its own hydraulic fluid reservoir. A gauge incorporated in the reservoir permits visual control of the fluid reserve.

R To guard against jamming of the shock absorber a shear point is provided at its connection to the torque tube.

At rest, the pressure is the same on both faces of the piston. When the piston is actuated in compression it forces hydraulic fluid from chamber 'A' to the reservoir through the restrictor valve 'a'. The restricted fluid passes via the reservoir and fills chamber 'B' through the restrictor valve 'b' which is opened under the effect of fluid pressure. When the piston is pulled, the reverse sequence takes place and hydraulic fluid passes from 'B' to 'A'. Consequently piston displacement speed and therefore that of the flight controls is limited by the restrictor valve flow.

R

R

R

R

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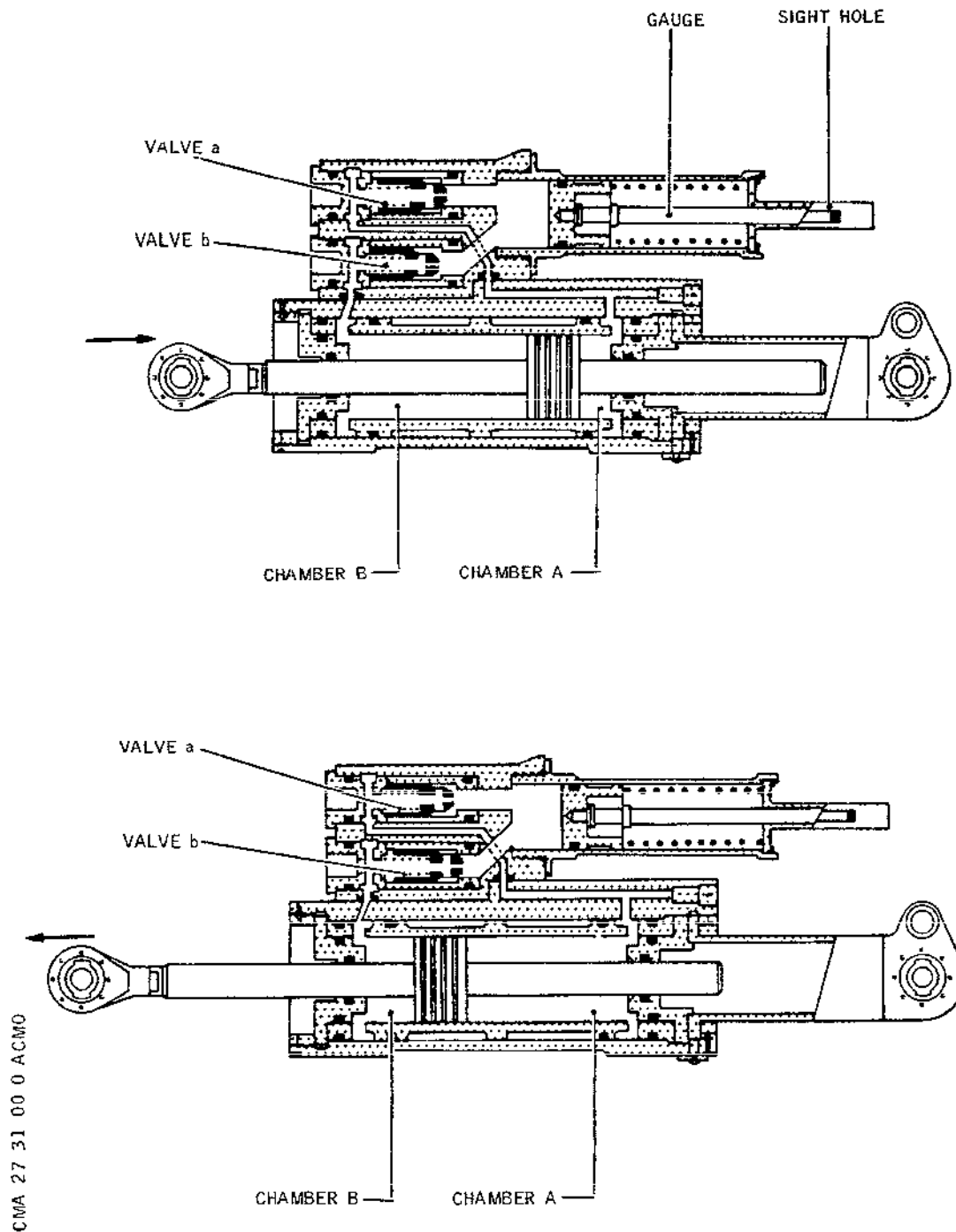
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## MAINTENANCE MANUAL



Shock Absorber Operation  
Figure 002

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## MAINTENANCE MANUAL

### 4. Load Limiting Mechanism (Ref. Fig.003 and 004)

- R The load limiting mechanism is composed of two parts pivoting about a common axis and installed on the relay jack support chassis. It comprises a spring pot directly controlled by the relay jack and an output lever to the control linkage downstream.
- R The spring pot consists of two chambers, each equipped with two concentric springs installed around and loading a spring retainer.
- R The spring retainers each receive a piston operated by a spigot hinged on the roller carrying arm.
- R The roller carrying arm pivots on the spring pot housing.
- R The output lever is equipped with a cam which engages the roller on the roller carrying arm.
- R Under the action of the relay jack, the spring pot drives the output lever via the roller maintained in the cam notch by the loading of the springs. If the load exerted on the lever exceeds the opposing load of the springs, the roller carrying arm compresses the springs via the pistons and the spring retainers. The roller leaves its notch and rolls on the cam profile.
- R As the load exerted on the lever decreases, the cam profile and the action of the springs tend to return the roller to its neutral position in the cam notch.

EFFECTIVITY: ALL

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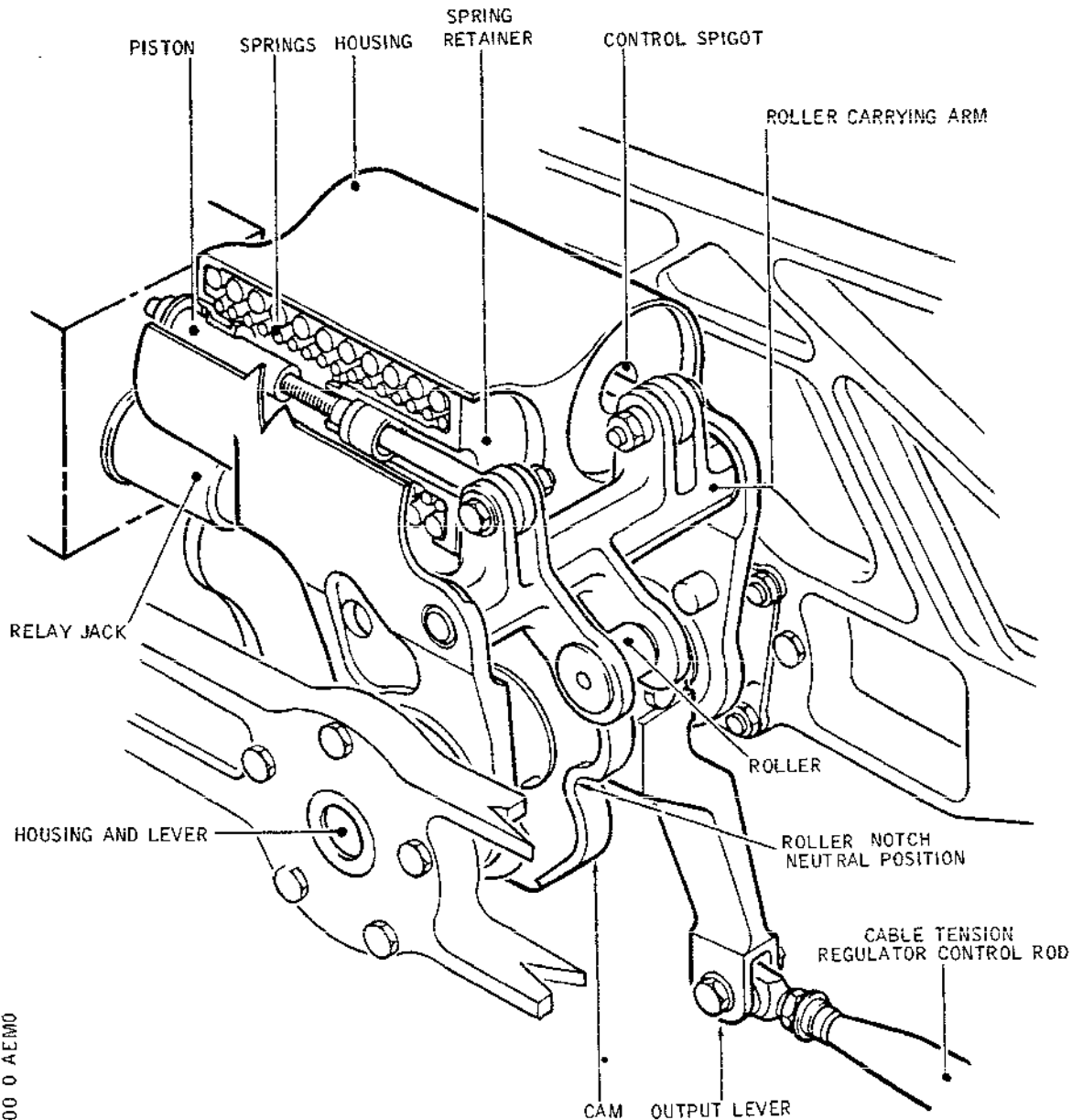
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## MAINTENANCE MANUAL



Load Limiting Mechanism - Description  
Figure 003

R

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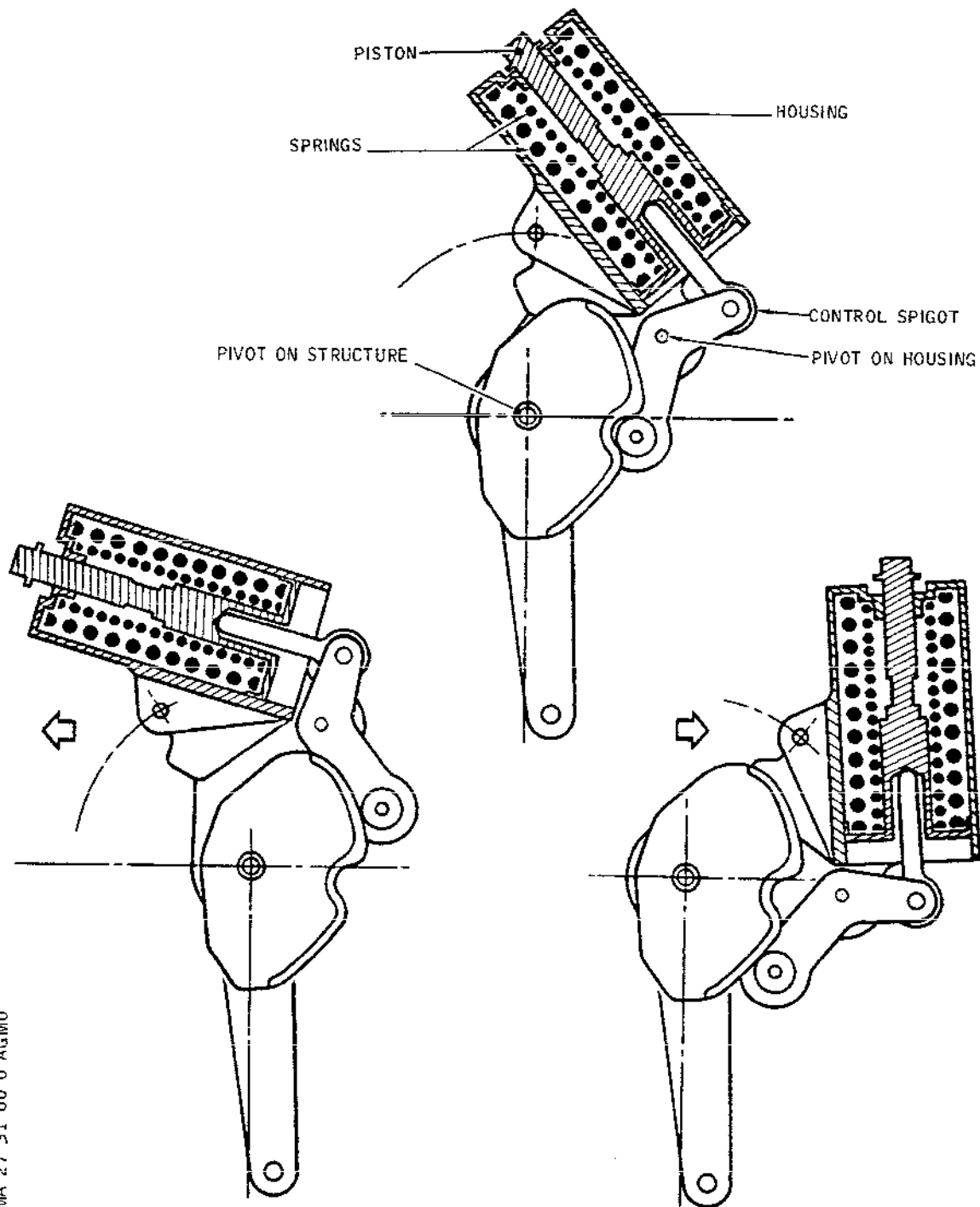
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Load Limiting Mechanism - Operation  
Figure 004

R

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## MAINTENANCE MANUAL

### 5. Cable Tension Regulator (Ref. Fig.005 and 006)

R The tension regulator fitted aft of the relay jack chassis under  
R the passenger compartment floor, comprises a compensating  
mechanism, two cable quadrants and two slack absorber jacks.

The compensating system forms an assembly pivoting between  
two support plates attached to the structure.

R The hub, the main part of the system, comprises two machined  
flanges perpendicular to the pivoting axis.

R Between these two flanges are attached two split cylinders  
guiding two springs, and a balance arm sliding on a locking  
shaft.

R The cable quadrants pivot independently about the compensating  
R system on bearings.

The slack absorber jacks connect each quadrant to one end of  
the compensating system balance arm.

Because of different coefficients of expansion of materials  
(structure/cables), the variations in temperature cause a  
change in cable tensions. The regulator compensates for these  
variations in tension.

R When cable tension increases the quadrants pivot, pulling on  
the balance arm via the slack absorber jacks. Under the effect  
R of the balanced load applied, the balance arm slides along the  
locking shaft compressing the compensating springs.  
A new balanced position of the system is obtained, correspon-  
ding to an adjusted cable tension.

R When cable tension decreases, the compensating springs push  
R back the balance arm along the locking shaft. The slack absor-  
R ber jacks transmit the movement and pivot the quadrants. Correct  
cable tension is maintained.

When a control load is applied the control lever operates the  
compensating mechanism assembly.

R The quadrant which actuates the cables must overcome the  
inertia and friction of the control linkage. The balance arm,  
held by the slack absorber jack of the quadrant loaded, pivots  
and wedges against the locking shaft, neutralizing the compen-  
sating system. The regulator assembly then acts as a single  
pulley. The balance arm, via the second slack absorber jack,  
R maintains a load opposite to the movement of the assembly on

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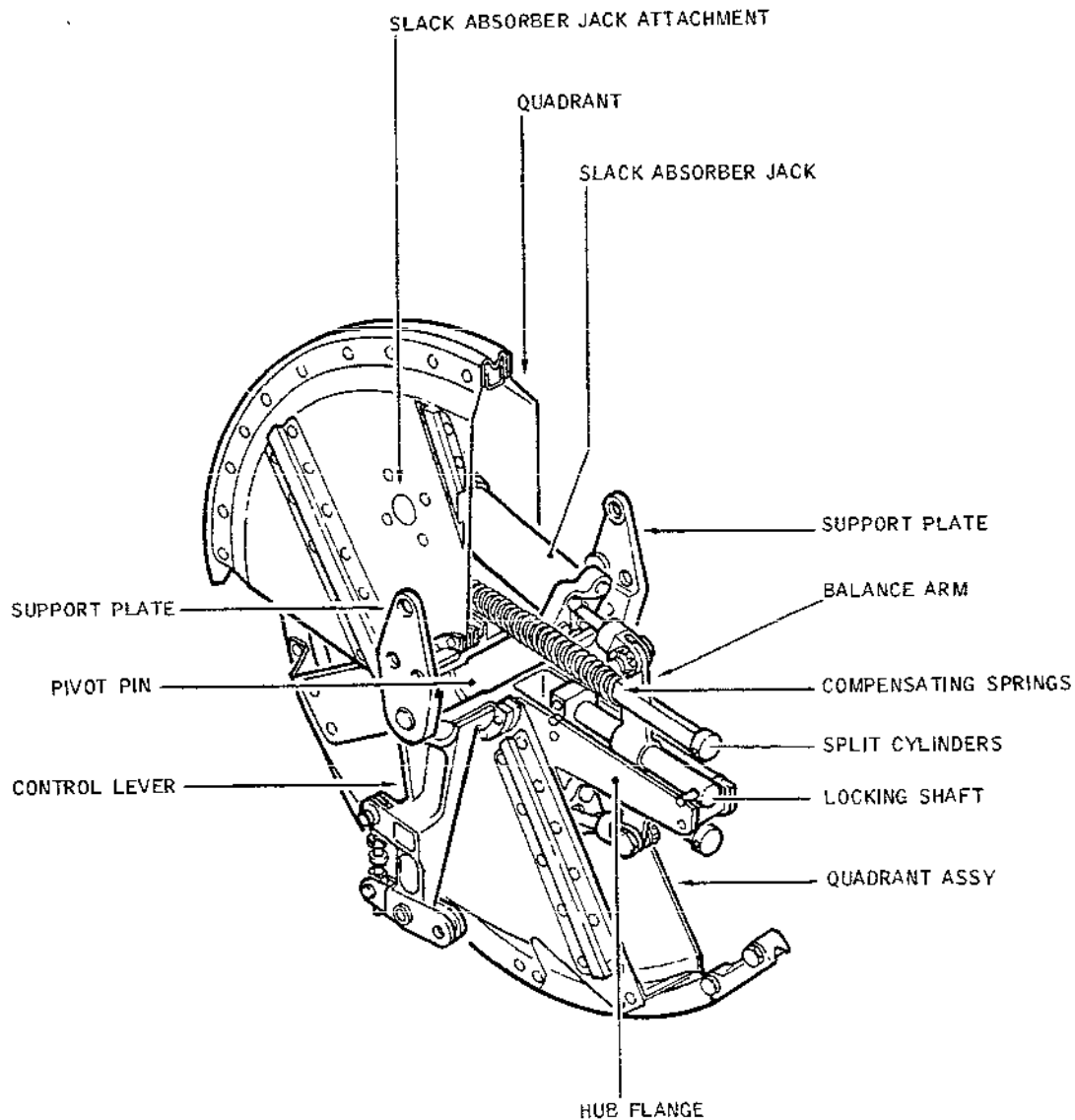
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## MAINTENANCE MANUAL



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Cable Tension Regulator - Description  
Figure 005

R

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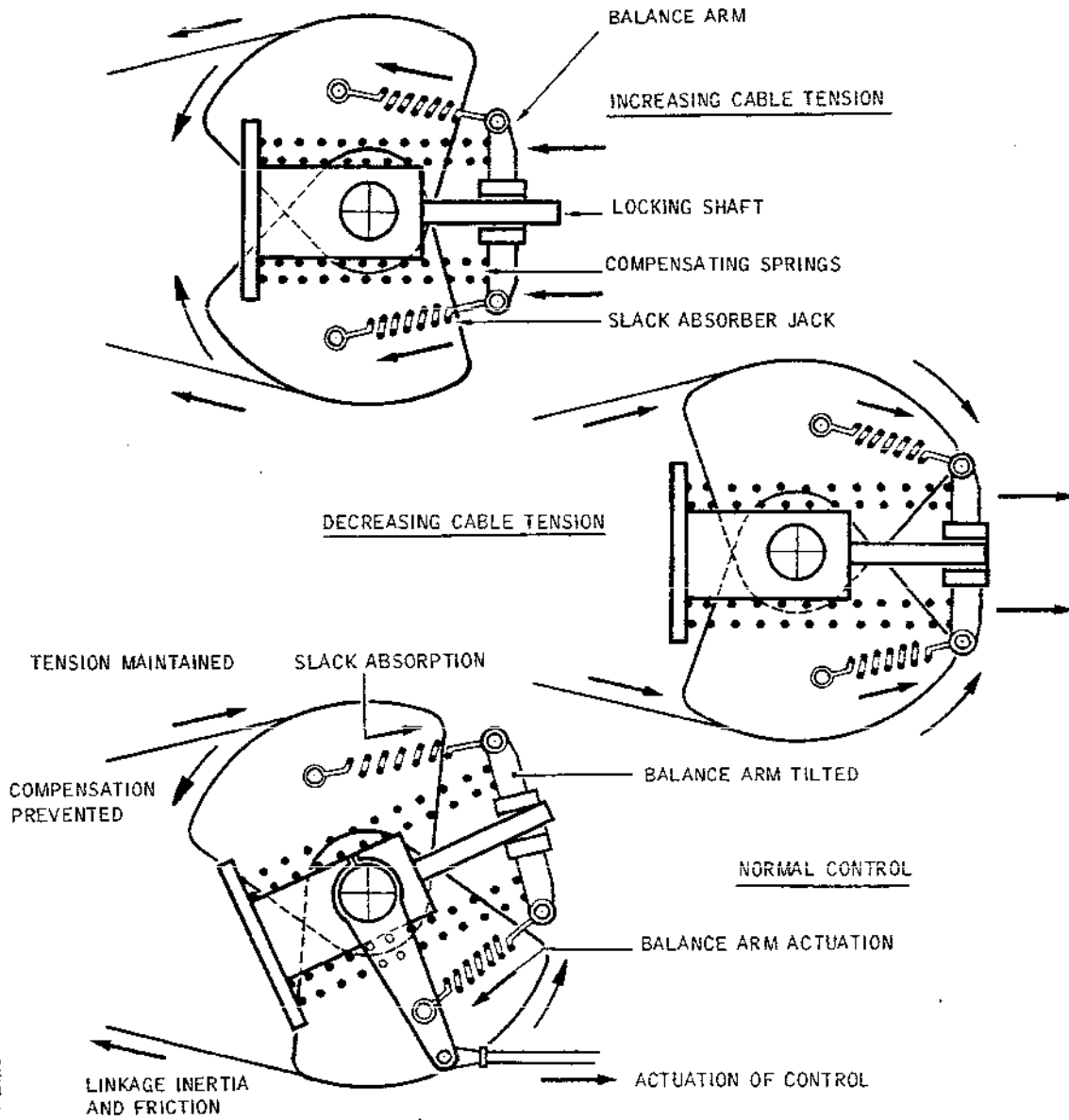
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Cable Tension Regulator - Operation  
Figure 006

R

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# *Concorde*

## MAINTENANCE MANUAL

the second quadrant and consequently a tension on the cable.

### 6. Mixing Unit (Ref. Fig. 007 )

R The mixing unit is mounted between frames 69 and 70 under the  
R passenger compartment floor. It is composed of two independent  
R stages. The upper stage controls the inner elevons and the lower  
stage the middle and outer elevons.

It comprises :

R An assembly of four quadrants and crank levers joined and pivoted  
by support beams anchored to the structure.

R A crank lever assembly pivoted on a beam and used to mix the  
pitch and roll commands.

R To the left of the assembly, two cable quadrants (R1, R2) of  
R opposite and combined displacement form the roll mixing input  
R system.

R The forward quadrant (R1) is fitted with two crank levers  
R pivoted on the same pin. The lower crank lever is longer than  
the upper crank lever and controls the middle and outer elevon  
R control linkage, whereas the upper crank lever controls the  
R inner elevons.

R These crank levers determine the variations of displacement in  
R roll between the inner elevons, and the middle and outer elevons  
R to minimize yaw moment.

R To the right of the assembly, two cable quadrants (P1, P2) of  
R opposite and combined displacement, form the pitch mixing input  
R system.

R The forward quadrant (P1) is equipped with two crank levers  
R pivoted on the same pin. The lower crank lever which is shorter  
R than the upper crank lever, controls the middle and outer  
elevons.

R These crank levers determine the variations of deflection  
between the middle and outer elevons.

R The crank lever comprises two superimposed bellcranks (PB)  
controlled by the pitch control cable quadrants and two super-  
R imposed crank levers (RL) controlled by the roll control cable  
R quadrants. To the rear two other superimposed bellcranks (CB)  
R distribute the movements to each wing ; they serve communally  
both pitch and roll.

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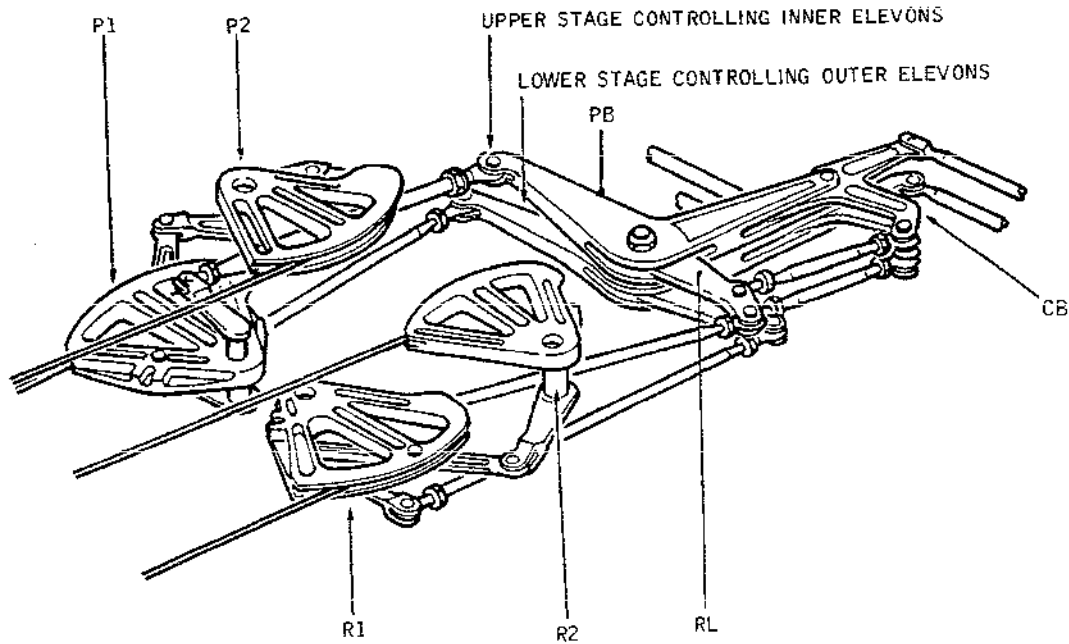
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## MAINTENANCE MANUAL

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Mixing Unit  
Figure 007

R

R

R

The two independent stages of the mixing unit operate on the same principle. Only the deflection values are different. Therefore, the operation of one stage only is described.

A. Roll Control  
(Ref. Fig. 008 )

R

The quadrants R1 and R2 are actuated by the roll control cables.

R

R

The quadrants P1 and P2 are immobile in the absence of pitch commands. Therefore the bellcrank PB is immobile.

R

R

In its movement, the quadrant R1 via control rod 1, drives the crank lever RL pivoted at O.

R

R

R

Crank lever RL via control rod 2, drives the bellcrank CB which pivots about the point OP (fixed in the absence of pitch commands).

R

The bellcrank CB drives the control linkage for each wing.

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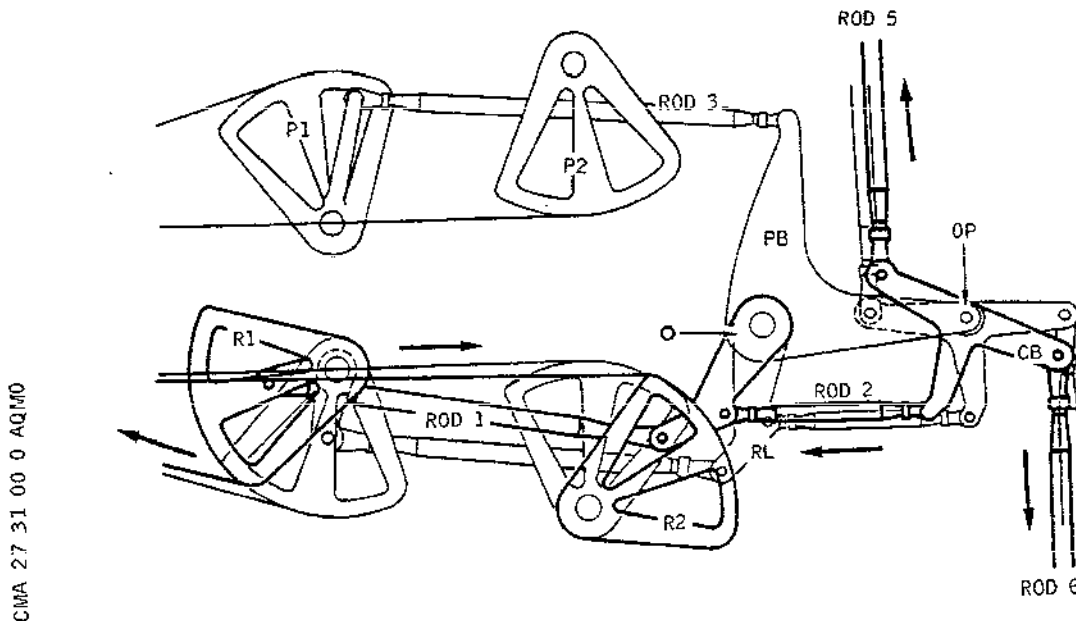
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## MAINTENANCE MANUAL

- R Handwheel maximum deflection :  $45^\circ$  each side of neutral.  
Elevon deflection : Outer and middle + or -  $20^\circ$ , inner + or -  $14^\circ$ .



One Stage of Mixing Unit - Roll Control  
Figure 008

- R
- B. Pitch Control (Ref. Fig. 009 )
- The quadrants P1 and P2 are actuated by the pitch control cables.
- R The quadrants R1 and R2 are immobile in the absence of roll control commands. The crank lever RL is immobile.
- R In its movement, the quadrant P1 via the control rod 3, drives the bellcrank PB which pivots about the fixed point O.
- R The bellcrank PB drives the bellcrank CB which, connected to the fixed crank lever RL displaces in parallel, driving the control linkages of each wing.
- R Control column maximum travel : Nose down  $9^\circ 16'$ .

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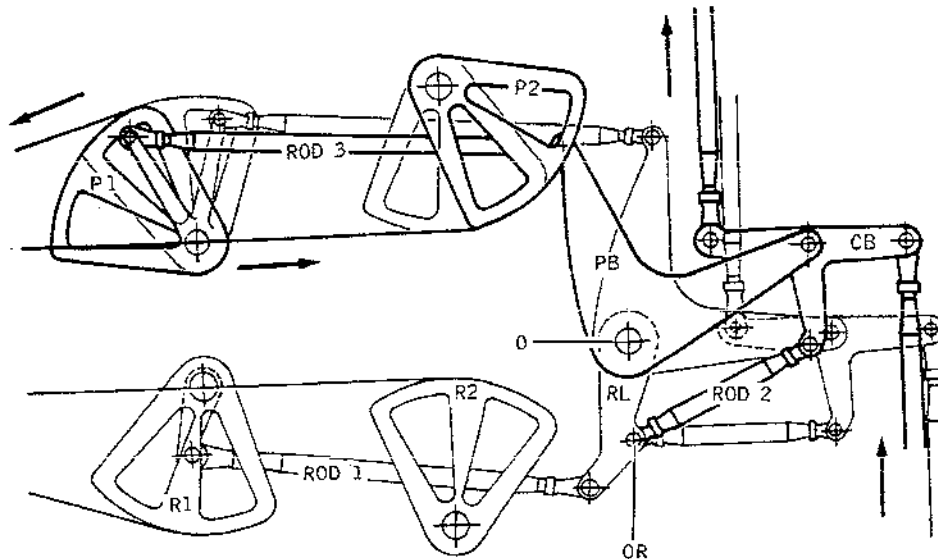
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R Nose up with compression of spring pot assembly :  $10^{\circ} 44'$ .

Elevon maximum deflection :

- R - With spring pot assembly compressed :  $17^{\circ}$  nose up and nose  
R down.  
R - Without spring pot assembly compressed :  $17^{\circ}$  nose up and  
R  $15^{\circ}$  nose down.

CMA 27 31 00 0 ASM0



One Stage of Mixing Unit - Pitch Control  
Figure 009

R

R C. Mixing  
R (Ref. Fig.010 and 011)

In mixing, only the quadrant pivot points and point 0 remain fixed.

According to the flight configuration the commands add or subtract for each wing. Elevons at the same position therefore have different deflections.

R For a maximum nose down or nose up position of the control  
R column and the spring pot assembly compressed, a roll de-  
R flection of  $2^{\circ} 52'$  can be obtained.

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## MAINTENANCE MANUAL

R For a maximum nose up position of the control column and  
R spring pot assembly compressed, a roll deflection of 4° can  
be obtained.

EFFECTIVITY: ALL

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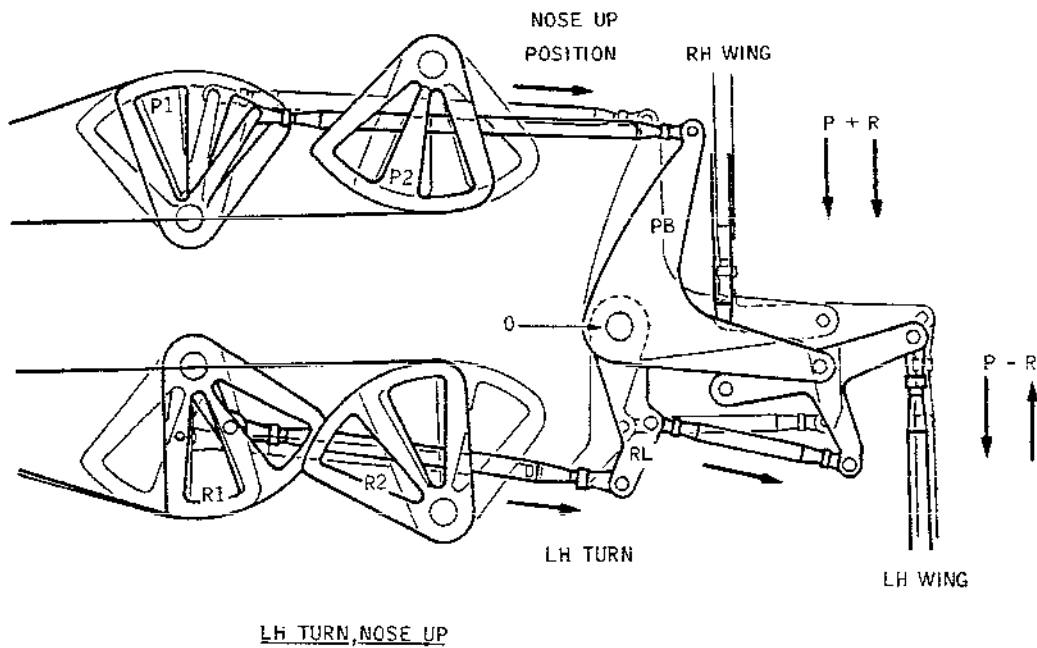
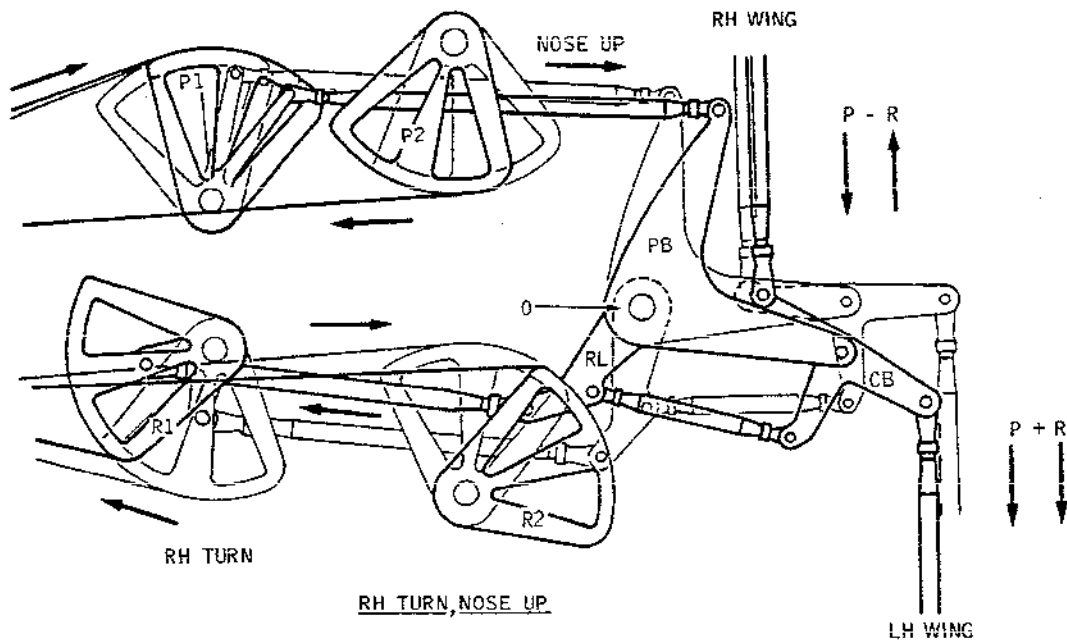
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## MAINTENANCE MANUAL



Mixing Operation  
Figure 010

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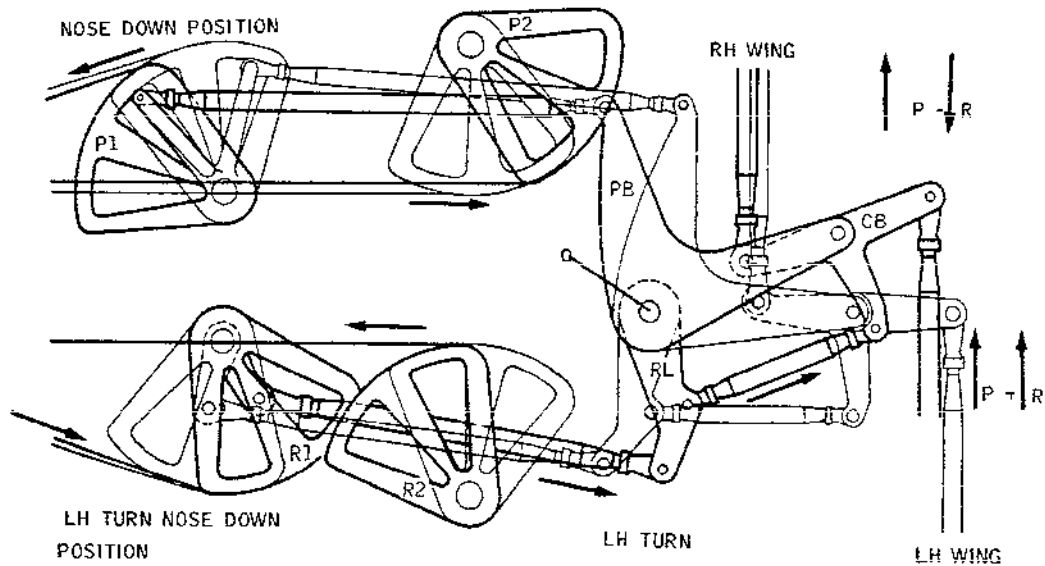
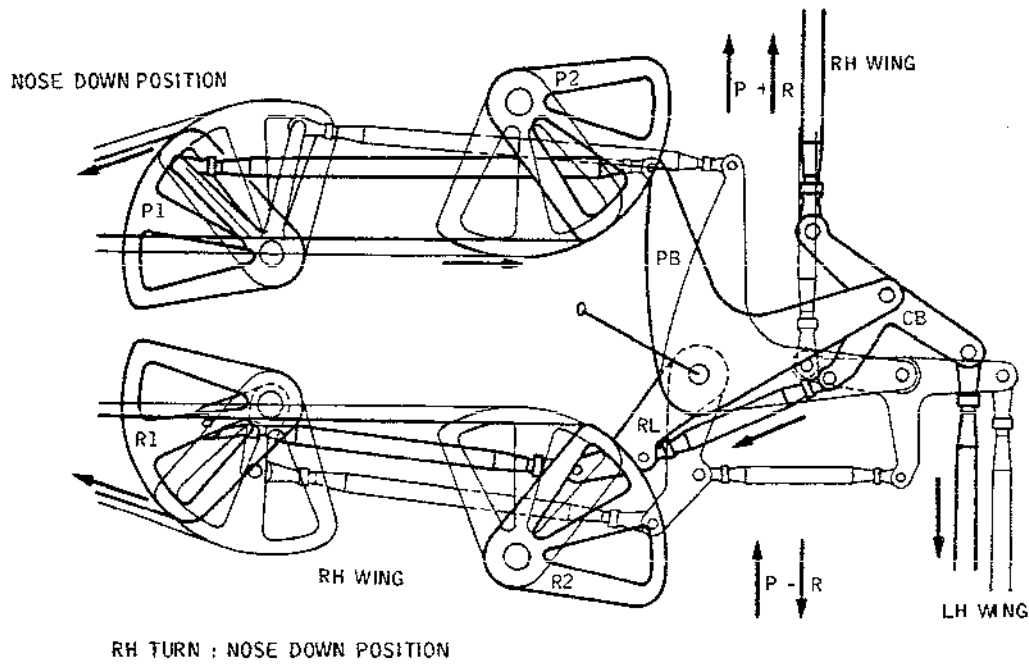
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## MAINTENANCE MANUAL



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Mixing Operation  
Figure 011

R

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## MAINTENANCE MANUAL

### 7. Elevons (Ref. Fig.012 and 013)

- R The elevons are linked in pairs by means of a shackle. Each pair  
R of elevons is operated by two rods controlled by the body of a  
PFCU.
- R Each elevon is hinged on the wing structure and connected to a  
R PFCU control rod.

EFFECTIVITY: ALL

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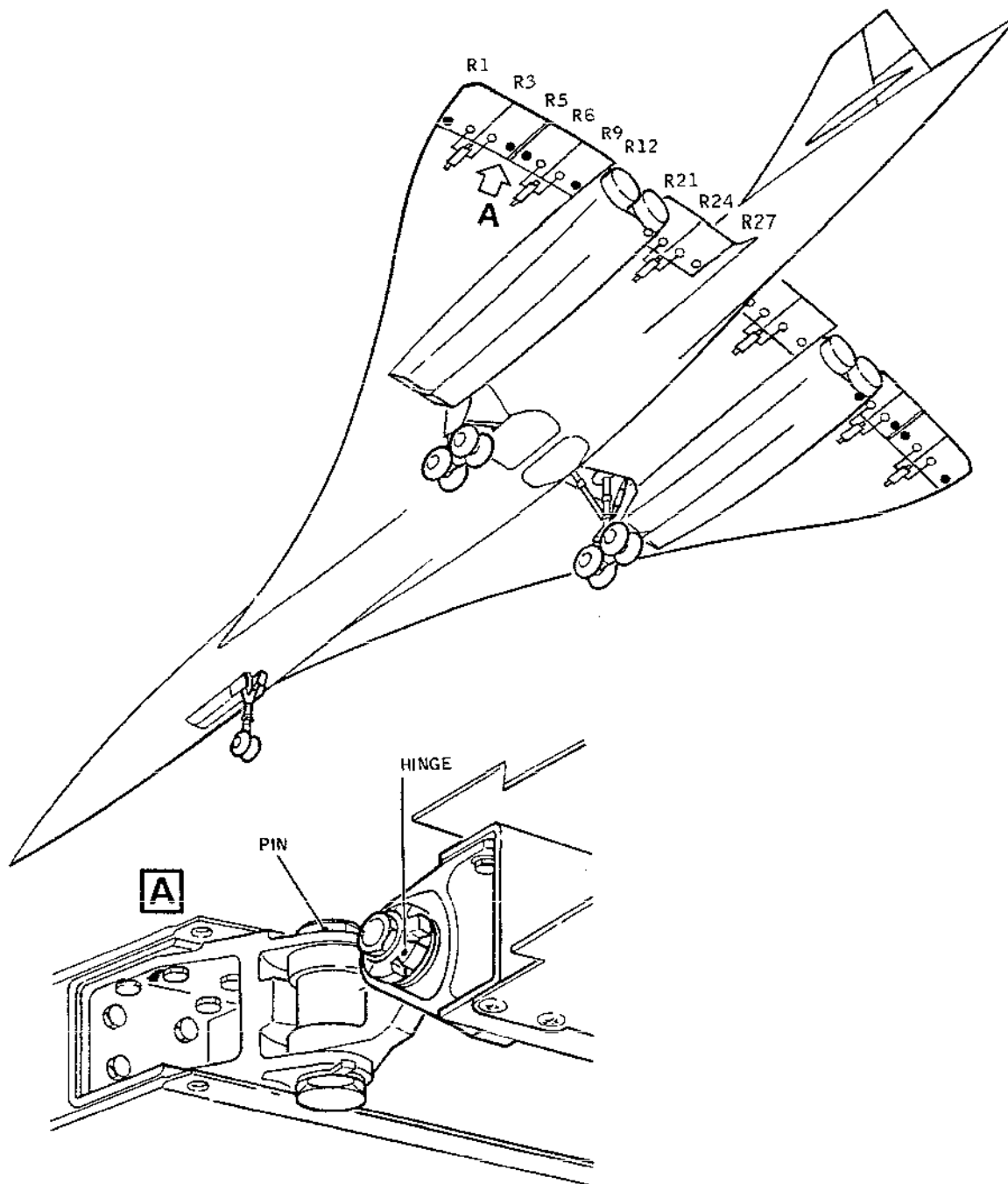
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Elevon Hinges  
Figure 012

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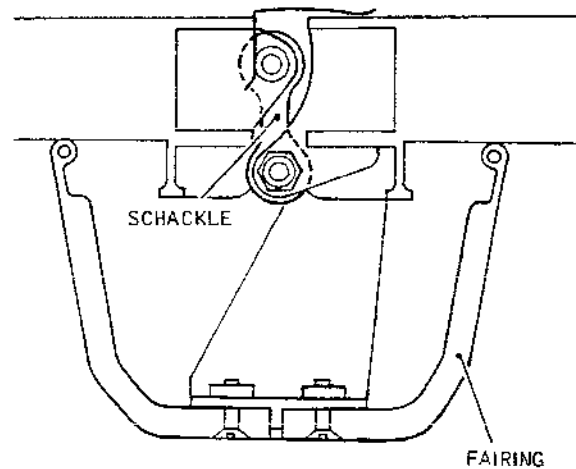
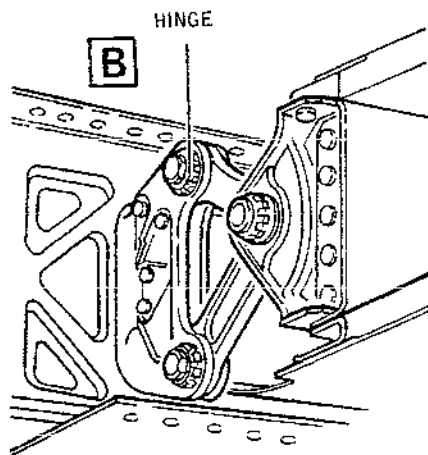
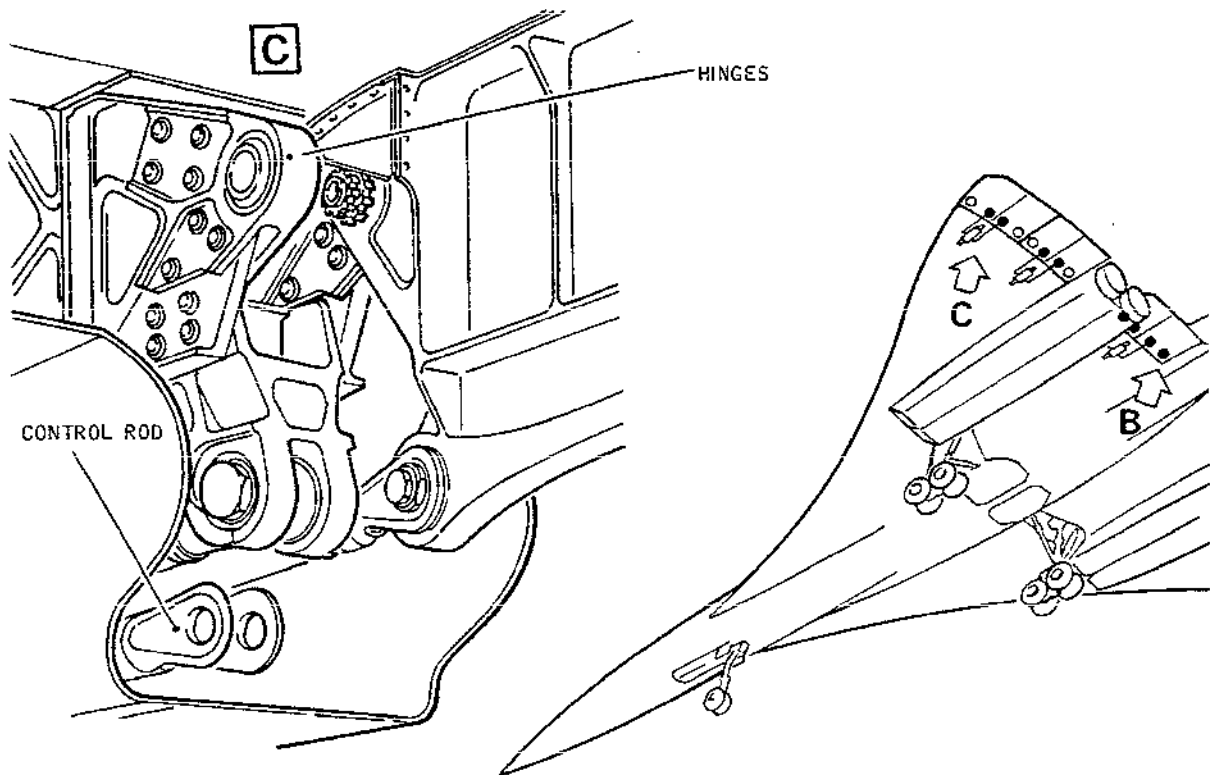
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Elevon Hinges and Connections  
Figure 013

R

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## MAINTENANCE MANUAL

### R 8. Operation of Each Control Section (Ref. Fig. 014 )

#### R A. Forward Fuselage Section

R Each control column is integral with a torque tube mounted under the flight compartment floor.

R The torque tube corresponding to the Captain's control column includes :

- R - Two fixed stops limiting the maximum elevon nose up and nose down deflection.
- R - A spring pot assembly installed on a fixed stop which limits elevon deflection to 15°, in nose up configuration only. However, this limit can be overridden by compressing this stop.
- R - A crank lever which actuates the artificial feel system input lever through an adjustable rod.
- R - A crank controls the flight data recorder potentiometers

R The First Officer's control column torque tube includes :

- R - the travel shock absorber actuating lever
- R - a bellcrank whose lower arm controls the artificial feel system and whose upper arm is fitted with a roller which travels inside a cam integral with the roll control torque tube. This system ensures direct limitation of the control column/handwheel travel in pitch/roll mixing.

R The artificial feel system input lever unites both the Captain's and First Officer's controls, and from this point on the control is common.

R Twin rods in parallel connect the artificial feel system input lever to the resolver control lever for the electrical control channel.

R The input lever to the synchro packs drives an autopilot force limiter spring rod with its upper crank.

R The spring rod directly actuates the spool valves of a relay jack, which compensates the inertia due to the length of the linkage, and interconnects the autopilot and the flight controls.

R The relay jack drives the mechanical linkage via a load limiting mechanism which protects the downstream control linkage.

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## MAINTENANCE MANUAL

### B. Centre Fuselage Section

R At the load limiting mechanism output, a jam detection strut  
R equipped with a microswitch drives a cable tension regulator  
which maintains the cable tension at the correct value despite length variations caused by thermal expansion.

R In the event of the mechanical controls jamming, compression  
R of the jam detection strut acting on the microswitch causes  
R the MECH JAM warning light located on overhead panel to  
R illuminate.

R The cables anchored to the tension regulators are routed  
under the cabin floor, guided by pulleys, and are then  
attached to two cable quadrants forming the input of a  
double mixing unit.

R The mixing unit comprises two stages of superimposed bell-  
R cranks, the upper set controlling the inner elevons, the  
lower set the middle and outer elevons.

R It is this arrangement which serves to modify the control  
ratio between the elevons.

R These bellcranks are also actuated by the roll controls.  
R In this manner they ensure the mixing of the pitch/roll  
R mechanical commands.

### R C. Wing Section (Ref. Fig. 015 )

R At the mixing unit output, four rods (two rigid rods for  
R inner elevon control and two spring rods for middle and  
R outer elevon control) drive two double rod and bellcrank  
R assemblies mounted in pressure seals, one for each wing.

R The control linkage, consisting of two rods per wing, runs  
the length of the web behind the wing spar box in an un-  
pressurized zone.

R These rods, via a bellcrank located at RIB26, transmit their  
R respective travel to a bellcrank located at RIB24. This  
R bellcrank transmits movement to control the middle and  
R outer elevons and via a spring rod, the spool valve of the  
PFCU operating the inner elevon.

R The control of the outer and middle elevons consists of a  
R single linkage from RIB24 onwards and is comprised of nine  
R rods and seven bellcranks located respectively at ribs 22,  
R 19, 15, 12, 9, 6 and 3.

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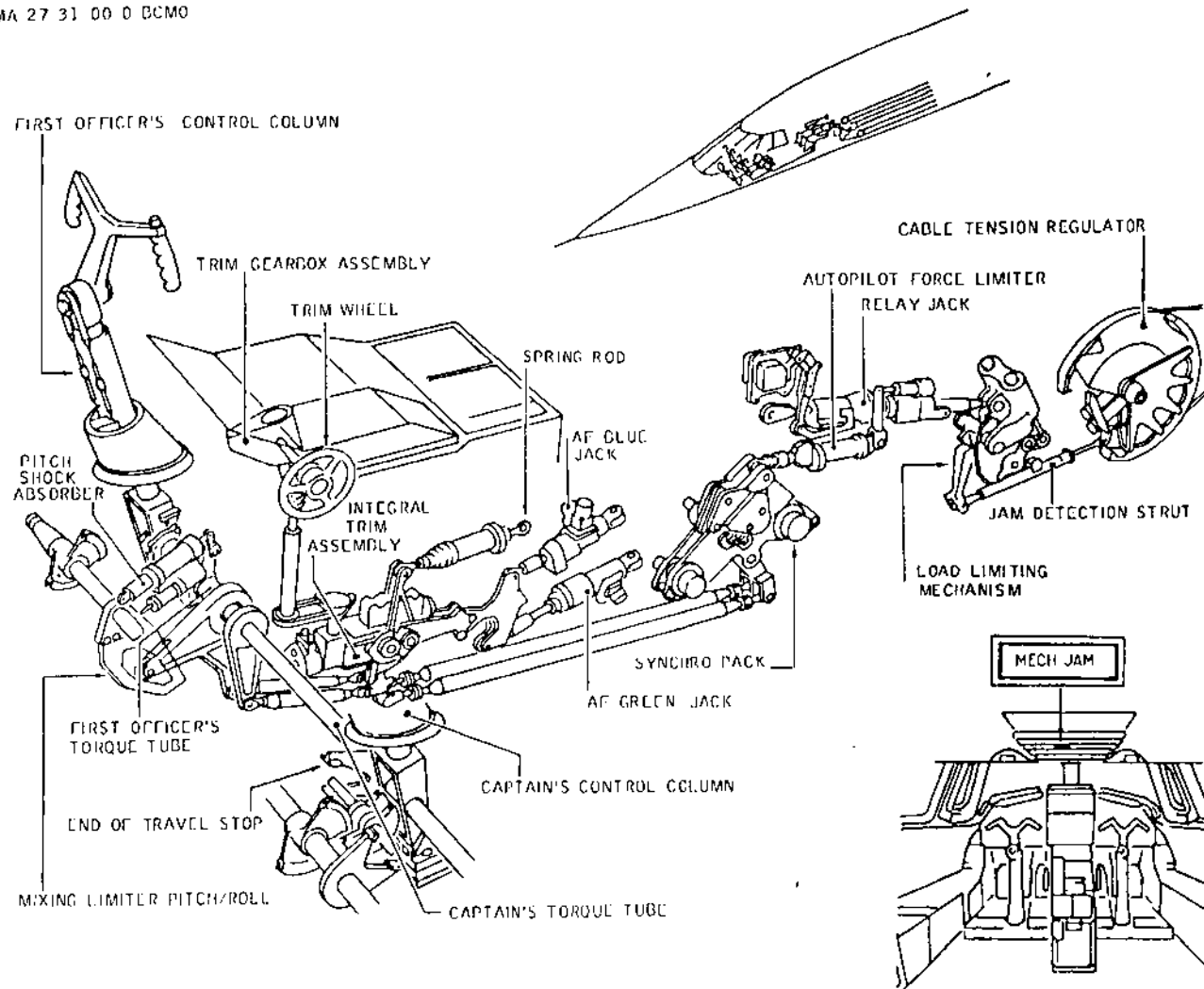
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Pitch Control in Fuselage  
Figure 014

R

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R PFCU's are mounted at RIBS9 and 3, and operate the elevons  
via fixed rods anchored to the PFCU body and to the control  
R surface. The PFCU spool valves are controlled by rigid rods  
for outer elevons and spring rods for middle elevons.

### 9. Operation

When the Captain's and First Officer's control columns are moved, their angular displacement becomes a linear movement from the torque tube onward.

R This linear movement actuates the relay jack input lever via a control rod. The lever opens the relay jack spool valves and hydraulic pressure is admitted, the relay jack body displaces and causes the cable tension regulators to rotate.

R The cables actuate the mixing unit which drives the input levers of the six PFCU's through a system of control rods and levers.

R These levers control the spool valves of each PFCU ; hydraulic pressure is admitted to the pistons and the PFCU bodies displace causing the elevons to deflect.

EFFECTIVITY: ALL

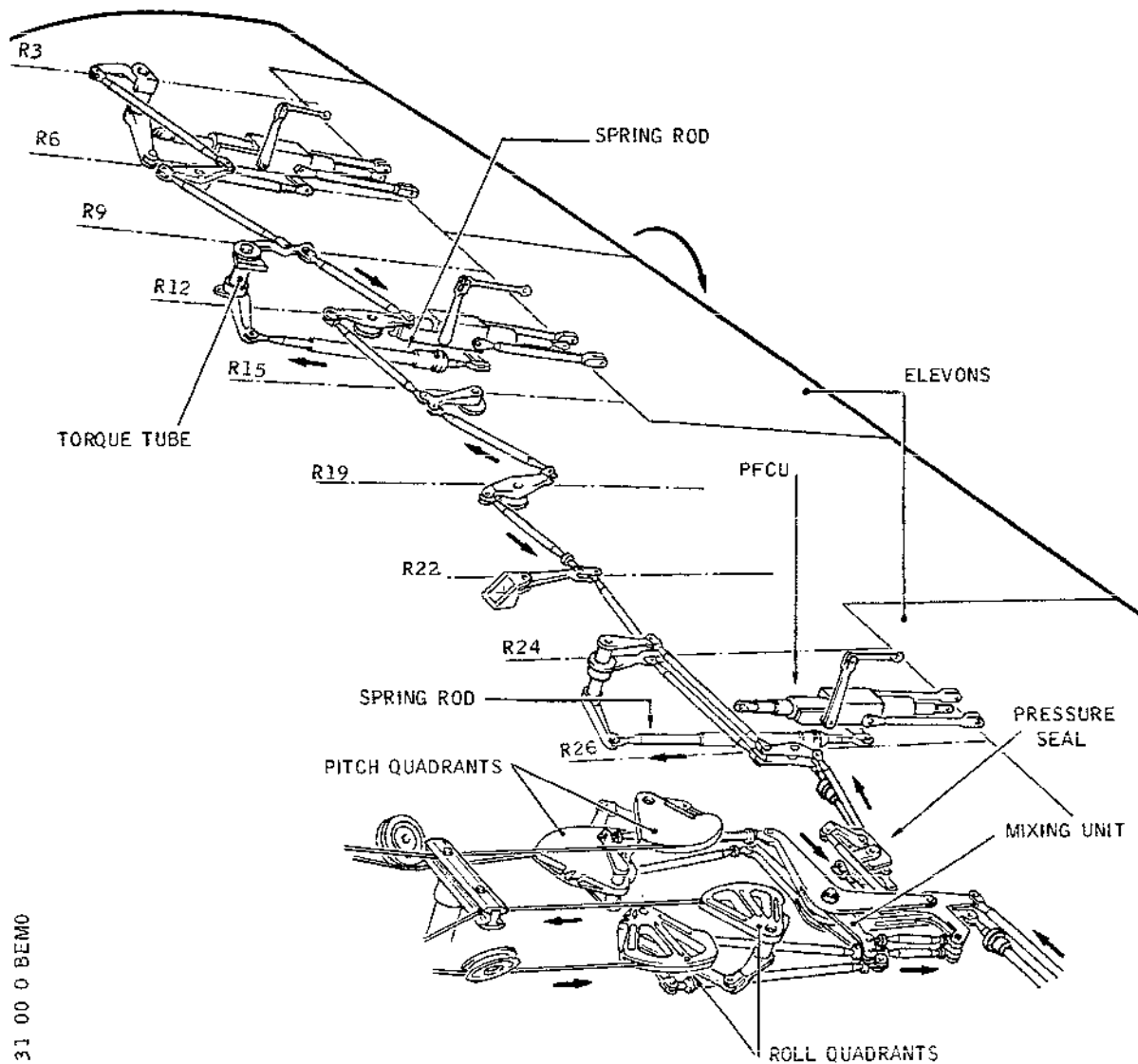
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## MAINTENANCE MANUAL



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Pitch Controls in Wing  
Figure 015

R

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## MAINTENANCE MANUAL

### MECHANICAL CONTROL - TROUBLE SHOOTING

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN 24-00-00, SERVICING.

#### 1. General

The following trouble shooting procedures are intended to enable faults found in the pitch mechanical channel to be rectified. These procedures are divided as follows :

- Trouble shooting in the event of resistance (friction) encountered when moving Flight Controls
- Trouble Shooting, downstream of the Relay Jack
- Trouble Shooting, control surfaces (elevons) do not return to neutral

The defect can be isolated with the aid of the trouble shooting procedures and traced through OK and NOT OK paths to the appropriate charts or other specified rectification action as may be necessary. If a defect occurs perform the appropriate rectification action, then repeat the operation at which the defect was encountered to ensure the operation is OK. Bracketed numbers in the procedures and charts indicate items on the component identification table (Ref. Table 101). The table provides information, including component location.

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### 2. Resistance (Friction) Encountered when Moving Flight Controls

#### A. General

This chapter provides a method of locating resistance (friction) encountered in a limited range of elevator deflection when moving Flight Controls.

This friction which may occur within a limited range of the total deflection of the Flight Controls corresponds to mechanical problems located between Flight Controls and the associated Relay Jack.

The proposed method is valid only for this type of fault and must not, under any circumstances, be used following reports that excessive load must be applied to deflect Flight Controls throughout their total travel range.

In this case, refer to paragraph 4 :

Control surfaces (elevons) do not return to neutral.

#### B. Prepare

##### (1) Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 9 ft. 8 in. (2.96 m)	
(2) Take the precautions described in the previous WARNING paragraph.	
(3) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).	
(4) Move control column from stop to stop and check for friction during actuation.	

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### C. Trouble Shooting

\*\*\*\*\*  
\* Remove artificial feel spring rod [1]. \*  
\* With Flight Controls in mechanical mode and hydraulic system pressurized, move control column from stop to stop. \*  
\* Resistance (friction) encountered. \*  
\*\*\*\*\*

OK	NOT OK--	Replace spring rod [1].
----	----------	-------------------------

\*\*\*\*\*  
\* Open door 121FB and immobilize pitch, roll and yaw resolvers with rigging pins D925252003, D925252001 and D925252002. \*  
\* Open door 121DB, disconnect the 4 rods from integral trim assembly lower lever. \*  
\* Operate artificial feel mechanism by actuating integral trim assembly lower lever. \*  
\* Actuation is carried out freely. \*  
\*\*\*\*\*

OK	NOT OK--	Actuation is not carried out freely. Resistance (friction) encountered Ref. Chart 101.
----	----------	--

\*\*\*\*\*  
\* Remove the two rods between torque tube and integral trim assembly lower lever. \*  
\* Move Captain's then First Officer's control column. \*  
\* Actuation is carried out freely. \*  
\*\*\*\*\*

OK	NOT OK--	Actuation is not carried out freely. Resistance (friction) encountered when moving Flight Controls Ref. Chart 102.
----	----------	--

\*\*\*\*\*  
\* Remove AP Force limiter [2]. \*  
\* CAUTION : DO NOT ALTER POSITION OF RELAY JACK INPUT LEVER WHEN REMOVING OR INSTALLING AP FORCE LIMITER. \*  
\* Remove rigging pin and actuate synchro pack lever. \*  
\* Actuation is carried out freely. \*  
\*\*\*\*\*

OK	NOT OK
----	--------

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```

||      |-----|
OK      NOT OK--| Replace synchro pack [12].      |
||      |-----|
*****
* By means of a spring scale, check load necessary *
* to actuate input lever of Relay Jack. Load      *
* measured at the end of input lever is less than  *
* 1 daN (2.25 lbf.).                               *
*****
||      |-----|
OK      NOT OK--| Load applied to input lever is greater than
||      |-----| 1 daN (2.25 lbf)
||      |-----| Replace Relay Jack [3].
||      |-----|
*****
* Replace AP Force limiter [2].                      *
* Install spring rod [1].                            *
* Install rods between integral trim assembly and   *
* torque tube.                                       *
* Bolt, special washer, flat washer, nut.          *
* Torque to between 27 and 32 lbf.in. (0.30 and 0.36 *
* m.daN). Safety with cotter pin.                  *
* Install rods between integral trim assembly and   *
* synchro pack.                                       *
* Bolt, special washers, flat washer, nut.          *
* Torque to between 27 and 32 lbf.in. (0.30 and 0.36 *
* m.daN). Safety with cotter pin.                  *
* Remove rigging pins from resolvers.               *
* Shut down pressurization of hydraulic systems (Ref.*
* 27-00-00, Servicing, Procedure to set Flight     *
* Controls in mechanical mode).                     *
* Close access doors and panels.                    *
* Remove tools and access platforms.                *
*****
```

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\*\*\*\*\*  
\* ACTUATION IS NOT CARRIED OUT FREELY \*  
\* RESISTANCE (FRICTION) ENCOUNTERED \*  
\*\*\*\*\*

\*\*\*\*\*  
\* The 4 rods are disconnected ; integral trim \*  
\* assembly lower lever is free. \*  
\* Manually rotate rocker arm of artificial feel \*  
\* jacks. \*  
\* This operation is carried out freely. \*  
\*\*\*\*\*

||  
||  
OK  
||  
||

NOT OK

\*\*\*\*\*  
\* Replace integral trim \*  
\* assembly [4]. \*  
\*\*\*\*\*

\*\*\*\*\*  
\* Disconnect Green artificial feel jack. \*  
\* Check that piston slides freely and pivots freely \*  
\* on its attachment point. \*  
\*\*\*\*\*

||  
OK  
||

NOT OK--| Replace green jack [5]. |

\*\*\*\*\*  
\* Disconnect Blue artificial Feel jack. \*  
\* Check that piston slides freely and pivots freely \*  
\* on its attachment point. \*  
\*\*\*\*\*

||  
OK  
||

NOT OK--| Replace Blue jack [6]. |

-----  
Replace artificial feel jack rocker arm [11].

Chart 101

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\*\*\*\*\*  
\* ACTUATION IS NOT CARRIED OUT FREELY \*  
\* RESISTANCE (FRICTION) ENCOUNTERED \*  
\* WHEN MOVING FLIGHT CONTROLS. \*  
\*\*\*\*\*

\*\*\*\*\*  
\* First Officer's side only. \*  
\* Check safety pin of shock absorber lever [10] at \*  
\* control column base. \*  
\* Safety pin is broken. \*  
\*\*\*\*\*

		-----	
NOT OK	OK--		Replace shock absorber [9] at control column
			base and shock absorber lever [10].
		-----	

\*\*\*\*\*  
\* Check that shock absorber slides freely and \*  
\* deflects freely about its attachment points. \*  
\*\*\*\*\*

		-----	
OK	NOT OK--		Replace shock absorber [9] at control column
			base.
		-----	

\*\*\*\*\*  
\* Disconnect all controls (rods) connected to \*  
\* Captain's and First Officer's torque tubes [7]. \*  
\* Check that torque tubes pivot freely about their \*  
\* hinge points. \*  
\*\*\*\*\*

		-----	
OK	NOT OK--		Replace defective torque tube [7].
		-----	

\*\*\*\*\*  
\* At Captain's side only, check that deflection of \*  
\* Flight data recorder potentiometer is carried out \*  
\* freely. \*  
\*\*\*\*\*

	-----	
NOT OK--		Replace potentiometer [8].
	-----	

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ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[1] Spring rod	213AF	213			27-32-12 R/I	
[2] AP force limiter	121FB	122			27-31-17 R/I	
[3] Relay Jack	121FB	122			27-34-14 R/I	
[4] Integral Trim assembly	121DB	122			27-33-13 R/I	
[5] Artificial feel jack - Green	121DB	122			27-34-13 R/I	
[6] Artificial feel jack - Blue	213AF	122			27-34-11 R/I	
[7] Torque Tube	113DB 121AB	121			27-31-12 R/I	
[8] Flight data recorder potentiometer	113DB 121AB	121			31-31-17 R/I	
[9] Pitch shock absorber	212NF 212NF	122			27-31-13 R/I	
[10] Shock absorber lever	212NF	122			27-31-16 R/I	
[11] Artificial feel rocker arm	121DB	122			27-32-14 R/I	
[12] Synchro pack	121GB	122		Under floor	27-36-11 R/I	

Component Identification  
Table 101

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### 3. Trouble Shooting, Downstream of the Relay Jack

#### A. General

This paragraph deals with trouble shooting of Flight Controls mechanical channel jamming detection circuit downstream of pitch and roll relay jack (MECH JAM warning, on overhead panel, on Flight Control Unit). The following trouble shooting is common to pitch and roll axes.

#### B. Prepare

##### (1) Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins - Synchro Pack	D925252000
Access Platform 3.220 m (10 ft. 7 in.)	
(2) Take the precautions described in the previous WARNING paragraph.	
(3) Carry out "Prepare" paragraph operations of Procedure to set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).	

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## MAINTENANCE MANUAL

### C. Trouble Shooting

\*\*\*\*\*  
\* When aircraft electrical network is energized \*  
\* MECH JAM warning must be visible on Flight Control \*  
\* Unit on overhead panel (hydraulic systems not \*  
\* pressurized, elevons in low position and pitch \*  
\* trim set to zero). \*  
\*\*\*\*\*

OK	NOT OK--	No pitch mechanical channel jamming detection : MECH JAM warning light is not illuminated Ref. Chart 107.
----	----------	---

\*\*\*\*\*  
\* On circuit breaker panel 1-213, trip, safety and \*  
\* tag circuit breaker PFCS ALL SURFACES MON GRN SUP \*  
\* (Map Ref. N13). On overhead panel, on Flight \*  
\* Control Unit MECH JAM warning light must remain \*  
\* illuminated. \*  
\*\*\*\*\*

OK	NOT OK--	Loss of redundancy of jamming detection supply system : MECH JAM warning light goes off. Ref. Chart 108.
----	----------	--

\*\*\*\*\*  
\* Set circuit breaker previously tripped then on \*  
\* circuit breaker panel 5-213, trip, safety and tag \*  
\* circuit breaker PFCS ALL SURFACES MON BLUE SUP \*  
\* (Map Ref. E12). \*  
\* On overhead panel, on Flight Control Unit MECH JAM \*  
\* warning light must remain illuminated. \*  
\*\*\*\*\*

OK	NOT OK--	Loss of redundancy of jamming detection supply system : MECH JAM warning light goes off. Ref. Chart 109.
----	----------	--

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OK

||

\*\*\*\*\*  
\* Reset circuit breaker previously tripped \*  
\* Pressurize Blue and Green hydraulic systems (Ref. \*  
\* 29-11-00 and 29-12-00, Servicing). \*  
\* - Elevons must return to trimmed position \*  
\* - On overhead panel \*  
\* - On SERVO CONTROLS unit, BLUE L. PRESS and GREEN \*  
\* L. PRESS caption lights must go off. \*  
\* - Cancel out PFC warning, if it is present, by \*  
\* pressing PFC warning light on master warning pa- \*  
\* nel \*  
\* - On Flight Control Unit press and hold MECH JAM \*  
\* warning light, it must remain illuminated, gong \*  
\* must sound and on master warning panel PFC war- \*  
\* ning light must illuminate. \*

\*\*\*\*\*

		-----
OK	NOT OK--	MECH JAM warning light goes off and PFC warning light does not illuminate. Replace Flight Control Unit C 57 [13].
		-----
OK	NOT OK--	MECH JAM warning light remains illuminated and PFC warning light does not illuminate (gong does not sound). Ref. Chart 110.
		-----

\*\*\*\*\*  
\* Release MECH JAM warning light : this warning \*  
\* light and PFC warning light must go off. \*  
\*\*\*\*\*

		-----
OK	NOT OK--	No disconnection of MECH JAM warning self-holding function : MECH JAM warning light does not go off. Replace Flight Control Unit C 57 [13].
		-----

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## MAINTENANCE MANUAL

OK

||

\*\*\*\*\*  
\* At zone 121, open access doors 121GB and 121FB \*  
\* then immobilize roll resolvers with rigging pin \*  
\* D925252001. \*  
\* Manually actuate jam detection strut C 269 located \*  
\* between Relay Jack C 8 and roll cable tension \*  
\* regulator, in order to compress its microswitch. \*  
\* On Flight Control Unit MECH JAM warning light must \*  
\* illuminate. \*  
\*\*\*\*\*

OK	NOT OK--	No detection of roll mechanical channel jamming : MECH JAM warning light is not illuminated. Replace jam detection strut C 269 [15] after checking whether current flows through micro-switch in compressed position.
----	----------	--

\*\*\*\*\*  
\* Remove pin D925252001. \*  
\* On Flight Control Unit, press MECH JAM warning \*  
\* light and release it : it goes off. \*  
\* Move control column from stop to stop. \*  
\* MECH JAM warning must not appear. \*  
\*\*\*\*\*

OK	NOT OK--	Loss of MECH JAM warning 800 ms timing : this warning only appears after rapid control actuation. Replace Flight Control Unit C 57 [13].
OK	NOT OK--	MECH JAM warning appears after a slow pitch control actuation. Ref. Chart 111.

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## MAINTENANCE MANUAL

OK

||

\*\*\*\*\*  
\* Move control handwheel from stop to stop \*  
\* MECH JAM warning must not appear. \*  
\*\*\*\*\*

||  
OK  
||

NOT OK--

-----  
MECH JAM warning appears after a slow roll  
control actuation

Ref. Chart 112  
-----

\*\*\*\*\*  
\* End of mechanical control trouble shooting \*  
\* downstream of Relay Jacks. \*  
\*\*\*\*\*

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*****		-----	
* NO PITCH MECHANICAL CHANNEL JAMMING*		GROUND EQUIPMENT REQUIRED	
* DETECTION : MECH JAM WARNING LIGHT *		-----	
* IS NOT ILLUMINATED.		DESCRIPTION	PART NO.
*****		-----	
		MULTIMETER	-----
		ACCESS PLATFORM	
		3.220 m (10 ft.	
		7 in.)	-----
		CIRCUIT BREAKER	
		SAFETY CLIPS	-----
		-----	

\*\*\*\*\*  
\* On overhead panel place and hold LO-HI-TEST \*  
\* switch in TEST position. \*  
\* MECH JAM warning light illuminates. \*  
\*\*\*\*\*

		-----	
YES	NO--	Ref. 33-14-00, Trouble Shooting	
		-----	

\*\*\*\*\*  
\* On circuit breaker panel 1-213 and 5-213, trip \*  
\* safety and tag circuit breakers PFCS ALL SURFACES \*  
\* MON GRN SUP and PFCS ALL SURFACES MON BLUE SUP \*  
\* (Map Ref. N13 and E12) at zone 121 open access \*  
\* door 121GB. \*  
\* WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 \*  
\* AND 3 PROHIBITING PRESSURIZATION OF BLUE, \*  
\* GREEN AND YELLOW HYDRAULIC SYSTEMS BY \*  
\* HYDRAULIC GROUND POWER UNIT. \*  
\* DISPLAY A WARNING NOTICE AT FLIGHT \*  
\* ENGINEER'S STATION PROHIBITING USE OF \*  
\* GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS \*  
\* On jam detection strut C 268 disconnect electrical \*  
\* connector then check jamming microswitch continuity \*  
\* measured between pins A and B. \*  
\*\*\*\*\*

		-----	
OK	NOT OK--	Replace Jam Detection Strut C 268 [14].	
		-----	
		-----	
		Replace Flight Control Unit C 57 [13].	
		-----	

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## MAINTENANCE MANUAL

*****		-----	
* LOSS OF REDUNDANCY OF JAMMING DETECTION SUPPLY SYSTEM : MECH JAM	*	GROUND EQUIPMENT REQUIRED	
* WARNING LIGHT GOES OFF.	*	DESCRIPTION	PART NO.
*****		-----	
		MULTIMETER	-----
		CIRCUIT BREAKER	-----
		SAFETY CLIPS	-----
		-----	

\*\*\*\*\*  
\* On circuit breaker panel 5-213, trip, safety and \*  
\* tag circuit breaker PFCS INV BLUE FAIL IND \*  
\* (Map Ref. E11). \*  
\* Unlock circuit breaker panel 15-216 and on shelf \*  
\* 12-216 remove relay C 112 [16]. \*  
\* Check continuity on relay between pins C2 and C3 \*  
\*\*\*\*\*

		-----	
OK	NOT OK--	Removed relay was faulty	
		-----	

\*\*\*\*\*  
\* Remove safety clip and tag and set circuit breaker \*  
\* tripped previously. \*  
\* Check on relay C 112 base that voltage measured \*  
\* between pin C3 and ground is 28 VDC. \*  
\*\*\*\*\*

		-----	
YES	NO--	Replace circuit breaker PFCS ALL SURFACES MON	
		BLUE SUP [19].	
		-----	
	-----	Replace Flight Control Unit C57 [13].	
		-----	

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*****		-----	
* LOSS OF REDUNDANCY OF JAMMING DETEC*	*	GROUND EQUIPMENT REQUIRED	
* TION SUPPLY SYSTEM : MECH JAM	*	-----	
* WARNING LIGHT GOES OFF	*	DESCRIPTION	PART NO.
*****		-----	
		MULTIMETER	-----
		CIRCUIT BREAKER	
		SAFETY CLIPS	-----
		-----	

\*\*\*\*\*  
\* On circuit breaker panel 1-213, trip, safety and \*  
\* tag circuit breaker PFCS INV GRN FAIL IND \*  
\* (Map Ref. M15). \*  
\* Unlock circuit breaker panel 15-216 and on shelf \*  
\* 12-216 remove relay C111 [17]. \*  
\* Check continuity on relay between pins C2 and C3. \*  
\*\*\*\*\*

		-----	
OK	NOT OK--	Removed relay was faulty.	
		-----	

\*\*\*\*\*  
\* Remove safety clip and tag and set circuit breaker \*  
\* tripped previously. \*  
\* Check on relay C111 base that voltage measured \*  
\* between pin C3 and ground is 28 VDC. \*  
\*\*\*\*\*

		-----	
YES	NO--	Replace circuit breaker PFCS ALL SURFACES MON	
		GRN SUP [18].	
		-----	
	-----	Replace Flight Control Unit C57 [13].	
		-----	

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*****	
* MECH JAM WARNING LIGHT REMAINS	* GROUND EQUIPMENT REQUIRED
* ILLUMINATED AND PFC WARNING LIGHT	* -----
* DOES NOT ILLUMINATE (GONG DOES NOT	* DESCRIPTION PART NO.
* SOUND).	* -----
*****	MULTIMETER -----
	CIRCUIT BREAKER
	SAFETY CLIPS -----
	ACCESS PLATFORM
	3.220 (10 ft.
	7 in.) -----
	RIGGING PINS -
	SYNCHRO PACK. D925252000
-----	

\*\*\*\*\*

\* On Flight Control Unit, release MECH JAM warning \*  
\* light ; it must go off. \*

\*\*\*\*\*

*****	
	*****
NO	YES---* Press MECH JAM warning light : it illuminates *
	*****
	NO YES--  Ref. 33-15-00, Trouble Shooting
	-----
	Replace Flight Control Unit C57 [13].
	-----

\*\*\*\*\*

\* Immobilize roll, yaw and pitch resolvers with pins \*  
\* D925252001, D925252002 and D925252003. \*  
\* On circuit breaker panels 1-213 and 5-213, trip \*  
\* safety and tag circuit breakers PFCS ALL SURFACE \*  
\* MON GRN SUP and PFCS ALL SURFACES MON BLUE SUP \*  
\* (Map Ref. N13 and E12). Disconnect connectors C268 \*  
\* and C269 from jam detection struts [14] and [15]. \*  
\* Check continuity between pins A and B of each \*  
\* microswitch C268 and C269. \*  
\* Four cases are possible : \*  
\* Case No.1 : No continuity on C268 and on C269 \*  
\* Case No.2 : continuity on C268 and on C269 \*  
\* Case No.3 : continuity on C269 only \*  
\* Case No.4 : continuity on C268 only \*

\*\*\*\*\*

||  
||

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*****		-----
* MECH JAM WARNING APPEARS AFTER A	*	GROUND EQUIPMENT REQUIRED
* SLOW PITCH CONTROL ACTUATION	*	-----
*****		DESCRIPTION PART NO.
*****		-----
*****		RIGGING PINS -
*****		SYNCHRO PACK. D925252000
*****		RIGGING PIN -
*****		MIXING UNIT -
* On Flight Control Unit, press MECH	*	SERVO CONTROL. D921310000
* JAM warning light and release it ;	*	SPRING SCALE OR
* it goes off.	*	EQUIVALENT WITH
* Move control handwheel from stop to	*	0.3 % ERROR OR
* stop.	*	LESS. -----
* MECH JAM warning light illuminates.*	*	-----
*****		-----

OK	NOT OK--	Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).	
		Open access door 121FB, immobilize roll, yaw and pitch resolvers with pins D925252001, D925252002 and D925252003.	
OK	NOT OK	Open access door 121GB. Disconnect jam detection strut from regulator.	
		By means of a spring scale, apply a load to cable tension regulator crank to actuate pitch linkage.	
OK	NOT OK	Load is less than 18 daN (40.56 lbf.).	
		-----	
OK	NOT OK	Replace jam detection strut C268 [14].	Load is greater than 18 daN (40.56 lbf.)
		-----	Check for friction on pitch linkage between cable tension regulator and mixing unit. Remove defective component

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||  
OK  
||

\*\*\*\*\*  
\* Set Flight Controls in electrical mode (Ref. 27-00-  
\* 00, Servicing). \*  
\* Open access door 121FB and immobilize roll, yaw \*  
\* and pitch resolvers with pins D925252001, D9252 \*  
\* 52002 and D925252003. \*  
\* Open floor panel 241HF, immobilize mixing unit \*  
\* with pin D921310000. \*  
\* CAUTION : DURING OPERATIONS CARRIED OUT AT ZONE 241 \*  
\* TAKE ALL NECESSARY PRECAUTIONS IN ORDER \*  
\* TO AVOID INTRODUCING INADVERTENTLY TOOLS \*  
\* OR MISCELLANEOUS ITEMS IN MIXING UNIT. \*  
\* Disconnect upper rod, mixing unit/pressure seal \*  
\* at LH wing. \*  
\* Using a spring scale, check load necessary to \*  
\* actuate wing linkage throughout free travel range \*  
\* (servo controls in electrical mode). \*  
\* Load exerted is equal to or less than 0.5 daN \*  
\* (1.12 lbf.). \*  
\*\*\*\*\*

		Load is greater than 0.5 daN (1.12 lbf.).
		Check for resistance (friction) :
		At LH pressure seal
OK	NOT OK--	On LH wing inner elevon mechanical control.
		Check load necessary to displace input lever of
		servo control [20] (PFCU).
		Remove defective component.

\*\*\*\*\*  
\* Disconnect upper rod, mixing unit/RH wing \*  
\* pressure seal. By means of a spring scale, check \*  
\* load necessary to actuate wing linkage throughout \*  
\* free travel range (servo controls in electrical \*  
\* mode). Load is equal to or less than 0.5 daN \*  
\* (1.12 lbf.) for a crank deflection angle of plus or \*  
\* minus 5° then increases up to 1.5 daN (3.37 lbf.) \*  
\* max. before the end of linkage free travel range. \*  
\* (Servo controls in electrical mode). \*  
\*\*\*\*\*

||  
OK NOT OK  
||

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OK	NOT OK--	Load is greater
		Check for resistance (friction) :
OK	NOT OK--	At RH pressure seal
		On RH wing inner elevon mechanical control
		Check load necessary to displace servo control
		[20] input lever.
OK	NOT OK--	Remove defective component.

\*\*\*\*\*  
\* Install upper rods, mixing unit/pressure seals ; \*  
\* bolts, special washers, flat washers, nuts. \*  
\* Safety with cotter pin. \*  
\* Disconnect spring rods linking mixing unit to \*  
\* pressure seals (lower rods). \*  
\* Pressure seal cranks pivot counterclockwise. \*  
\* Manually assist this movement. After linkage has \*  
\* reached balance point, load necessary to actuate \*  
\* wing crank in clockwise direction, must be less \*  
\* than the limits given in graph No.1 \*  
\* (Ref. Fig. 101 ) \*

OK	NOT OK--	Actuating load is greater than limits given in graph.
		Check for resistance (friction) :
OK	NOT OK--	At LH pressure seal
		On LH wing outer and middle elevon mechanical control
		Check load necessary to displace PFCU [21] input lever.
		Remove defective component.

\*\*\*\*\*  
\* Repeat the same operation on RH wing pressure \*  
\* seal. \*  
\* Load applied must be less than limits given in \*  
\* graph. \*  
\* (Ref. Fig. 101 ) \*

OK	NOT OK	

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OK

NOT OK--

Load applied is greater than limits given in graph  
Check for resistance (friction) :  
At RH pressure seal  
On RH wing outer and middle elevon mechanical control  
Check load necessary to displace PFCU [21]  
input lever  
Remove defective component.

\*\*\*\*\*  
\* Check for resistance on mixing unit \*  
\* section common to pitch and roll control \*  
\*\*\*\*\*

Chart 111 (Sheet 4 of 4)

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## MAINTENANCE MANUAL

*****		-----	
* MECH JAM WARNING APPEARS AFTER A	*	GROUND EQUIPMENT REQUIRED	
* SLOW ROLL CONTROL ACTUATION	*	-----	
*****		DESCRIPTION	PART NO.
*****		-----	
* Take the precautions described in	*	RIGGING PINS -	
* the previous WARNING paragraph	*	SYNCHRO PACK.	D925252000
* Set Flight Controls in electrical	*	RIGGING PIN -	
* mode (Ref. 27-00-00, Servicing)	*	MIXING UNIT -	
* Open access door 121FB and	*	SERVO CONTROL.	D921310000
* immobilize roll, yaw and pitch	*	SPRING SCALE	
* resolvers with rigging pins D9252	*	OR EQUIVALENT	
* 52001, D925252002 and D925252003.	*	WITH 0.3 % ERROR	
* Open access door 121GB and	*	OR LESS.	-----
*****		-----	
* disconnect jam detection strut from*	*		
* cable tension regulator.	*		
* By means of a spring scale, apply a*	*		
* load to cable tension regulator	*		
* crank to actuate roll linkage.	*		
* Actuating load is less than 18 daN *	*		
* (40.56 lbf.).	*		
*****			
OK	NOT OK-----	Load is greater than 18 daN (40.56	
		lbf.). Check for resistance (fric-	
		tion on roll control between cable	
		tension regulator and mixing unit.	
		Replace defective component.	
-----		-----	
Replace jam detection			
strut C269 [15].			
-----			

Chart 112

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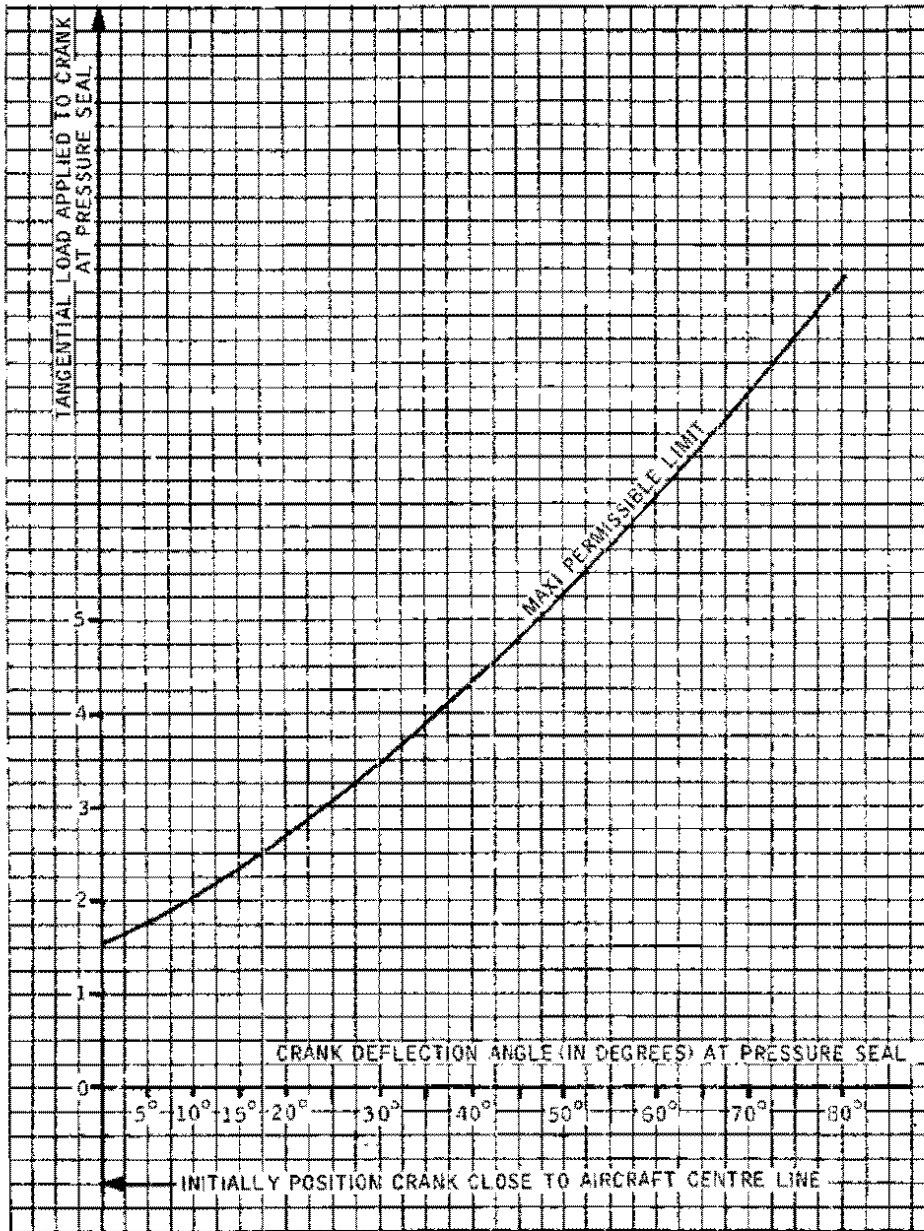
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## MAINTENANCE MANUAL



CMA 27 31 00 1 AAMG

Graph No.1  
Figure 101

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## MAINTENANCE MANUAL

ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL / ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[13] Flight control unit		4-211	C 57	Overhead Panel	27-36-15 R/I	27-37-02
[14] Jam detection strut	121GB	122	C268	Under floor	27-31-21 R/I	27-37-02
[15] Jam detection strut	121GB	121	C269	Under floor	27-11-21 R/I	27-37-02
[16] Relay	15-216	12-216	C112	Electronics rack RH		27-37-02
[17] Relay	15-216	12-216	C111	Electronics rack RH		27-37-02
[18] Circuit breaker		1-213	1C 54	N13	24-50-00 R/I	27-37-02
[19] Circuit breaker		5-213	2C 54	E12	24-50-00 R/I	27-37-02
[20] Inner power flight control unit	JB,LL, LR,KB	551 or 651			27-34-53 I/C	
[21] Outer and middle power flight control unit	JB,LL, LR,KB	553 or 552 or 653 or 652			27-34-52 I/C	

Component Identification  
Table 101

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## MAINTENANCE MANUAL

### 4. Control Surfaces (Elevons) do not return to Neutral

#### A. General

This chapter provides a rapid method of locating play and resistance (friction) encountered in pitch flight controls : play and resistance result in an unaccurate control of the aircraft.

Non-return of control surfaces is dealt with :

- in Blue, then Green, electrical channel
- in mechanical channel only

During non-return test and after flight control has reached the position corresponding to the required deflection, allow the latter to return to neutral slowly and without jerks up to balanced point and note reading immediately.

Only the operator required to perform test shall be present on the aircraft to the exclusion of other personnel.

#### B. Equipment and Materials

DESCRIPTION	PART NO.
Protractor, Elevon and Rudder	TE2012000
Rigging Pins - Synchro Pack	D925252000
Access Platform 3.672 m (12 ft.)	
Electrical Ground Power Unit	
Circuit Breaker Safety Clips	

#### C. Prepare

- (1) Set Flight Controls in mechanical mode (27-00-00, Servicing).
- (2) Set pitch and roll trim controls to zero.
- (3) Open door 121FB and immobilize roll resolvers with rigging pin D925252001.
- (4) Move control column several times in both directions.
- (5) Trip, safety and tag the following circuit breaker :

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
STICK SHAKER SUP	1-213	W 513	P15
(6) Check that the following circuit breakers are set :			

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW "A" SYS SUP	1-213	G 292	M17
ADC 1 28V SUP		1F 74	P12
ADC 26V SUP	2-213	1F 78	A 2
PITCH ART FEEL COMP 1 SUP		1C 244	E 4
ADC1 115V SUP		1F 73	F 3
RH UC WEIGHT SW "B" SYS SUP	3-213	G 294	B 9

- (7) On ADC control panel (centre console)
- (a) Place ADC1 switch in ON position.
  - (b) Place ADC1 TEST selector switch in position 1.
    - (b1) Amber ADC1 warning light must illuminate.
    - (b2) After approximately 30 seconds Blue TEST indicator light must illuminate.
    - (b3) Press then release amber ADC1 warning light ; it must go off.
- (8) On overhead panel, on ARTIFICIAL FEEL engage switch unit No.1, engage PITCH switch. It must remain engaged.
- (9) Adjust potentiometer and voltmeter on protractor.

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## MAINTENANCE MANUAL

### D. Trouble Shooting

\*\*\*\*\*  
\* Non-return to neutral in Blue, then Green, elec- \*  
\* trical channel. \*  
\* Set Flight Controls in Blue electrical mode (Ref. \*  
\* 27-00-00, Servicing). On overhead panel on ARTIFI- \*  
\* CIAL FEEL engage switch unit, No. 1, engage PITCH \*  
\* switch. Make certain that pitch and roll trim \*  
\* controls are set to zero. \*  
\* Open door 121FB, and immobilize roll resolvers \*  
\* with rigging pin D925252001. \*  
\* Install protractor on LH wing outer and middle \*  
\* elevons. \*  
\* Move control column several times in nose up and \*  
\* nose down direction. Push control column so that \*  
\* elevons fully deflect in nose down direction. \*  
\* Allow control column to return to neutral slowly \*  
\* and without jerks. \*  
\* Note position at which elevons stop, by reading on \*  
\* voltmeter. \*  
\* Repeat operation in nose up direction and note \*  
\* position at which elevons stop. \*  
\* Note difference between the two readings. \*  
\* On Flight Control Unit, place O & M ELEVONS, IN \*  
\* ELEVONS and RUDDER switches in GREEN position \*  
\* Push control column so that elevons fully deflect \*  
\* in nose down direction. \*  
\* Allow control column to return to neutral slowly \*  
\* and without jerks and note position at which \*  
\* elevons stop. Repeat operation in nose up direction \*  
\* and note position at which elevons stop. \*  
\* Note difference between the two readings. \*  
\* Difference between the two positions is equal to \*  
\* or less than 15 minutes. \*  
\*\*\*\*\*

OK	NOT OK--	Differences are greater than 15 minutes for one or for the two electrical control channels. Carry on test following OK path and refer to Chart 115 (Sheet 2)
	NOT OK--	Differences are greater than 15 minutes for one or for the 2 electrical control channels and on one elevon only. Carry on test following OK path and refer to Chart 115 (Sheet 2).

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* Install protractors on LH and RH wing inner \*  
\* elevons. \*  
\* Push control column so that elevons fully deflect \*  
\* in nose down position. \*  
\* Allow control column to return to neutral slowly \*  
\* and without jerks. \*  
\* Note position at which elevons stop, by reading on \*  
\* voltmeter. \*  
\* Repeat operation in nose up direction and note \*  
\* position at which elevons stop. \*  
\* Note difference between the two readings. \*  
\* On Flight Control Unit, place O & M ELEVONS, IN \*  
\* ELEVONS and RUDDER switches in BLUE position. \*  
\* Push control column so that elevons fully deflect \*  
\* in nose down position. \*  
\* Allow control column to return to neutral slowly \*  
\* and without jerks. \*  
\* Note position at which elevons stop. \*  
\* Repeat operation in nose up position and note \*  
\* position at which elevons stop. \*  
\* Note difference between the two readings. \*  
\* Difference between the 2 positions for each \*  
\* channel is equal to or less than 15 minutes. \*  
\*\*\*\*\*

 OK 	NOT	OK-----	Differences are greater than 15 minutes for one or for the 2 electrical control channels. Carry on test following OK path and refer to Chart 115 (Sheet 2).
 OK 	NOT	OK-----	Differences are greater than 15 minutes for one or for the 2 electrical control channels and on one elevon only. Carry on test following OK path and refer to Chart 115 (Sheet 2).

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## MAINTENANCE MANUAL

||  
OK  
||

```
*****
* Install protractor on RH wing outer and middle      *
* elevons.                                              *
* Push control column so that elevons fully deflect  *
* in nose down position.                              *
* Allow control column to return to neutral slowly    *
* and without jerks.                                  *
* Note position at which elevons stop.                 *
* Repeat operation in nose up direction and note      *
* position at which elevons stop.                     *
* Note difference between the two readings.           *
* On Flight Control Unit, place O & M ELEVONS, IN    *
* ELEVONS and RUDDER switches in GREEN position.     *
* Push control column so that elevons fully deflect  *
* in nose down position.                              *
* Allow control column to return to neutral slowly    *
* and without jerks.                                  *
* Note position at which elevons stop.                 *
* Repeat operation in nose up direction and note      *
* position at which elevons stop.                     *
* Note difference between the two readings.           *
* Difference between the two positions for each      *
* channel is equal to or less than 15 minutes.       *
*****
```

 OK 	NOT OK-	Differences are greater than 15 minutes for one channel or for the 2 electrical control channels. Carry on test following OK path and refer to Chart 115 (Sheet 2).
	NOT OK-	Differences are greater than 15 minutes for one channel or for the 2 electrical control channels and on one elevon only. Carry on test following OK path and refer to Chart 115 (Sheet 2).
	NOT OK-	Differences are greater than 15 minutes for one channel or for the 2 electrical control channels and on all elevons. Carry on test following OK path and refer to Chart 115 (Sheet 1).

```
*****
* Elevon "non-return to neutral" tests are conclusive *
* in electrical mode. Continue test in mechanical    *
* mode.                                              *
*****
```

||

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MAINTENANCE MANUAL

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* Non-return to neutral in mechanical channel. \*  
\* On Flight Control Unit, place O & M ELEVONS, IN \*  
\* ELEVONS and RUDDER switches in MECH position. \*  
\* Move control column several times in nose down and \*  
\* nose up direction. \*  
\* Push control column so that elevons fully deflect \*  
\* in nose down direction. \*  
\* Allow control column to return to neutral slowly \*  
\* and without jerks. \*  
\* Note position at which elevons stop. \*  
\* Repeat operation in nose up direction and note \*  
\* position at which elevons stop. \*  
\* Measure difference between the two readings. \*  
\* Difference between the 2 positions for mechanical \*  
\* channel must be equal to or less than 30 minutes. \*  
\*\*\*\*\*

OK	NOT OK-----	Difference is greater than 30 minutes for mechanical channel. Carry on test following OK path and refer to 27-11-00, Trouble Shooting, Paragraph 4. Chart 116, Sheet 9.
	NOT OK-----	Difference is greater than 30 minutes for mechanical channel, on one middle elevon only. Carry on test following OK path and refer to 27-11-00, Trouble Shooting, Paragraph 4. Chart 116, Sheet 6.
	NOT OK-----	Difference is greater than 30 minutes for mechanical channel, on one outer elevon only. Carry on test following OK path and refer to 27-11-00, Trouble Shooting, Paragraph 4. Chart 116, Sheet 7.

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* Install protractor on LH wing outer and middle \*  
\* elevons. \*  
\* Push control column so that elevons fully deflect \*  
\* in nose down direction. \*  
\* Allow control column to return to neutral slowly \*  
\* and without jerks. \*  
\* Note position at which elevons stop. Repeat \*  
\* operation in nose up direction and note position \*  
\* at which elevons stop. \*  
\* Measure difference between the two readings. \*  
\* Difference between the two positions measured in \*  
\* mechanical channel is equal to or less than \*  
\* 30 minutes. \*  
\*\*\*\*\*

OK	NOT OK-----	Difference is greater than 30 minutes for mechanical channel. Carry on test following OK path and refer to 27-11-00, Trouble Shooting. Paragraph 4. Chart 116 Sheet 9.
	NOT OK-----	Difference is greater than 30 minutes for mechanical channel, on one middle elevon only. Carry on test following OK path and refer to 27-11-00, Trouble Shooting. Paragraph 4. Chart 116 Sheet 6
	NOT OK-----	Difference is greater than 30 minutes for mechanical channel, on one outer elevon only. Carry on test following OK path and refer to 27-11-00, Trouble Shooting. Paragraph 4. Chart 116 Sheet 7
	NOT OK-----	Difference is greater than 30 minutes for mechanical channel, on the 2 wings. Carry on test following OK path and refer to 27-11-00, Trouble Shooting, Paragraph 4. Chart 117.

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* Install protractor on LH and RH wing inner elevons.\*  
\* Push control column so that elevons fully deflect \*  
\* in nose down direction. \*  
\* Allow control column to return to neutral slowly \*  
\* and without jerks. \*  
\* Note position at which elevons stop. \*  
\* Repeat operation in nose up direction and note \*  
\* position at which elevons stop. \*  
\* Measure difference between the two readings. \*  
\* Difference between the two positions measured in \*  
\* mechanical channel must be equal to or less than \*  
\* 30 minutes. \*  
\*\*\*\*\*

OK	NOT OK-----	Difference is greater than 30 minutes for mechanical channel, on the two elevons. Refer to 27-11-00, Trouble Shooting, Paragraph 4. Chart 117.
	NOT OK-----	Difference is greater than 30 minutes for mechanical channel, on one elevon only. Refer to 27-11-00, Trouble Shooting, Paragraph 4. Chart 116 Sheet 5.
	NOT OK-----	Difference is greater than 30 minutes for mechanical channel, on the 3 elevons of one wing. Refer to 27-11-00, Trouble Shooting, Paragraph 4. Chart 116 Trouble Shooting, Paragraph 4. Chart 116 Sheet 1.
	NOT OK-----	Difference is greater than 30 minutes for mechanical channel, on all elevons. Refer to Chart 116 (Sheet 1).

Elevon "non-return to neutral" tests are conclusive in mechanical channel.  
Flight Controls are in correct operating condition.

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* DIFFERENCE IS GREATER THAN 15 \*  
\* MINUTES FOR ONE CHANNEL OR FOR THE \*  
\* TWO BLUE AND GREEN ELECTRICAL \*  
\* CONTROL CHANNELS. \*  
\*\*\*\*\*

\*\*\*\*\*  
\* Difference is present on all elevons \*  
\*\*\*\*\*

For one channel only---

Play at CX pack rod of involved  
electrical channel.  
Replace synchro pack [12].

For the 2 channels-----

Play or resistance (friction) in  
front section upstream of synchro  
pack. Ref. Chart 117.

Chart 115 (Sheet 1 of 2)

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\*\*\*\*\*  
\* Difference is present on one or \*  
\* several elevons. \*  
\*\*\*\*\*

For one channel only----| Replace PFCU [21] or [20] depending |  
| on the elevon involved. |

For the two channels----| Play at feedback linkage of involved |  
| PFCU [21] or [20]. |

Chart 115 (Sheet 2 of 2)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* DIFFERENCE IS GREATER THAN 30 \*  
\* MINUTES FOR MECHANICAL CHANNEL \*  
\*\*\*\*\*

\*\*\*\*\*  
\* Difference is present on all elevons of both wings.\*  
\* On Flight Control Unit, place O & M ELEVONS, IN \*  
\* ELEVONS and RUDDER switches in BLUE position. \*  
\* Open door 121FB and immobilize pitch resolvers \*  
\* with rigging pin D925252003. \*  
\* On SERVO CONTROLS unit, place lower selector switch\*  
\* in YELLOW/BLUE position. On RELAY JACK unit, place \*  
\* switch in BLUE position. Disconnect AP force \*  
\* limiter [2]. \*  
\* Check that when a load of plus or minus 50 daN \*  
\* (112,6 lbf.) is applied, eye-end fitting to eye-end\*  
\* fitting centre distance varies by a value equal to \*  
\* or less than 0.24 mm (0.0094 in.). \*  
\*\*\*\*\*

		-----
OK	NOT OK-----	Replace AP force limiter [2].
		-----

\*\*\*\*\*  
\* Install AP force limiter [2]. \*  
\* On SERVO CONTROLS unit, place lower selector switch in NORMAL\*  
\* position. \*  
\* On RELAY JACK unit, place switch in NORM position. \*  
\* Remove rigging pin D925252003 from pitch resolvers. \*  
\* Open floor panel 241HF, and immobilize mixing unit \*  
\* with rigging pin D921310000. \*  
\* CAUTION : WHEN INSERTING AND REMOVING PINS TAKE ALL NECESSARY\*  
\* PRECAUTIONS IN ORDER TO AVOID INTRODUCING \*  
\* INADVERTENTLY TOOLS OR MISCELLANEOUS ITEMS IN \*  
\* MIXING UNIT. \*  
\* Install a comparator to measure displacement of the PFCU \*  
\* attachment fork end (play at spherical bearings). Measurement\*  
\* is performed by setting trim to plus or minus 1 degree, \*  
\* within minus 0 and minus 0.2. Variation measured is less \*  
\* than or equal to 0.2 mm (0.0079 in.). \*  
\*\*\*\*\*

OK	NOT OK

Chart 116 (Sheet 1 of 3)

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# MAINTENANCE MANUAL

```
*****
* Immobilize pitch resolvers by means of rigging pin *
* D925252003. *
* Disconnect jam detection strut [14]. *
* Check for resistance (friction) or play at spheri- *
* cal bearings. *
* Check that when a load of plus or minus 18 daN *
* (40.5 lbf.) is applied eye-end fitting to eye-end *
* fitting centre distance difference is equal to or *
* less than 0.25 mm (0.0098 in.). *
*****
```

```
*****
* Check that there is no play in load limiting          *
* mechanism [22].                                         *
*****
```

\*\*\*\*\*  
 \* To actuate control, load to be applied to head of \*  
 \* cable tension regulator bellcrank is equal to or \*  
 \* less than 4.6 daN (10.3 lbf.) in electrical mode. \*  
 \*\*\*\*\*

Chart 116 (Sheet 2 of 3)

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* Check cable tension, reading cable tension regula- \*  
\* tor marker indication. \*  
\*\*\*\*\*

||  
OK NOT OK-----| Adjust cable tension. |  
||

\*\*\*\*\*  
\* Actuate cable tension regulator bellcrank \*  
\* throughout all its travel range and check that \*  
\* play measured between head of bellcrank and a \*  
\* cable quadrant of the cable tension regulator is \*  
\* equal to or less than 1.2 mm (0.0472 in.). \*  
\*\*\*\*\*

||  
OK NOT OK-----| Replace cable tension regulator [23].|  
||

-----  
| Replace mixing unit (Ref. 27-11-00, Trouble |  
Shooting, paragraph 4, Chart 117).

\*\*\*\*\*  
\* Install jam detection strut [14] \*  
\* Close access doors and panels \*  
\* Remove access platforms. \*  
\*\*\*\*\*

Chart 116 (Sheet 3 of 3)

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## MAINTENANCE MANUAL

*****		-----	
* DIFFERENCE IS GREATER THAN 30	*	GROUND EQUIPMENT REQUIRED	
* MINUTES FOR MECHANICAL CHANNEL AND	*	-----	
* THAN 15 MINUTES FOR ONE OR FOR THE	*	DESCRIPTION	PART NO.
* TWO ELECTRICAL CONTROL CHANNELS.	*	-----	
*****		PROTRACTOR-	
		ELEVON AND	
		RUDDER.	TE 2012000
		RIGGING PINS-	
		SYNCHRO PACK.	D925252000
		GROUND POWER	
		UNIT-HYDRAULIC	
		POWER AND	
		PRELIMINARY	
		TESTING.	EMH398E
		ACCESS PLATFORM	
		3.672 m (12 ft.)	-----
		SPRING SCALE	
		50 daN WITH	
		0.3 PER CENT	
		ERROR OR LESS.	-----
		-----	

\*\*\*\*\*

\* On Flight Control Unit, place O & M ELEVONS, IN \*

\* ELEVONS and RUDDER switches in BLUE position. \*

\* Install protractor on LH outer elevon. \*

\* Move control column several times in nose down and \*

\* nose up directions. \*

\* Pull control column so that elevon deflects 10 \*

\* degrees minimum in nose up direction. \*

\* Allow control column to return to neutral slowly \*

\* and without jerks. \*

\* Place a comparator under integral trim assembly \*

\* horizontal arm at 180 mm (7.08 in.) of its hinge \*

\* point. \*

\* Repeat operation with elevon in nose down position \*

\* and by the same value. Allow control column to \*

\* return to neutral slowly and without jerks. \*

\* Non-return of horizontal arm, read on comparator \*

\* must be equal to or less than 0.3 mm \*

\* (0.0118 in). \*

\*\*\*\*\*

		-----	
OK	NOT OK-----	Non-return of integral trim horizontal	
		arm is greater than 0.3 mm (0.0118 in.).	
		Carry on test following OK path and	
		refer to Sheet 4.	
		-----	

Chart 117 (Sheet 1 of 8)

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* On SERVO CONTROLS Unit, place lower selector switch\*  
\* in YELLOW/BLUE position. \*  
\* On RELAY JACK unit, place switch in BLUE position. \*  
\* Disconnect rods between integral trim assembly and \*  
\* synchro pack, at synchro pack lever : cotter pin, \*  
\* nut, washer, bolt. \*  
\* Apply a load of plus or minus 2 daN (4.5 lbf.) to \*  
\* resolver input bellcrank and at rod attachment \*  
\* point. Play measured at the same point is equal to \*  
\* or less than 0.37 mm (0.0146 in.). \*  
\*\*\*\*\*

||  
OK NOT OK-----| Replace synchro pack [12]. |  
||

\*\*\*\*\*  
\* At integral trim assembly, disconnect rods between \*  
\* trim and torque tube : cotter pin, nut, flat \*  
\* washer, special washer, bolt. \*  
\* NOTE : For removing bolt, it is necessary to press \*  
\* plunger on head of bolt to free the locking \*  
\* balls. \*  
\* Apply a load of plus or minus 2.5 daN (5.6 lbf.) to \*  
\* rod attachment point on trim. \*  
\* Play measured at the same point is equal to or \*  
\* less than 0.5 mm (0.0197 in.). \*  
\*\*\*\*\*

||  
OK NOT OK-----| Replace integral trim assembly [4] |  
| (play between gears and/or at hinge |  
| point). |  
||

Chart 117 (Sheet 2 of 8)

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* Shut down pressurization of hydraulic systems \*  
\* (Ref. 27-00-00, Servicing, Procedure to set \*  
\* Flight Controls in electrical mode). \*  
\* Open door 151DB, depressurize Blue, Yellow, \*  
\* and Green Hydraulic systems. \*  
\* Open door 153BB and depressurize hydraulic \*  
\* tanks by unscrewing tank depressurization valves by \*  
\* a few turns. Check pressure drop on pressure \*  
\* indicators. Tighten tank depressurization valves \*  
\* and safety with lockpins. \*  
\* Disconnect AP force limiter [2]. \*  
\* Remove rigging pin D925252003 from pitch \*  
\* resolvers. \*  
\* Driving load of resolvers, applied to input \*  
\* bellcrank at rod attachment point (Bellcrank in \*  
\* balanced position) is equal to or less than \*  
\* 0.25 daN (0.56 lbf.). \*  
\*\*\*\*\*

||            |            -----  
OK        NOT OK-----| Replace synchro pack [12].        |  
||            |            -----

-----  
| Replace ends of rod between integral trim and |  
synchro pack.

\*\*\*\*\*  
\* At resolvers : \*  
\* Install rods between trim and synchro pack : \*  
\* bolt, washer, nut, cotter pin. Torque to between \*  
\* 27 and 32 lbf.in. (0.30 and 0.36 m.daN). \*  
\* At integral trim, install rods between trim and \*  
\* torque tube ; bolt, special washer, flat washer, \*  
\* nut, cotter pin. \*  
\* Torque to between 0.3 and 0.36 m.daN (27 and \*  
\* 32 lbf.in.). Install AP Force limiter [2]. \*  
\* Close access doors and panels. \*  
\* Remove access platforms. \*  
\*\*\*\*\*

Chart 117 (Sheet 3 of 8)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* Non-return of integral trim horizontal arm is \*  
\* greater than 0.3 mm (0.0118 in.). \*  
\* Open access door 121FB and immobilize pitch \*  
\* resolvers with rigging pin D925252003. \*  
\* Disconnect artificial feel spring rod [1] \*  
\* Check that when a load of plus 2.7 daN (6 lbf.) and \*  
\* minus 8 daN (18 lbf.) is applied, eye-end fitting \*  
\* to eye-end fitting distance varies by a value equal \*  
\* to or less than 0.25 mm (0.0098 in.). \*  
\*\*\*\*\*

		-----	
OK	NOT OK	-----	Replace artificial feel spring rod [1].
		-----	

\*\*\*\*\*  
\* At torque tube, disconnect rods between torque tube \*  
\* and integral trim assembly : cotter pin, nut, flat \*  
\* washer, special washer, bolt. \*  
\* NOTE : For removing bolt it is necessary to press \*  
\* plunger on head of bolt in order to free the \*  
\* locking balls. \*  
\* By means of a spring scale, actuate Captain's \*  
\* control column. Move control column in nose up \*  
\* and nose down direction. Results must correspond \*  
\* with graph No.2. \*  
\*\*\*\*\*

		-----	
OK	NOT OK	-----	Resistance (friction) is caused by ball
		-----	bearings of torque tube or by the
		-----	Flight data recorder potentiometer
		-----	

\*\*\*\*\*  
\* Repeat the same operation on First Officer's \*  
\* control column. Results must correspond with graph \*  
\* No.3 \*  
\*\*\*\*\*

		-----	
OK	NOT OK	-----	Ref. Chart 117 (Sheet 7)
		-----	

\*\*\*\*\*  
\* Check for resistance or play at spherical bearings \*  
\* of rods between torque tube and integral trim \*  
\* assembly. \*  
\*\*\*\*\*

OK	NOT OK	

Chart 117 (Sheet 4 of 8)

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```

||
||
|| NOT OK-----| Replace rod ends. |
||
||
*****
* On SERVO CONTROLS Unit place lower selector switch *
* in YELLOW/BLUE position.                             *
* On RELAY JACK unit, place switch in Blue position.   *
* Disconnect AP force limiter [2].                     *
* On SERVO CONTROLS unit, place lower selector switch *
* in NORMAL position.                                  *
* On RELAY JACK unit, place switch in NORM position.   *
* On Flight Control Unit, place O & M ELEVONS, IN      *
* ELEVONS and RUDDER switches in MECH position.       *
* Check that Relay Jack actuating load applied to     *
* head of input lever is equal to or less than 1 daN *
* (2.25 lbf.).                                         *
*****
||
||
|| OK   NOT OK-----| Replace Relay Jack [3]. |
||
||
*****
* Check for resistance (friction) at spherical          *
* bearings of AP force limiter.                         *
*****
||
||
|| OK   NOT OK-----| Replace AP force limiter [2]. |
||
||

```

Chart 117 (Sheet 5 of 8)

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* Shut down pressurization of hydraulic systems (Ref.\*  
\* 27-00-00, Servicing, Procedure to set Flight \*  
\* Controls in electrical mode). \*  
\* Open door 151DB, depressurize Blue, Green and \*  
\* Yellow hydraulic systems. \*  
\* Open access door 153BB, depressurize hydraulic \*  
\* tanks by unscrewing tank depressurization valves \*  
\* by a few turns. Check pressure drop on pressure \*  
\* indicator. Tighten depressurization valves and \*  
\* safety with lockpins. \*  
\* Open door 121FB. \*  
\* Disconnect the two artificial feel jacks from \*  
\* AF rocker arm : Green jack [5], Blue jack [6] \*  
\* Manually actuate AF rocker arm. No resistance \*  
\* (friction) is present. \*  
\*\*\*\*\*

||  
OK  
||

NOT OK-----| Ref. Chart 117 (Sheet 8) |

-----  
| Replace integral trim assembly [4] (resistance at |  
hinge point).

\*\*\*\*\*  
\* At torque tube, connect rods between integral trim \*  
\* assembly and torque tube : bolt, special washer, \*  
\* flat washer, nut. \*  
\* Torque to between 27 and 32 lbf.in. (0.30 and \*  
\* 0.36 m.daN). \*  
\* Safety with cotter pin. \*  
\* Connect the two artificial feel jacks : \*  
\* Green jack [5] Blue jack [6] \*  
\* Close access doors and panels \*  
\* Remove access platforms. \*  
\*\*\*\*\*

Chart 117 (Sheet 6 of 8)

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\*\*\*\*\*  
\* First Officer's side ; \*  
\* Check breaking point of pitch shock absorber [9] \*  
\*\*\*\*\*

		-----	-----
OK	NOT OK	-----	Replace pitch shock absorber [9]
		-----	-----

\*\*\*\*\*  
\* Disconnect pitch shock absorber [9] ; using a \*  
\* spring scale actuate control column. \*  
\* Actuating load must correspond with graph No.1, \*  
\* Captain's side. \*  
\*\*\*\*\*

		-----	-----
OK	NOT OK	-----	Resistance (friction) is caused by ball bearings of torque tube.
		-----	-----

-----  
Replace pitch shock absorber [9].

Chart 117 (Sheet 7 of 8)

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\*\*\*\*\*  
\* Disconnect Green artificial feel jack [5] \*  
\* Check that jack rod slides freely and that spheri- \*  
\* cal bearings are free of friction. \*  
\*\*\*\*\*

		-----
OK	NOT OK-----	Replace Green artificial feel jack [5]
		-----

\*\*\*\*\*  
\* Disconnect Blue artificial feel jack [6] \*  
\* Check that jack rod slides freely and that spheri- \*  
\* cal bearings are free of friction. \*  
\*\*\*\*\*

		-----
OK	NOT OK-----	Replace Blue artificial feel jack [6]
		-----

-----  
Replace artificial feel jack rocker arm [11]

Chart 117 (Sheet 8 of 8)

EFFECTIVITY: ALL

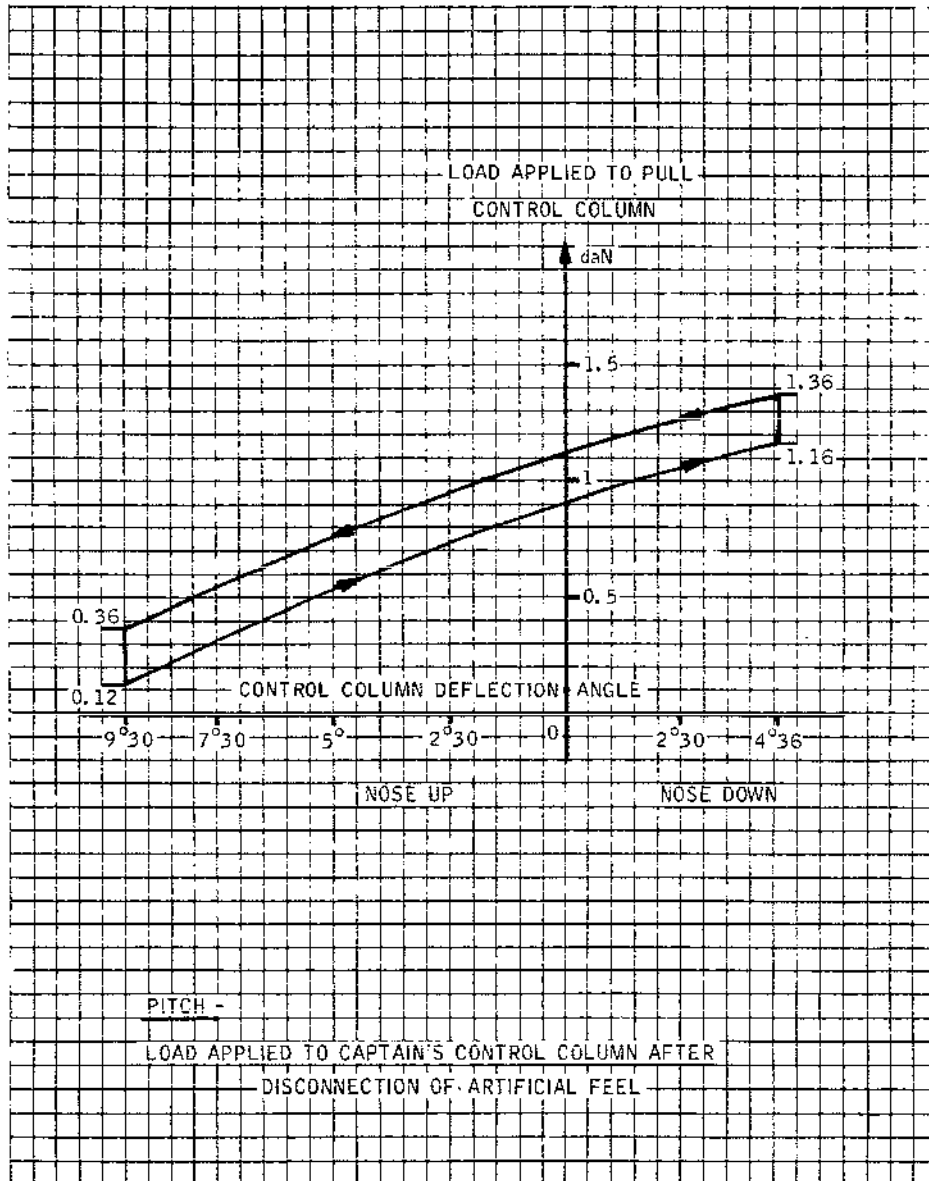
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## MAINTENANCE MANUAL



Graph No.2  
Figure 102

EFFECTIVITY: ALL

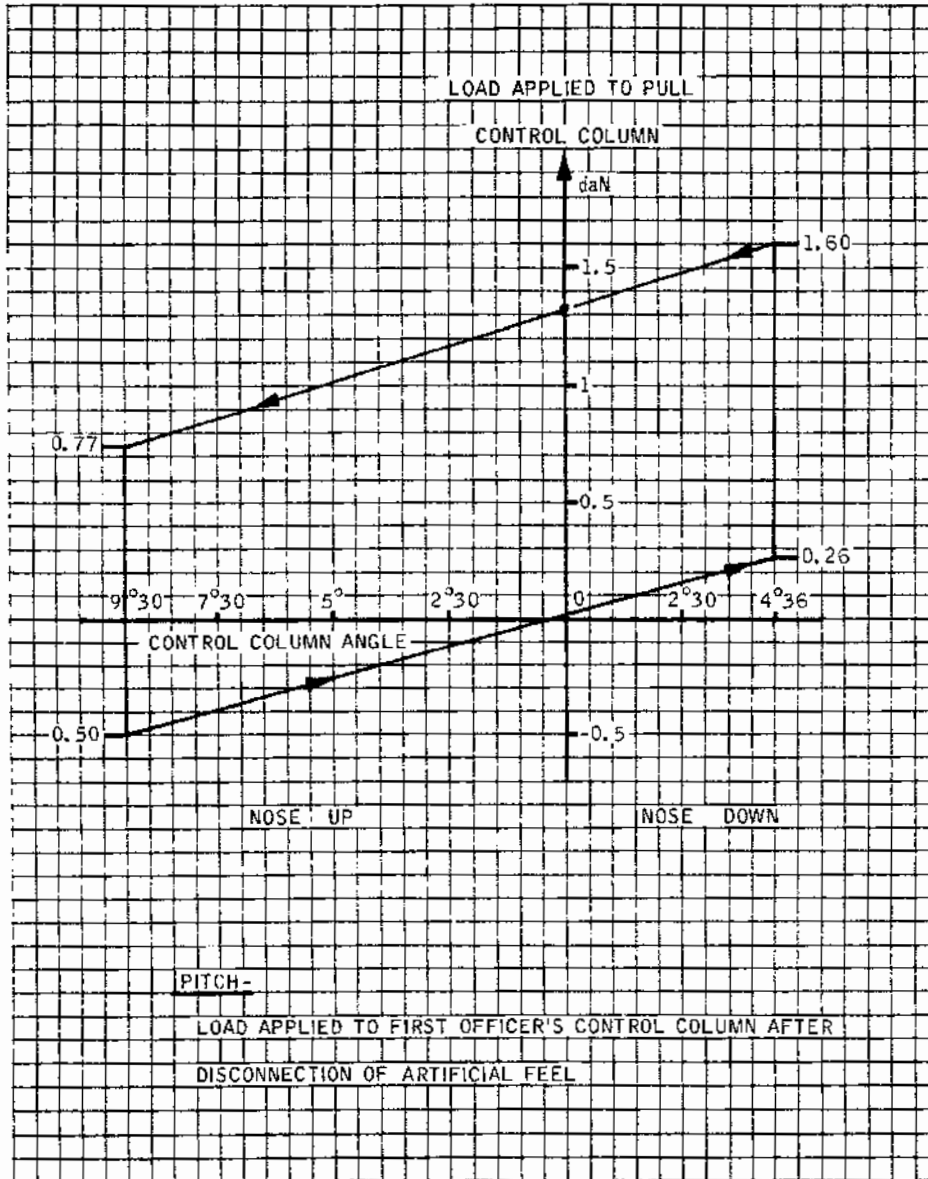
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Graph No.3  
Figure 103

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## MAINTENANCE MANUAL

ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[1] Artificial feel spring rod	213AF 211HF	122			27-32-12 R/I	
[2] AP force limiter	121FB	122			27-31-17 R/I	
[3] Relay jack	121FB	122			27-34-14 R/I	
[4] Integral trim assembly	121DB	122			27-33-13 R/I	
[5] Green artificial feel jack	121DB	122			27-34-13 R/I	
[6] Blue artificial feel jack	213AF	122			27-34-11 R/I	
[9] Pitch shock absorber	212HF 212NF	122			27-31-13 R/I	
[11] Artificial feel rocker arm	121DB	122			27-32-14 R/I	
[12] Synchro pack	121GB	122			27-36-11 R/I	
[14] Jam detection strut	121GB	122			27-31-21 R/I	
[20] Inner power flight control unit	JB, LL LR, KB	551 or 651			27-34-53 R/I	
[21] Outer and middle power flight control unit	JB, LL LR, KB	553 or 552 or 653 or 652			27-34-52 R/I	
[22] Load limiting mechanism	121GB	122			27-31-14 R/I	

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## MAINTENANCE MANUAL

ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[23] Cable tension regu- lator	215AF 121GB	122			27-31-15 R/I	

Component Identification  
Table 101

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## MAINTENANCE MANUAL

### MECHANICAL CONTROL - REMOVAL/INSTALLATION

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

This topic deals with the removal/installation of the mechanical control components, in fuselage section between F8 and F71.

#### 2. Guide Pulleys and Control Cables (Ref. Fig. 401 )

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Zero Rigging Device - Relay Chassis	E925019000
Rigging Pins - Synchro Pack	D925252000
Rigging Pin - Mixing Unit Servo Control	D921310000
Locking Equipment - Cable Tension Regulator	D921606000
Access Platform 3.672 m (12 ft.)	

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## MAINTENANCE MANUAL

DESCRIPTION	PART NO.
Cable Grip	D921620000
Circuit Breaker Safety Clips	
Tensiometer	
Lockwire Dia. 0.028 in. (0.7 mm)	
Corrosion Resistant Steel	

### B. Prepare

- (1) Take the precautions described in the previous "WARNING" paragraph.
- (2) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (3) Check that pitch, yaw and roll trim controls are set to zero.
- (4) Open door 121FB, immobilize pitch and roll resolvers with pins D925252001 and D925252003.
- (5) Install equipment E925019010, E925019013 and E925019012.
- (6) Open floor panel 241HF and immobilize mixing unit with pin D921310000.
- (7) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).

**WARNING :** DISPLAY WARNING NOTICES, ON ENGINES 1, 2 AND 3, PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY ALSO A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZATION SYSTEM ELECTRIC PUMPS.

MAKE CERTAIN THAT NO PERSONNEL IS WORKING ON MECHANICAL LINKAGE BETWEEN MIXING UNIT AND ELEVONS.

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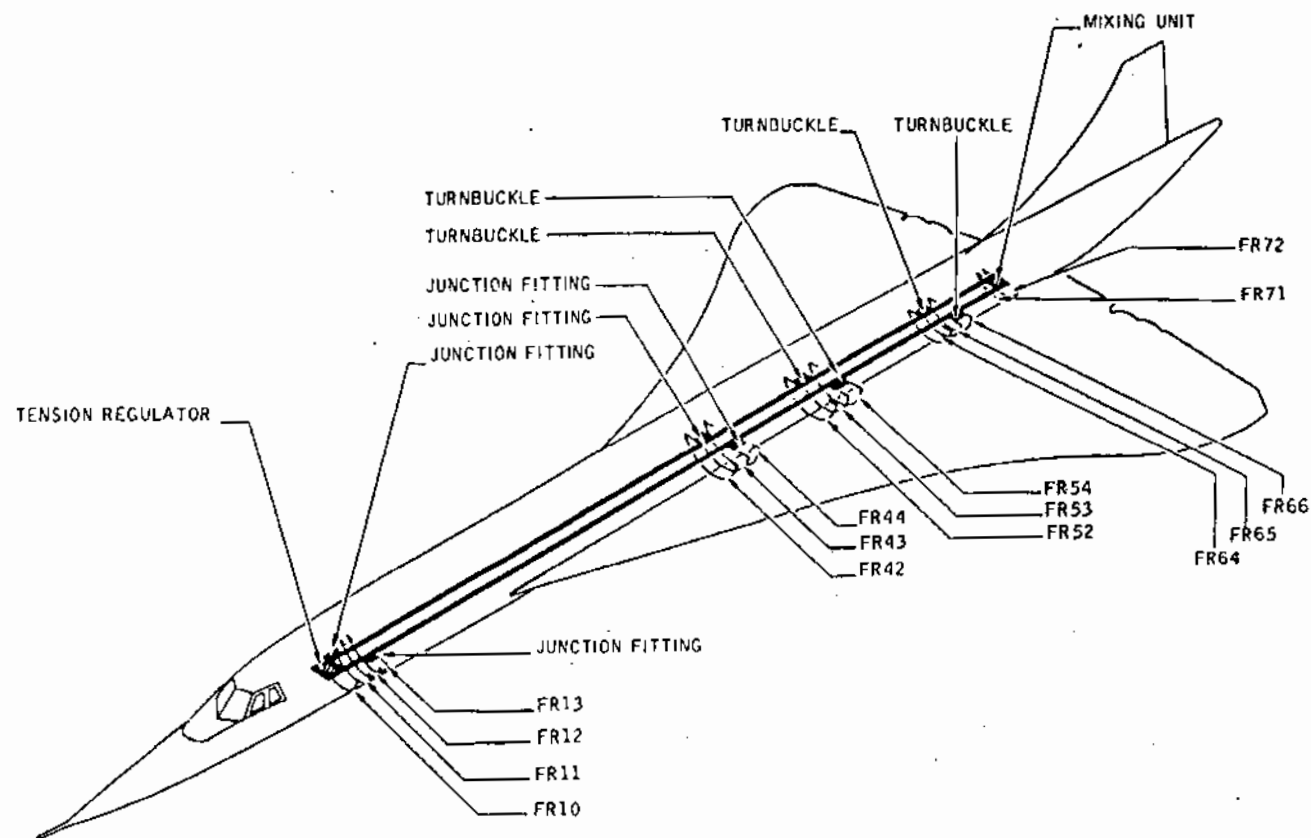
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## MAINTENANCE MANUAL

CMA 27 31 00 4 AAM0



Control Cables  
Figure 401

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IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED DISPLAY A WARNING NOTICE ON THIS UNIT, PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (8) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

- (9) Open door 151DB, depressurize Blue, Green and Yellow hydraulic systems (Ref. 29-11-00, 29-12-00 and 29-21-00, Servicing).

- (10) Open door 121GB, and floor panel 215AF giving access to cable tension regulators.

- (11) Open floor panel 231JF giving access to turnbuckles.

- (12) Open floor panels corresponding to cable lengths or to pulleys to be removed.

(a) Pulleys

Pulley located between frames 9 and 10 : 215AF  
pulley located at frame 67 : 241AF.  
pulley located at frame 68 : 241AF.

(b) Pitch cables

(b1) RH cable

Cable length from cable tension regulator to cable junction fitting located between frames 10 and 11 : panels 215AF, 215BF.

Cable length from cable junction fitting. (between frame 10 and 11) to cable junction fitting located between frames 42 and 43 : panel 215BF, 215CF, 221AF, 221DF, 221HF, 221LF, 221QF, 221UF, 221XF, 223AF, 223DF, 223LF, 223SF, 231AF.

Cable length from cable junction fitting (between frames 42 and 43) to turnbuckle located between frames 52 and 53 : panels 231AF, 231DF, 231GF, 231HF, 231JF.

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Cable length from turnbuckle (between frame 52 and 53) to turnbuckle located between frames 64 and 65 : panels 231JF, 231AF, 233BF, 233CF, 233FF, 233JF.

Cable length from turnbuckle (between frame 64 and 65) to mixing unit : panels 233JF, 241AF, 241BF, 241EF.

### (b2) LH cable

Cable length from cable tension regulator to cable junction fitting located between frames 12 and 13 ; panels 215BF, 215AF, 215CF, 221AF.

Cable length from cable junction fitting (between frame 12 and 13) to cable junction fitting located between frames 43 and 44 : panels 221AF, 221DF, 221HF, 221LF, 221QF, 221UF, 221XF, 223AF, 223DF, 223LF, 223SF, 231AF.

Cable length from cable junction fitting (between frames 43 and 44) to turnbuckle located between frames 53 and 54 : 231AF, 231DF, 231GF, 231HF, 231JF.

Cable length from turnbuckle (between frames 53 and 54) to turnbuckle located between frames 65 and 66 : panel 231JF, 233AF, 233BF, 233CF, 233FF, 233JF.

Cable length from turnbuckle (between frames 65 and 66) to mixing unit : panels 233JF, 241AF, 241BF, 241EF.

### C. Remove Guide Pulley (Ref. Fig. 403 )

- (1) Remove locking clips (3) from turnbuckles corresponding to the pulley to be removed.  
Turn cable turnbuckles symmetrically until a sufficient tension enabling the locking equipment D921606000 to be installed on the regulator, is obtained.
- (2) Install locking equipment on cable tension regulator.
- (3) Slacken cables until the pulley can be removed.
- (4) On the support of the pulley to be removed, remove cable guard if necessary (cotter pin, nut, washer and

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## MAINTENANCE MANUAL

bolt).

- (5) Remove cotter pin, remove nut, washer and remove pulley bolt.

### D. Preparation of Replacement Component

### E. Install Guide Pulleys (Ref. Fig. 402 )

- (1) Engage cable in pulley throat  
Position pulley on its support.  
Insert bolt, washer, tighten nut, safety with cotter pin. Torque to between 0.46 to 0.58 m.daN (40 to 50 lbf in).

NOTE : There must be a clearance of 1 mm minimum (0.039 in.) between the pulley side plates and its support and 0.022 to 0.060 in. (0.6 to 1.5 mm) between pulleys and spacers.

- (2) Tighten cables symmetrically until tension reaches the normal value.

- (3) On pulley support, install the cable guard.

NOTE : Compensation locking equipment D921606000 maintain the two side plates in adjustment position 10.

- (4) Tighten turnbuckles symmetrically until a sufficient and equal tension of both cables, enabling easy removal of the regulator locking equipment, is obtained.

- (5) Remove cable tension regulator locking equipment (D921606000).

- (6) Note temperature in adjacent cable area and adjust tension as per adjustment graph.

- (7) Tension adjustment is always symmetrical. The position of the index on the centre indicating drum must coincide with the selected position on the graph.  
TENSION = 25 daN (56.2 lbf).

- (8) Check that tension is equally distributed between both cables by removing rigging pin E925019105 from equipment E925019012 (easy removal of rigging pin).

- (9) Safety turnbuckles with locking clips.

- (10) Remove safety clip and tag and set circuit breaker

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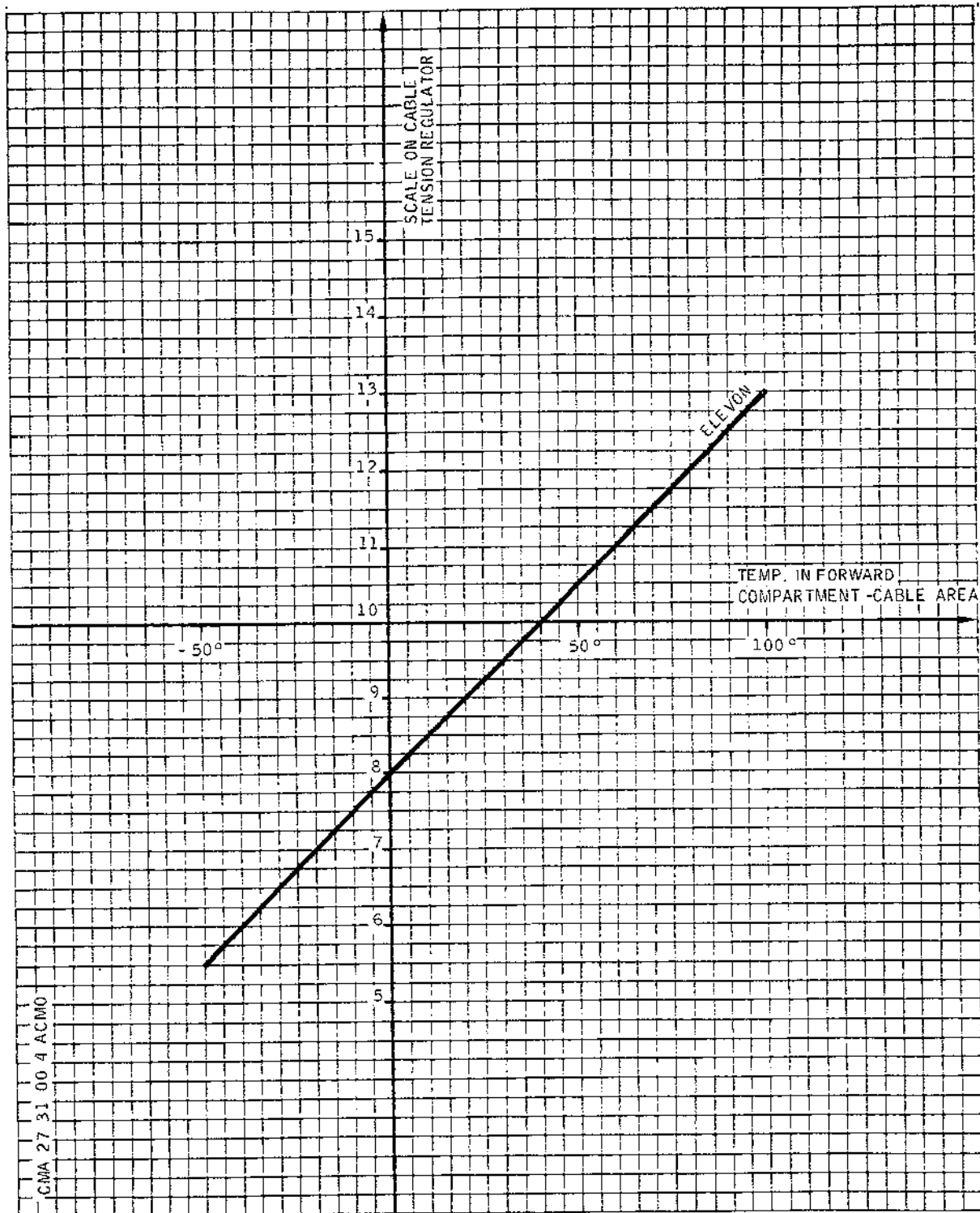
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Cable Tension Adjustment Graph According to Temperature  
Figure 402

R

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M626, panel 15-216, Map Ref F22.

- (11) Remove warning notices.
  - (12) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
  - (13) Remove equipment E925019013, E925019012 and E925019010 and pin D921310000 from mixing unit.
  - (14) Remove pins D925252001 and D925252003 from pitch and roll resolvers.
  - (15) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
- F. Remove cables up to turnbuckles, frame 65 before mixing unit (Ref. Fig.403 and 404)
- (1) Remove locking clips (3) from turnbuckles to be removed. Turn turnbuckles symmetrically until the tension enabling installation of locking equipment D921606000 on regulator is obtained. Install locking equipment.
  - (2) On cable length to be removed, proceed as follows :
    - (a) Turnbuckle (Ref. Fig. 403 )
      - (a1) Remove locking clips and slacken cables symmetrically until they can be disengaged.
      - (a2) Slide sleeve (2), separate cable ends.
    - (b) Cable junction fitting (Ref. Fig. 403 )  
Remove locking clips (1), slide outer sleeve (2) and separate cable ends (3) and (4).  
  
Install equipment D921620000 (cable grip).  
This equipment maintains tension of cables remaining on the aircraft.
  - (3) If this cable length passes through a fairlead, separate the two elements of the fairlead to free the cable (lockwire, screw, washers).
  - (4) If this cable length passes over a guide pulley, remove the cable guards mounted on the pulley support to free the cable : cotter pin, nut, washer, bolt and spacers.

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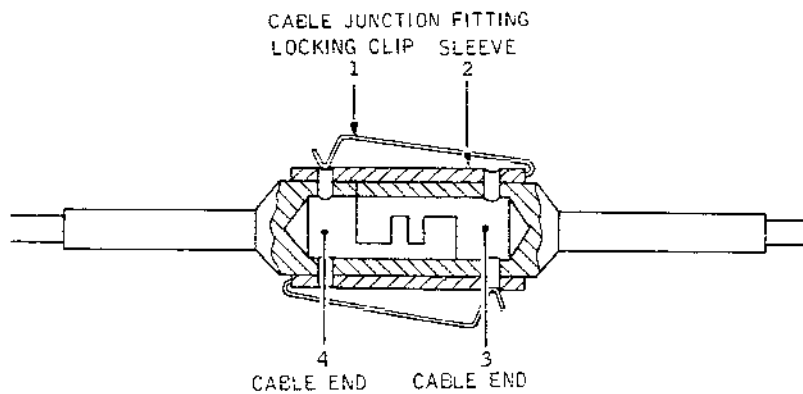
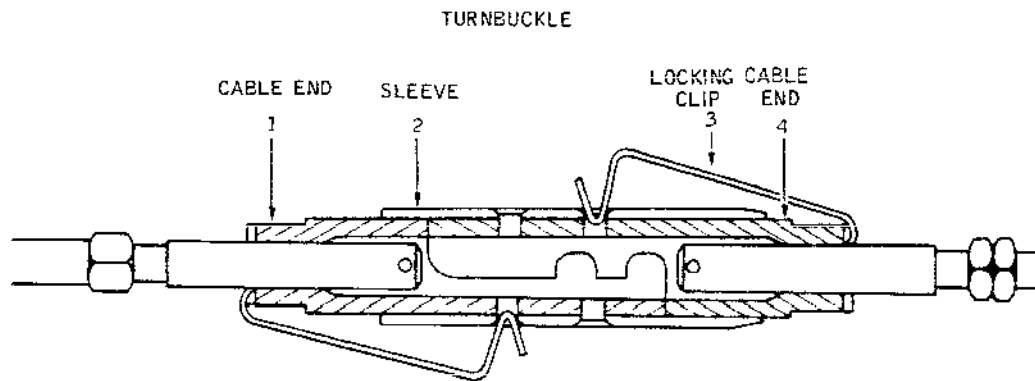
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Cable Junctions  
Figure 403

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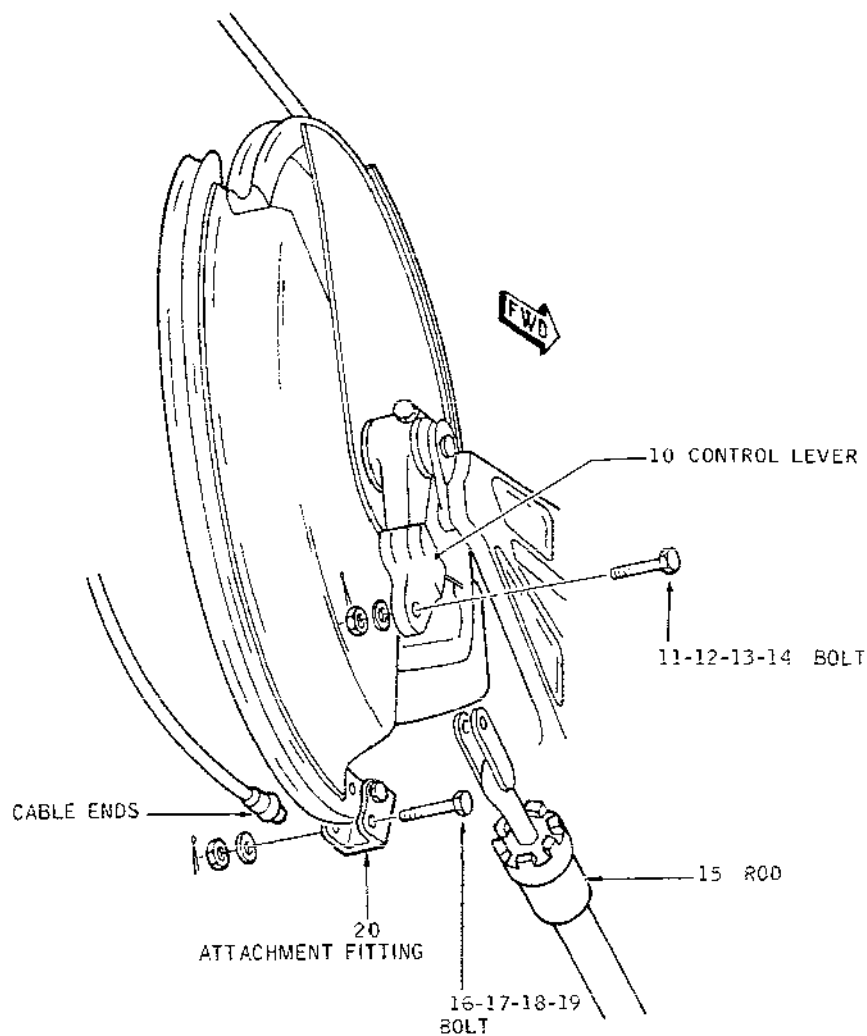
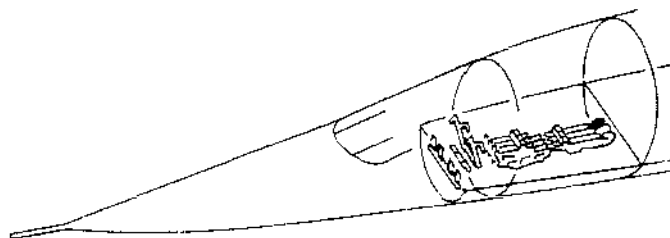
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Cables on Tension Regulators  
Figure 404

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(5) Cable length connected to a cable tension regulator (Ref. Fig. 404 )

(a) Remove lower cable guard casing (Ref. 27-31-15, Removal/Installation).

(b) Remove cotter pin (11), remove nut (12), washer (13), bolt (14).  
Disconnect rod (15) from control lever (10).

(c) Remove cotter pin (16), remove nut (17), washer (18), and bolt (19).  
Tilt attachment fitting (20) on fixed pin and disengage lower cable.

(d) Rotate tension regulator so as to gain access to upper cable end attachment fitting.

Disengage upper cable length (same procedure as that for lower cable).

NOTE : For removing or installing bolts (14) and (19), it is necessary to press plunger on head of bolt, to free retaining balls.

G. Install cable up to frame 65 before mixing unit

(1) On cable tension regulator (Ref. Fig. 404 )

(a) Engage upper cable end in recess on tension regulator, tilt cable attachment fitting on fixed pin, insert bolt, install washer, nut and safety with cotter pin.

(b) Rotate tension regulator and engage lower cable end in recess on regulator.  
Tilt attachment fitting (20) on fixed pin, insert bolt (19), install washer (18), nut (17) and safety with cotter pin.

(c) Connect rod (15) to control lever (10), insert bolt (14), install washer (13), nut (12).  
Torque to between 27 and 32 lbf.in. (0.30 and 0.36 m.daN). Safety with cotter pin (11).

(d) Install lower cable guard casing (Ref. 27-31-15, Removal/Installation).

(2) At fairlead, engage cable in grooves on lower part of fairlead ; position upper part and attach with screws.  
Torque to between 27 and 32 lbf.in. (0.30 and

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0.36 m.daN). Safety with lockwire as per 20-21-13.

- (3) On guide pulleys, engage cable on pulley throat, install spacer, insert bolt, install washer, nut. Safety with cotter pin.

NOTE : Minimum clearance between pulleys and spacers must be between 0.022 and 0.060 in. (0.6 and 1.5 mm).

- (4) On turnbuckles and cable junction fittings, connect cable ends and maintain them with sleeves.

Remove equipment D921620000.

- (5) Tighten turnbuckles symmetrically until a sufficient and equal tension of the two cables is obtained enabling easy removal of the regulator locking equipment.
- (6) Remove locking equipment D921606000.
- (7) Note temperature in adjacent cable area, and adjust cable tension according to adjustment graph.
- (8) Tension adjustment is always symmetrical. The position of the pointer on the centre indicating drum shall coincide with the selected position on the graph. Tension = 25 daN (56.2 lbf).
- (9) Check that tension is equally distributed between both cables by removing rigging pins E925019105 from equipment E925019012 (easy removal of rigging pins).
- (10) Safety turnbuckles and cable junction fittings with locking clips.
- (11) Remove safety clip and tag and set circuit breaker M626, panel 15-216, Map Ref F22.
- (12) Remove warning notices.
- (13) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (14) Remove equipment E925019012, E925019013 and E925019010 and remove pin D921310000 from mixing unit.
- (15) Remove pins D925252001 and D925252003 from pitch and roll resolvers.

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- (16) Shut down pressurization of hydraulic systems  
(Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
- (17) Make certain that minimum clearance values are observed at the following points.  
(Ref. Fig. 405 )
- (a) Clearance A  
Between cables and edges of passages in floor support beams.  
Flight control cable and frame beams without fairleads from frame 11 to frame 38.  
Nominal clearance 10 mm (0.393 in.)  
Minimum clearance 8 mm (0.315 in.)
  - (b) Clearance B  
Between cables and edges of passages in floor support beams.  
Flight control cable and beams with fairleads from frame 9 to frame 37.  
Nominal clearance 10 mm (0.393 in.)  
Minimum clearance 4 mm (0.157 in.)
  - (c) Clearance C  
Between cables and edges of passages in floor support beam at frame 8.  
Nominal clearance 10 mm (0.393 in.)  
Minimum clearance 5 mm (0.196 in.)
- H. Remove cables from mixing unit  
(Ref. Fig. 403, 404 and 406)
- (1) Remove safety clip and tag and set circuit breaker M626, panel 15-216, Map Ref F22.
  - (2) Remove warning notices.
  - (3) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).
  - (4) Disconnect actuating rods from input levers on all elevon PFCU's.
    - (a) Remove the following fairings :  
LH wing 551JB, 552JB, 553JB  
RH wing 651JB, 652JB, 653JB
    - (b) Disconnect and separate actuating rods from PFCU inputs levers.

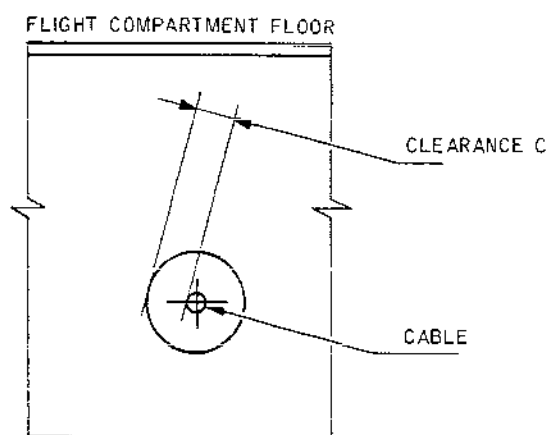
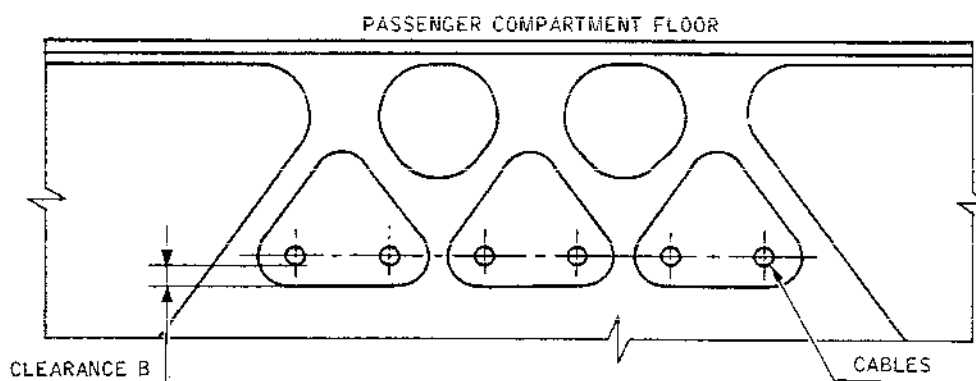
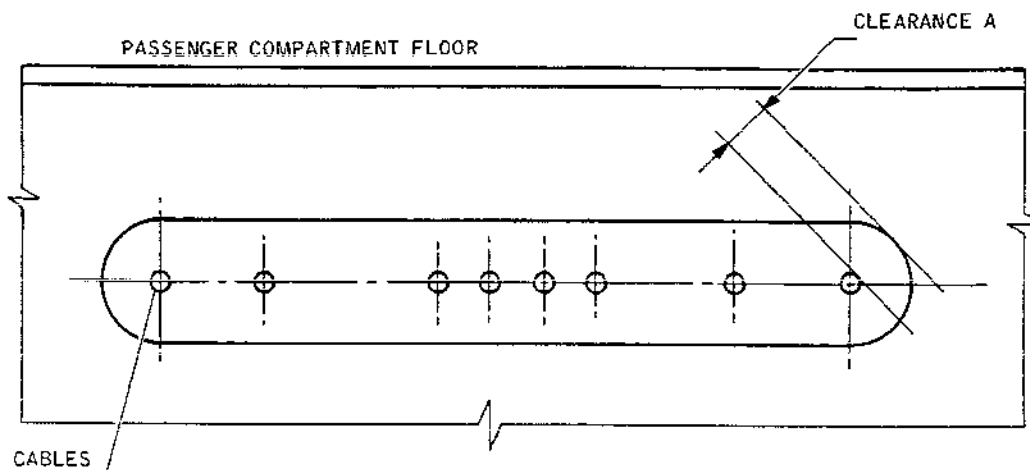
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Clearances between Cables and Structure  
Figure 405

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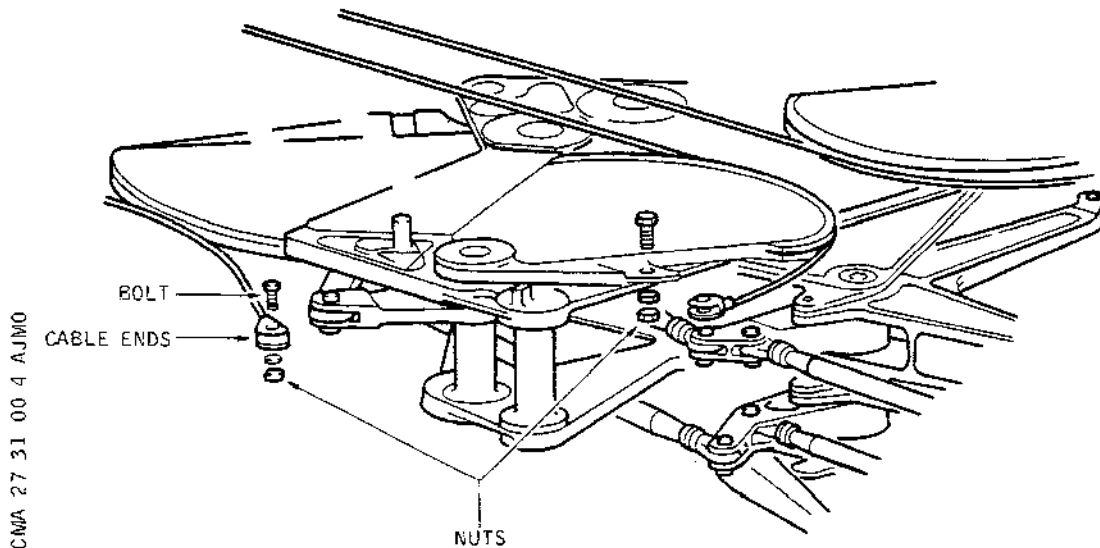
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## MAINTENANCE MANUAL



Cables on Mixing Unit  
Figure 406

- (5) Shut down pressurization of hydraulic systems  
(Ref. 27-00-00, Servicing. Procedure to set Flight Controls in electrical mode).
- (6) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

**WARNING :** DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3, PROHIBITING PRESSURIZATION OF BLUE, YELLOW AND GREEN HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY ALSO A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZATION SYSTEM ELECTRIC PUMPS.

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## MAINTENANCE MANUAL

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

(Ref. Fig. 403 )

- (7) On turnbuckles (located between frames 65 and 66 for LH cable) and between frames 64 and 65 for RH cable), remove locking clips (3).

Tighten turnbuckles symmetrically until a sufficient tension is obtained enabling installation of equipment D921606000 on regulator.

Install locking equipment D921606000.

- (8) Slacken cables symmetrically until they can be disconnected from turnbuckles.  
Slide sleeve assembly (2) and separate cable ends.  
Install equipment D921620000.

- (9) Remove pin D921310000 from mixing unit.

- (10) Remove cotter pins, remove nuts, washers, remove bolts attaching cable ends to cable quadrant, disengage cable ends.

### I. Install cables on mixing unit (Ref. Fig. 406 )

- (1) Engage cable ends on cable quadrants, install bolt, washer and nut. Safety with cotter pin.
- (2) Immobilize mixing unit with rigging pin D921310000.
- (3) On turnbuckles, connect cable ends and maintain them with sleeves.  
Remove equipment D921620000.
- (4) Tighten turnbuckles symmetrically until a sufficient and equal tension of both cables is obtained enabling easy removal of cable tension regulator locking equipment.
- (5) Remove equipment D921606000 from cable tension regulator.
- (6) Note temperature of adjacent cable area and adjust tension according to adjustment graph.
- (7) Tension adjustment is always symmetrical. The position of the pointer on the centre indicating drum shall coincide with the selected position on the graph.

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Tension = 25 daN (56.2 lbf).

- (8) Check that tension is equally distributed between both cables, by removing rigging pins E925019105 from equipment E925019012 (easy removal of rigging pins).
- (9) Safety turnbuckles with locking clips.
- (10) Connect actuating rods to PFCU input levers ; bolt, washer, nut.  
PFCU at RIB24. Torque to between 0.25 and 0.30 m.daN (23 and 26.541 lbf.in.).  
PFCU at RIB3 and 9. Torque to between 0.31 and 0.37 m.daN (27.425 and 32.733 lbf.in.).  
Safety with cotter pin.
- (11) Remove safety clip and tag and set circuit breaker M626, panel 15-216, Map Ref F22.
- (12) Remove warning notices.
- (13) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (14) Remove equipment E925019012, E925019013 and E925019010, remove pin D921310000 from mixing unit.
- (15) Remove rigging pins D925252001 and D925252003 from pitch and roll resolvers.
- (16) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
- (17) Install the following fairings :  
551JB, 552JB, 553JB  
651JB, 652JB, 653JB

### J. Test

- (1) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (2) Carry out an operational test (Ref. 27-31-00, Adjustment/Test).
- (3) Insert rigging pins D925252001 and D925252003 in pitch and roll resolvers.  
Install equipment E925019010, E925019013 and 925019012.  
Make certain that rigging pin D921310000 can be inserted and removed easily.

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## MAINTENANCE MANUAL

Remove :                   - rigging pin D921310000  
                             - equipment E925019012, E925019013  
                                  and E925019010  
                             - rigging pins D925252001 and  
                                  D925252003

- (4) Shut down pressurization of hydraulic systems  
(Ref. 27-00-00, Servicing, Procedure to set Flight  
Controls in mechanical mode).
- (5) Before closing access doors and panels, carry out a  
double inspection of work performed and area affected  
as per instruction detailed in 05-55-11.

### K. Close-Up

- (1) Make certain that working area is clean and clear of  
tools and miscellaneous items of equipment.
- (2) Close floor panels.
- (3) Close access doors and panels.
- (4) Remove access platforms.

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## MAINTENANCE MANUAL

### MECHANICAL CONTROL - ADJUSTMENT/TEST

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. Linkage Adjustment

##### A. General

For any important check after total removal of pitch linkage, the adjustment procedure described below must be complied with.

After a partial removal or replacement of component, it is necessary to immobilize linkage with rigging pins upstream and downstream of the replaced component.

WARNING : YAW MECHANICAL CONTROLS MUST BE CONNECTED TO SERVO CONTROL AND IN OPERATIONAL CONDITION.

##### B. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pin - Pitch/Roll Shaft	D925367000
Rigging Pins - Set - Integral Trim Pitch/Roll/Yaw	D921277000
Rigging Pin - Mixing Unit Servo	D921310000

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## MAINTENANCE MANUAL

DESCRIPTION	PART NO.
Control	
Rigging Pin - Torque Tube at RIBS 3 and 9	D921337000
Rigging Pin - Torque Tube at RIB 24	D921311000
Rigging Pin - Synchro Pack	D925252000
Rigging Template - Integral Trim	D921250000
Zeroing Equipment - Elevons	D921354000
Protractor - Elevons and Rudder	TE2012000
Jig - Neutral Setting - Elevons at RIB3	D921303000
Jig - Neutral Setting - Elevons at RIB9	D921304000
Jig - Neutral Setting - Elevons at RIB24	E920001000
Zero Rigging Device Relay Chassis	E925019000
Test Set - Zero Setting - Resolvers	TE3016000
Ground Power Unit - Hydraulic-Power and Preliminary Testing	EMH398E
Access Platforms 3.220 m (10 ft.7 in.) 3.084 m (10 ft.1 in.)	
Electrical Ground Power Unit	
Lockwire Dia. 0.041 in. (1 mm) Corrosion Resistant Steel	

### C. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) On overhead panel, on Flight Control Unit, place BLUE

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## MAINTENANCE MANUAL

INVERTER and GREEN INVERTER switches in PRW OFF position.

- (3) Depressurize Green, Blue and Yellow hydraulic systems (Ref. 29-11-00, Servicing ; 29-12-00, Servicing and 29-21-00, Servicing).

WARNING : DISPLAY NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY ON THIS UNIT A WARNING NOTICE PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (4) Open the following access doors and panels. They correspond to the flight control mechanical linkage components.

(Ref. Fig.501 and 502)

ITEM	DESIGNATION	ACCESS
1	Torque tube	113 DB
2	Torque tube	121 AB
3	Integral trim assembly	121 DB
4	AP Force limiter	121 FB
5	Synchro pack	121 EB
6	Load limiting mechanism	121 GB
7	PFCU-R 3	553 JB
8	PFCU-R 3	553 KB
9	Control rod and bellcrank at wing RIB3	544 CB
10	Control rod and bellcrank at wing RIB6	543 BB
11	PFCU-R 9	552 JB
12	PFCU-R 9	552 KB
13	Control rod and bellcrank at wing RIB9	543 AB
14	Control rod and bellcrank at wing RIB22	542 AB
15	PFCU-R 24	551 JB
16	PFCU-R 24	551 KB
17	Control rod and bellcrank at wing RIB26	541 AB

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## MAINTENANCE MANUAL

ITEM	DESIGNATION	ACCESS
18	Bulkhead pressure seal connection	151 DB
19	Control rod and bellcrank at wing RIB26	641 AB
20	PFCU-R 24	651 JB
21	PFCU-R 24	651 KB
22	Control rod and bellcrank at wing RIB22	642 AB
23	Control rod and bellcrank at wing RIB9	643 AB
24	PFCU-R 9	652 JB
25	PFCU-R 9	652 KB
26	Control rod and bellcrank at wing RIB6	643 BB
27	Control rod and bellcrank at wing RIB3	644 BB
28	PFCU-R 3	653 JB
29	PFCU-R 3	653 KB
30	Control rod and bellcrank at wing RIB15	536 CT
31	Control rod and bellcrank at wing RIB19	535 DT
32	Cabin bulkhead pressure seal connection	241 KF
33	Mixing unit	241 JF
34	Mixing unit	241 HF
35	Cabin bulkhead pressure seal connection	242 KF
36	Control rod and bellcrank at wing RIB19	635 DT
37	Control rod and bellcrank at wing RIB15	636 CT

### D. Adjustment in Fuselage Front Section

**WARNING** : UNLESS OTHERWISE SPECIFIED IN THE TEXT ALL ADJUSTMENT OPERATIONS SHALL BE CARRIED OUT WITHOUT HYDRAULIC AND ELECTRICAL POWER.

**NOTE** : Scrupulously follow order of operations described below. All adjustable rods are removed.

- (1) Immobilize pitch torque tube with rigging pin D925367000.
- (2) Immobilize integral trim assembly in zero position ; to do this, rotate control wheel on centre console until rigging pin D921277000 can be easily inserted on input lever.

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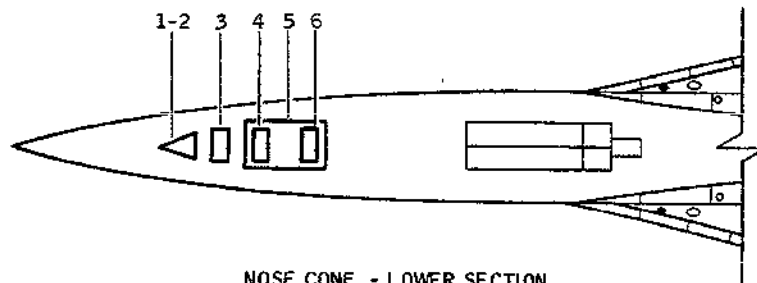
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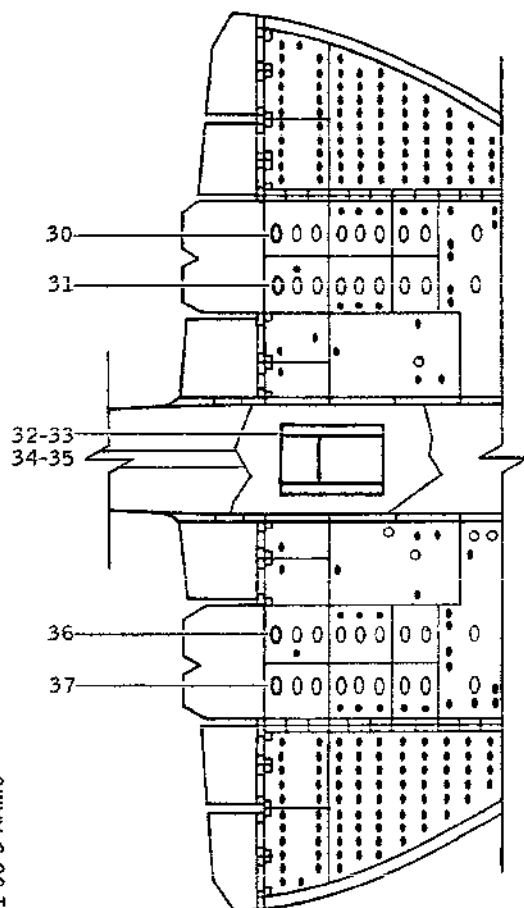
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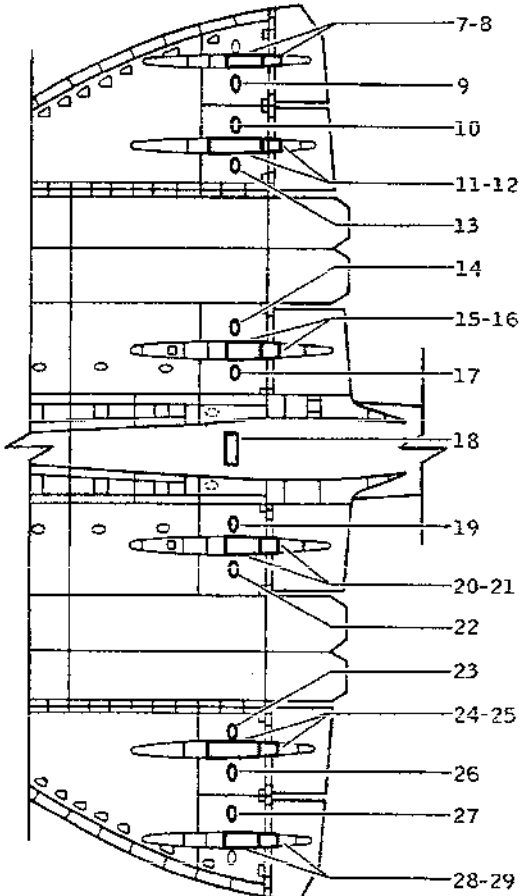
## MAINTENANCE MANUAL



NOSE CONE - LOWER SECTION



WING - UPPER SURFACE



WING - LOWER SURFACE

Access to Flight Controls  
Figure 501

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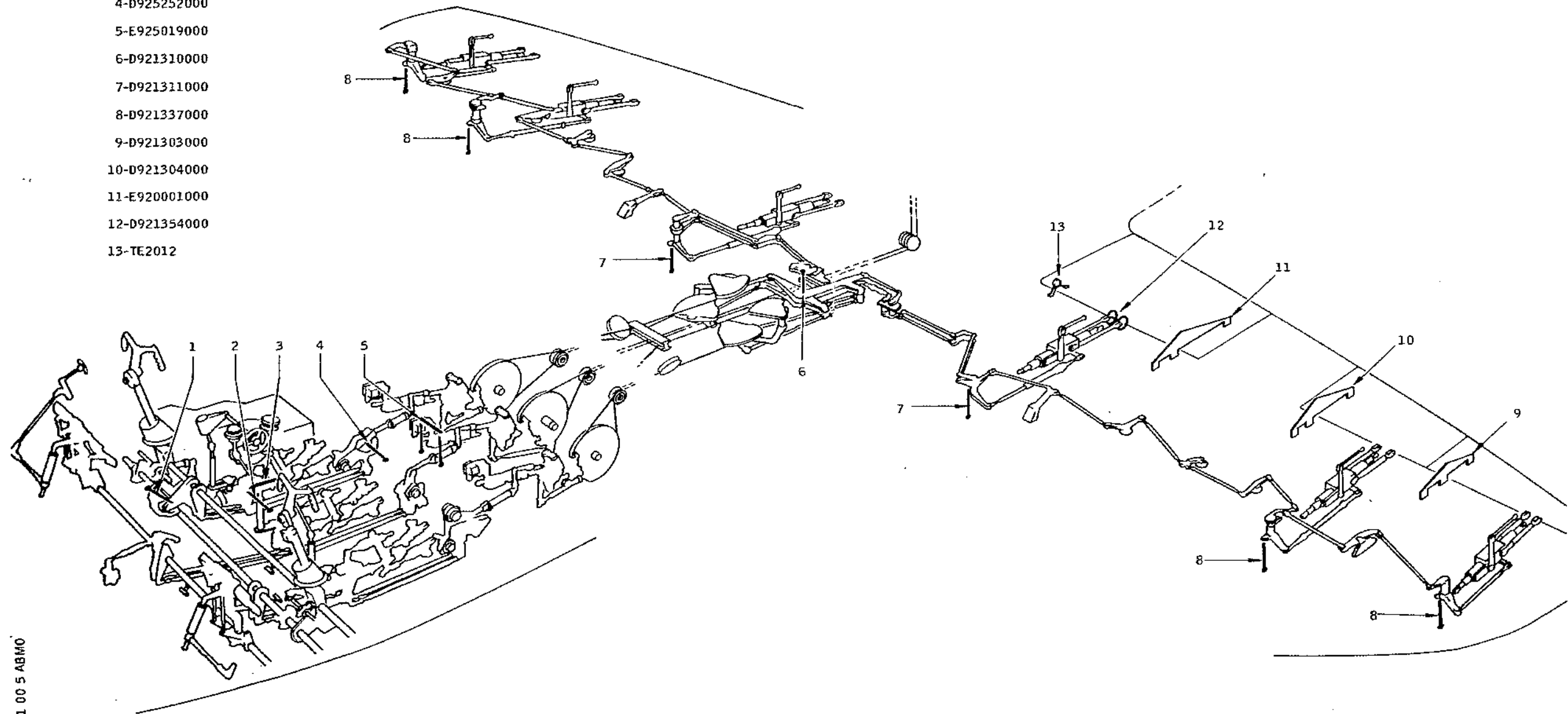
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## MAINTENANCE MANUAL

- 1-D925367000
- 2-D921277000
- 3-D921250000
- 4-D925252000
- 5-E925019000
- 6-D921310000
- 7-D921311000
- 8-D921337000
- 9-D921303000
- 10-D921304000
- 11-E920001000
- 12-D921354000
- 13-TE2012



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Rigging Pins and Equipment For Mechanical  
Adjustment of Flight Controls  
Figure 502

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## MAINTENANCE MANUAL

- (3) Install equipment D921250000. Check that spring rod is not compressed. Pin must be inserted without rod piston displacement.
- (4) Remove link rod, between torque tube and integral trim, assigned to Captain's side and install it on First Officer's side. Adjust its length and wirelock its adjustable ends. (Ref. 20-21-13).

NOTE : For installing or removing link rod attachment bolts, it is necessary to press the plunger located on head of bolt in order to free the retaining balls.

- (5) Remove this rod and install it on Captain's side. Install bolts on its ends. Torque to between 27 and 32 lbf.in. (0.30 and 0.36 m.daN). Safety with cotter pin.
- (6) Install rod assigned to First Officer's side. If necessary adjust rod length and wirelock its adjustable ends. Torque to the same values as for Captain's side rod. Safety with cotter pin. Install safety attachments and coupling clamps. Torque coupling clamp attaching nuts to between 12 and 15 lbf.in. (0.15 and 0.18 m.daN). (Ref. Fig. 503 )

NOTE : Clearance A between potentiometer attachment and rod must be :  
Nominal Clearance : 3 mm (0.118 in.)  
Minimum required clearance : 2.5 mm (0.098 in.)

- (7) Immobilize synchro pack with rigging pin D925252003
- (8) Install link rods between integral trim and synchro pack input levers. Adjust rod length until attachment bolts can be installed easily, tighten the adjustable ends and safety with lockwire. (Ref. 20-21-13). Install bolts on their attachment ends and torque to between 27 and 32 lbf.in. (0.30 and 0.36 m.daN). Safety with cotter pin. Install safety attachments and coupling clamps. Torque coupling clamp attaching nuts to between 12 and 15 lbf.in. (0.15 and 0.18 m.daN). Safety with cotter pin.
- (9) Remove equipment D921250000  
Remove rigging pin D921277000 from input lever on

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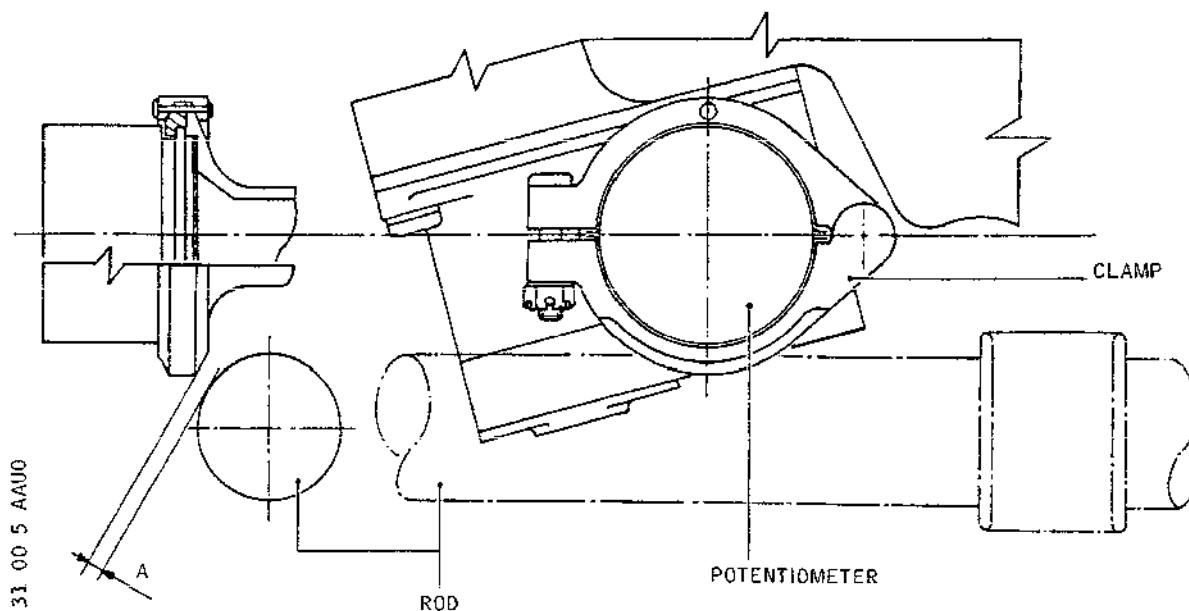
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## MAINTENANCE MANUAL



Clearance Between Rod and Potentiometer  
Figure 503

integral trim assembly and rigging pin D925367000 from pitch torque tube.

- (10) Install equipment E925019010 under relay chassis, and equipment rod E925019012 connecting equipment support to load limiting mechanism lower lever.
- (11) Install AP force limiter. Tighten attachment bolt nuts : on synchro pack side, torque to between 45 and 50 lbf. in (0.52 and 0.60 m.daN). On Relay Jack side torque to between 27 and 32 lbf.in. (0.30 and 0.36 m.daN). Safety with cotter pin.
- (12) Remove rigging pin E925019105 from load limiting mechanism lower lever.
- (13) Connect hydraulic ground power unit EMH 398E to relay jack and pressurize the latter.
- (14) Make certain that rigging pin E925019105 on load limiting mechanism can be easily inserted and removed. If not, adjust length of AP force limiter as follows :

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## MAINTENANCE MANUAL

- (a) Cut and remove lockwire and unscrew lock nut on adjustable end, disengage lock washers.
  - (b) Manually rotate rod stem to lengthen or shorten AP force limiter until rigging pin E925019105 can be easily inserted or removed.
  - (c) Engage lock washer with tab in slot provided on front face of rod stem.
  - (d) Engage the second lock washer.
  - (e) Tighten lock nut of adjustable end.  
Torque to between 170 and 180 lbf.in (1.8 and 2 m.daN) Wirelock. (Ref. 20-21-13).
- (15) Check adjustment of Relay Jack sensor.  
(Ref. 22-12-61, Adjustment/Test).
- (16) Remove equipment E925019012, E925019010, rigging pins D925252003.
- (17) Depressurize Relay Jack and disconnect hydraulic ground power unit.
- (18) Connect the aircraft hydraulic lines to the Relay Jack as follows.
- (a) Maintain adapters screwed in Relay Jack using appropriate wrench.
  - (b) Torque hydraulic line union nuts to between the following values :
- |                     |   |
|---------------------|---|
| Blue Pressure       | : 1.51 and 1.63 m.daN<br>(11.1372 and 12.0223 lbf.ft) |
| Blue Return         | : 1.92 and 2.15 m.daN<br>(14.1612 and 15.8576 lbf.ft) |
| Green Pressure      | : 1.51 and 1.63 m.daN<br>(11.1372 and 12.0223 lbf.ft) |
| Green Return        | : 1.92 and 2.15 m.daN<br>(14.1612 and 15.8576 lbf.ft) |
| Yell/Green Pressure | : 2.43 and 2.76 m.daN<br>(17.9228 and 20.3567 lbf.ft) |
| Yellow Return       | : 2.43 and 2.76 m.daN<br>(17.9228 and 20.3567 lbf.ft) |
| Yell/Blue Pressure  | : 2.43 and 2.76 m.daN<br>(17.9228 and 20.3567 lbf.ft) |

### E. Adjustment in Fuselage

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(Ref. 27-31-00, Removal/Installation).

### F. Linkage Adjustment in Wings (Ref. Fig. 504 )

**WARNING** : WHEN ELEVONS ARE NOT CONNECTED TO SERVO CONTROLS, THEY MUST BE MAINTAINED WITHIN THE STRUCTURAL DEFLECTION LIMITS BY MEANS OF THE ZEROING EQUIPMENT D921354000 OR USING STANDS. (IF AIRCRAFT IS ON JACKS)  
FEEDBACK LINKS MUST BE DISCONNECTED FROM STRUCTURE AS LONG AS SERVO CONTROL ADJUSTMENT IS NOT CARRIED OUT.

- (1) In the event of a total linkage removal ; install fixed rods according to their previous position. (Ref. Following paragraph).  
Install attachment bolts and nuts. Safety with cotter pin.

**NOTE** : On mixing unit bellcrank, the attachment bolt of RH upper rod (13) is installed upside down.

- (2) Fixed rods location and length in wings.

Rod (1), between RIB3 and RIB6 RH wing 1250.5 mm (49.2 in.).

Rod (3), between RIB9 and RIB10 RH wing 675.2 mm (26.57 in.).

Rod (4), between RIB10 and RIB14 RH wing 1376.6 mm (54.2 in.).

Rod (6), between RIB18 and RIB22 RH wing 1417.5 mm (55.8 in.).

Rod (7), between RIB22 and RIB24 RH wing 702.5 mm (27.61 in.).

Lower rod (8) between RIB24 and RIB26 RH wing 1102.8 mm (43.4 in.).

Lower rod (10) between RIB26 and RH pressure seal 944 mm (37.2 in.).

Upper rod (11) between RIB26 and RH pressure seal 865.4 mm (34.07 in.).

Lower rod (12)(springrod) between RH pressure seal and Mixing unit 857,9 mm (33.77 in.).

Upper rod (13) linking RH pressure seal - Mixing unit 933,3 mm (36.74 in.).

Lower rod (14)(spring rod) between mixing unit and LH pressure seal 761 mm (29.96 in.).

Upper rod (15) between mixing unit and LH pressure seal 843 mm (33.19 in.).

Lower rod (16) between pressure seal and LH RIB26 119,8 mm (4.09 in.).

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Upper rod (17) between pressure seal and LH RIB26  
1039,5 mm (40.295 in.).  
Lower rod (18) between RIB26 and RIB24, LH wing, 777.2  
mm (30.6 in.).  
Rod (20) between RIB24 and RIB22, LH wing, 796.2 mm  
(31.347 in.).  
Rod (21) between RIB22 and RIB19, LH wing, 1427.5 mm  
(56.2 in.).  
Rod (23) between RIB15 and RIB11, LH wing, 1366 mm  
(53.76 in.).  
Rod (24) between RIB11 and RIB9, LH wing, 570 mm (22.45  
in.).  
Rod (26) between RIB6 and RIB3, LH wing, 1263.4 mm  
(49.74 in.).

(3) Adjustable rod location and theoretical length in wing.

Rod (2), between RIB6 and RIB9 RH wing 1252.11 mm  
(49.3 in.).  
Rod (5), between RIB15 and RIB19 RH wing 1417.5 mm  
(55.8 in.).  
Upper Rod (9), between RIB24 and RIB26 RH wing 1102.8  
mm (43.4 in.).  
Upper Rod (19), between RIB26 and RIB24 LH wing 777.2  
mm (30.6 in.).  
Rod (22), between RIB19 and RIB15 LH wing 1428 mm  
(56.22 in.).  
Rod (25), between RIB9 and RIB6 LH wing 1257,5 mm  
(49.5 in.).

(4) Immobilize Pitch and Roll synchro pack with rigging  
pin D925252003, D925252001.

(5) Immobilize mixing unit with rigging pin D921310000

(6) Immobilize rod and bellcrank at RIBS24 in RH and LH  
wings with rigging pins D921311000.

(7) Install adjustable rods between rod and bellcrank  
assemblies at RIB26 and at RIB24. Adjust rod length  
until attachment bolts can be inserted freely. Install  
bolts and nuts and safety with cotter pin.

R On RH side, check that rods slide freely through fire  
R wall connector without excessive chafing as follows :  
R (Ref. Fig. 504 )

R (a) Note position of bellcranks at RIB26 and at RIB24

R (b) Remove rigging pin from RIB24, (D921311000), RH  
R side

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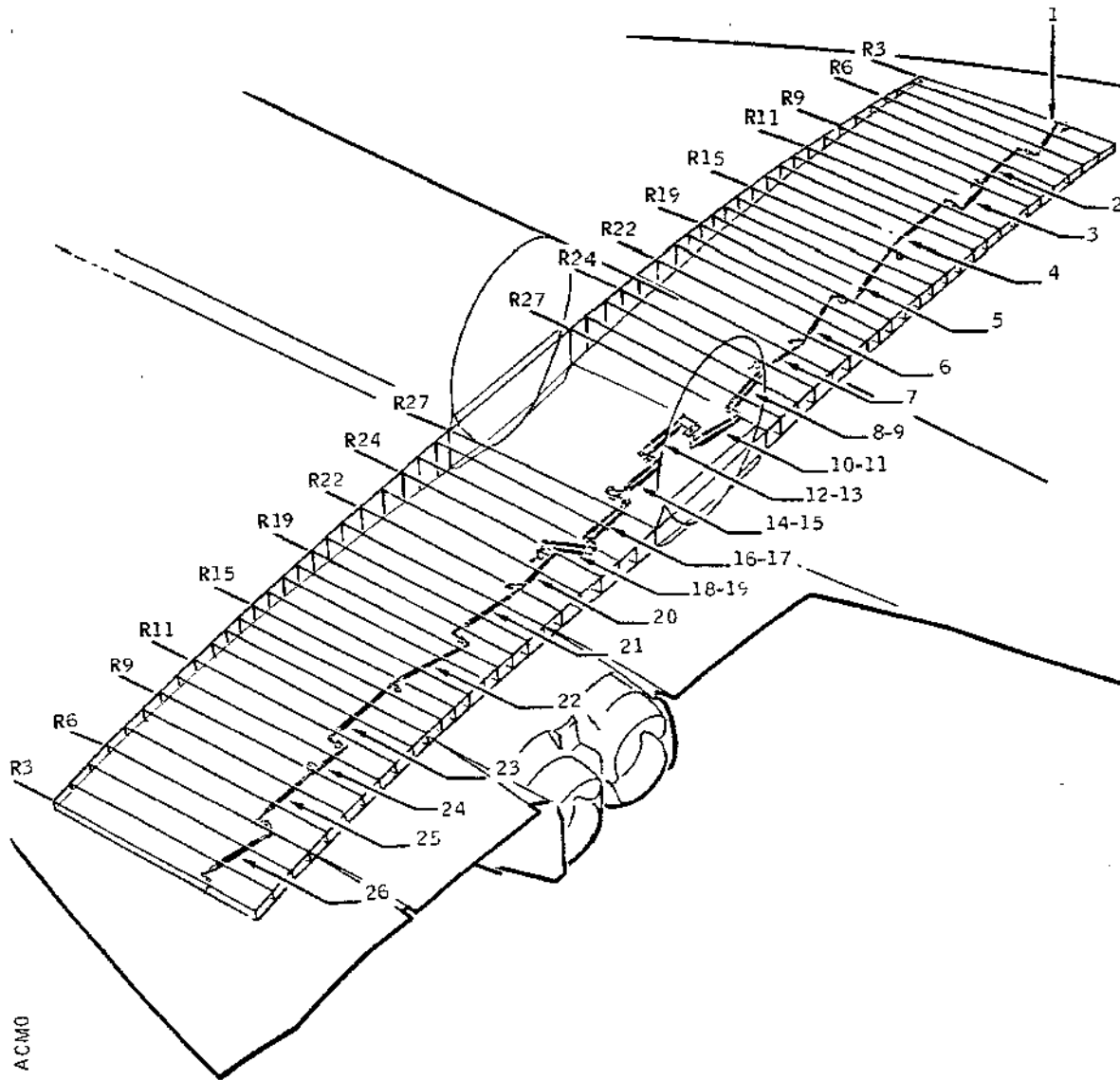
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Linkage Location in Wings  
Figure 504

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- R (c) At bellcrank at RIB26  
R Disconnect rods (10) and (11) which connect  
R bellcrank at RIB26 to bellcrank at pressure seal.
- R (d) At bellcrank at RIB24  
R Disconnect rod (7) which connect bellcrank  
R at RIB24 to bellcrank at RIB22
- R (e) Operate bellcrank at RIB24 in both directions  
R so as to obtain maximum travel of both rods (8)  
R and (9).
- R NOTE : Maximum travel of rods is 165 mm  
R (6.4961 in.), i.e. 82.5 mm (3.2480 in.)  
R each side of neutral.
- R (f) Check that rods (8) and (9) slide freely through  
R fire wall connectors during above travels.  
R If excessive chafing is noted, adjust bulkhead  
R connector as follows :
- R (f1) Disconnect adjustable links of the fire  
R wall connector support.
- R (f2) Operate rods (8) and (9) by rotating bell-  
R crank at RIB26.
- R (f3) Position fire wall connector so as to  
R evenly distribute play between rod and  
R connector, to avoid excessive chafing  
R during rod (8) (9) travel (Ref. step (7)  
R (e) above).
- R (f4) Adjust length of adjustable links and  
R connect to fire wall connector support.
- R (f5) Check that locking of lock nuts to set the  
R links to the desired length has not upset  
R the previous adjustment.
- R (f6) Repeat adjustment, if required, until rods  
R (8) and (9) slide freely inside fire wall  
R connector.
- R (g) At RIB26 bellcrank  
R Connect rods (10) and (11) linking bellcrank  
R at RIB26 to fire wall pressure seal bellcrank.  
R Tighten nuts and safety with a cotter pin.
- R (h) At RIB24 bellcrank  
R Connect rod (7) linking relay at RIB24 to relay

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- R at RIB22.  
R Tighten nut and safety with cotter pin.
- R (i) Check that insertion of rigging pin at RIB24  
R is carried out freely. If necessary repeat  
R adjustment of adjustable rod between bellcranks  
R at RIB24 and at RIB26.
- (8) Remove pin D921311000 at RIB24. Immobilize rod and bellcrank at RIB9 in LH and RH wings with rigging pins D921337000.
- (9) Install adjustable rods between rod and bellcrank assemblies at RIB15 and at RIB19. Adjust rod length until attachment bolts can be inserted freely. Install bolts and nuts and safety with cotter pin.
- (10) Remove pin D921310000 from mixing unit. Immobilize rod and bellcrank at RIB3 in LH and RH wings with rigging pin D921337000.
- (11) Install adjustable rods between rod and bellcrank assemblies at RIB6 and at RIB9. Adjust rod length until attachment bolts can be inserted freely. Install bolts and nuts and safety with cotter pin.
- (12) Remove rigging pins D921337000 from rod and bellcrank assemblies at RIBS9 and 3.
- (13) Install equipment E920001000, D921303000, D921304000 on wings. Position elevons so that they touch the neutral setting jig. Install elevon zeroing equipment D921354000.
- (14) Install protractors TE 2012000 and set them to zero.
- (15) Remove equipment E920001000, D921303000, D921304000 and elevon zeroing equipment D921354000.
- (16) Manually or by means of any appropriate equipment fully deflect elevons in both directions so that they reach an angular value (read on protractor) of at least :
- 22° 16 minutes, nose up and nose down, for inner elevons.
  - 27° 30 minutes, nose up and down, for outer and middle elevons.

NOTE : During this operation, do not exceed required angles in order not to damage upper protective

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strip when in nose up configuration, and so that elevon does not rest on structural stop when in nose down configuration.

- (17) Support elevon approximately to zero.
- (18) Set eccentric bush, PFCU LH side, to zero.  
Marks engraved on bush and on body.  
Install back-up washers and LH rods linking PFCUs to elevons.  
Tighten attachment nuts. Torque to between 9.2 and 16.6 m.daN (68 and 118 lbf. ft). Safety with cotter pin.

NOTE : Correct thickness of shim washers to obtain required torque value.

- (19) Install back-up washers and RH rods ; on PFCU RH trunnion, adjust eccentric bush so that rod can be installed freely. In the event that eccentricity of RH bush is insufficient, adjust LH bush so as to obtain required rod end fitting centre-to-centre distance. Tighten attachment nuts. Torque to between 9.2 and 16.6 m.daN. (68 and 118 lbf. ft). Safety with cotter pin.

NOTE : Correct thickness of peel shim to obtain required torque value.

- (20) Manually or by means of any appropriate equipment deflect elevons from one PFCU stop to the other.  
Check on protractors that deflection angles are not greater than :

20°46 minutes plus or minus 30 minutes nose up and nose down for inner elevons.

25° 45 minutes plus or minus 30 minutes nose up or nose down for outer and middle elevons.

- (21) Return elevon to neutral, install zeroing equipment D921354000.
- (22) Adjust PFCU input lever actuating rods to their theoretical length :  
789,2 mm (31.07 in.), RIB24.  
853,1 mm (33.59 in.), RIB9.  
690,7 mm (27.2 in.), RIB3.
- (23) Install these rods.  
Tighten and safety attachment bolts.  
At RIB9 and 3, torque to between 0.31 and 0.37 m.daN (27.31 and 32.733 lbf.in) Safety with cotter pin.

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At RIB24, torque to between 0.26 and 0.30 m.daN  
(23 and 26.541 lbf.in) Safety with cotter pin.

NOTE : On control rod and bellcrank side at RIB24 and  
RIB9, PFCU lever actuating rod attachment bolts  
are installed upside down.

- (24) Install rigging pin D921310000 and remove zeroing  
equipment D921354000. Position elevon on PFCU lower  
stop.
  - (25) Make certain that elevon travel range is clear.
  - (26) Remove warning notices and set Flight Controls in  
Mechanical Mode (Ref. 27-00-00, Servicing).
  - (27) Remove rigging pin D921310000 and adjust, if necessa-  
ry, length of PFCU input lever actuating rods to set  
protractor to zero plus or minus 2 minutes.
  - (28) Remove rigging pins D9252520003 and D925252001 from  
synchro packs.
  - (29) Move control column in nose down direction, up to  
maximum travel and check elevon deflection : 17° plus  
or minus 30 minutes for the 6 elevons.
  - (30) Move control column in nose up direction, up to spring  
pot assembly and check elevon deflection : 15° plus  
or minus 30 minutes for the 6 elevons.
- NOTE : In the event that the maximum deflections could  
not be obtained in nose down direction, adjust  
length of lever arm on cable tension regulator  
located in zone 121.
- (31) Immobilize Roll and Pitch synchro packs with rigging  
pins D925252001 and D925252003 and mixing unit with  
rigging pin D921310000.
  - (32) Shut down pressurization of hydraulic systems  
(Ref. 27-00-00, Servicing, Procedure to set Flight  
Controls in mechanical mode).
  - (33) Do not remove protractors TE 2012000 and carry out  
PFCU resolver electrical zero adjustment.

G. Adjustment of PFCU resolver electrical zero.  
(Ref. Fig. 505 )

- (1) Make certain that Pitch and Roll resolvers and mixing

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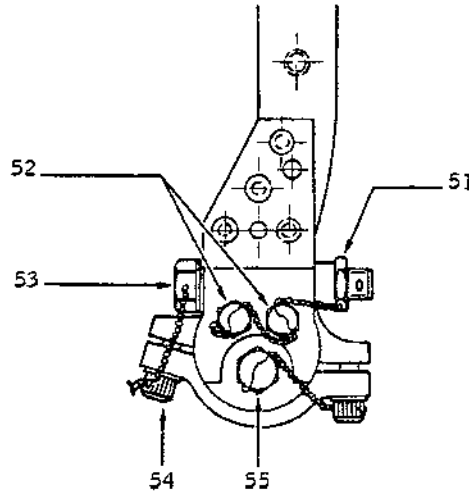
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Resolver Electrical Zero Adjustment  
Figure 505

unit are immobilized with rigging pins. If not :

- (a) Set Flight Controls in mechanical mode.  
(Ref. 27-00-00, Servicing) and immobilize Roll and Pitch resolvers with rigging pins D925252001 and D925252003, and mixing unit with rigging pin D921310000.
- (b) Shut down pressurization of hydraulic systems  
(Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
- (2) Disconnect electrical connectors from PFCUs and connect electrical connectors of Test set TE3016000 to PFCU.
- (3) Position elevons to neutral, and maintain them in this position by means of zeroing equipment D921354000. In the event that protractors have been removed or are out of adjustment, proceed as follows :
  - (a) Install neutral setting jigs E920001000,

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D921303000 and D921304000.

- (b) Lock each elevon in zero position by means of zeroing equipment D921354000. When locked check that elevon is in contact with neutral setting jig pick up.
- (c) Install protractors TE2012000 and set to zero.
- (d) Remove neutral setting jigs E920001000, D921303000 and D921304000.
- (4) Connect to structure PFCU resolver feedback link bolt attachment plates. Do not safety.
- (5) Proceed with resolver zero electrical adjustment of each PFCU as follows :
  - (a) Unsafety nuts and bolts (51), (52), (54) and (55).
  - (b) Slightly loosen bolts (52), (54) and (55).
  - (c) Loosen nut (51) in order to be able to turn bolt (53) with slight resistance.
  - (d) Turn bolt (53) in appropriate direction until test set TE 3016000 indicator pointer indicates 0° plus or minus 2 minutes. At the same time, gradually increase test set sensitivity to maximum.
  - (e) Tighten nut (51)  
Torque to between 13 and 15 lbf.in (0.15 and 0.17 m.daN).
  - (f) Make certain that electrical zero has not varied.
  - (g) Tighten bolts (52) and (54).  
Torque to between 6 and 8 lbf.in (0.07 and 0.09 m.daN).
  - (h) Tighten bolt (55).  
Torque to between 23 and 25 lbf. in. (0.259 and 0.282 m.daN).
  - (i) Wirelock bolts (52), (54) and (55) and nut (51) (Ref. 20-21-13).
- (6) Disconnect from structure resolver feedback link bolt attachment plates.
- (7) Disconnect test set from PFCU.

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- (8) Connect aircraft electrical connectors to PFCU.
- (9) Remove zeroing equipment (D921354000).
- (10) Fully deflect elevon and check that, in both PFCU stop positions, feedback link can be connected easily to structure.

WARNING : IN PFCU STOP POSITIONS, MAKE CERTAIN BEFORE CONNECTING FEEDBACK LINK TO STRUCTURE THAT A CLEARANCE OF AT LEAST 1 mm (0.039 in.) IS OBTAINED BEFORE RESOLVERS REACH THEIR INTERNAL STOPS

- (11) Attach link bolt attachment plates to structure.
- (12) Check that elevon travel range is clear.
- (13) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).
- (14) Remove rigging pin D925252003 and D925252001 from synchro packs and D921310000 from mixing unit.
- (15) Operate control column, at least three times, in both nose up and nose down directions, up to stop, slowly release control column to neutral. Immobilize synchro packs with rigging pins D925252003 and D925252001. On protractors TE 2012000 check elevon position : 0° plus or minus 2 minutes. If this value is outside tolerance, re-adjust PFCU resolver electrical zero.
- (16) Remove rigging pins D925252003 and D925252001 from synchro packs.  
Remove protractors TE2012000.
- (17) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in electrical mode).

### H. Close-Up

- (1) Clean relay jack, PFCUs and adjacent areas.  
Make certain that no trace of hydraulic fluid remains.
- (2) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (3) Close access doors and panels corresponding to the linkage components, Ref. list C. (4).

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(4) Remove access platforms.

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### 2. Operational Test

#### A. General

The purpose of the test is to make certain that the mechanical linkage from controls to control surfaces operates correctly.

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph (p 501).
- (2) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (3) Check that roll and pitch trim controls are in zero position.

#### C. Test

- (1) Move control column, in nose down direction, up to maximum travel.  
Check on ICOVOL indicator (Flight Control Surface Position Indicator) :
  - That the 6 elevons deflect downwards.
  - The maximum deflections =  $17^{\circ}$  plus or minus 30 minutes for the 6 elevons.
- (2) Move control column in nose up direction up to spring pot assembly.  
Check on ICOVOL indicator :
  - That the 6 elevons fully deflect upwards
  - That the maximum deflections equal  $15^{\circ}$  plus or minus 30 minutes.
- (3) Return control column to neutral position
  - Check on ICOVOL indicator that the 6 elevons are in neutral position.

#### D. Close-Up

- (1) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set flight controls in mechanical mode).

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### 3. System Test

#### A. General

The purpose of the test is :

- (1) To check that control surface deflection values correspond to Flight Control displacement values.
- (2) To check that the load applied to components does not exceed the authorized values.

#### B. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins - Synchro Pack	D925252000
Protractor - Elevon and Rudder	TE2012000
Hand Equipment - Effort Measuring Flight Control Linkages	TE3019200
Access Platforms - 3.220 m (10 ft.7 in.) - 4.337 m (14 ft.7 in.)	

#### C. Prepare

- (1) Take the precautions described in the previous WARNING paragraph. (page 501).
- (2) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (3) Check that roll and pitch trim controls are set to zero.
- (4) Open access panel 121FB and immobilize pitch and roll synchro packs with rigging pin D925252003 and D925252001.
- (5) Install the following equipment:  
TE 2012000 on elevons.  
TE 3019102 at Captain's station.  
TE 3019211, TE 3019210 and TE 3019220 at First Officer's station.

NOTE : Equip spring scale with a 100 daN blade.

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- (6) Set measuring equipment to zero.
- (7) Remove rigging pins from synchro packs D925252001 and D925252003.

### D. Mechanical Mode Test

- (1) By means of equipment installed on First Officer's control column, fully deflect control column in nose down direction.
- (2) The load is progressive and equals 48 daN (108.1 lbf) maximum.
- (3) Note :
  - (a) Control column deflection = 10° plus or minus 24 minutes.
  - (b) Elevon deflection = 17° plus or minus 30 minutes.
- (4) Deflect control column in nose up direction up to spring pot assembly.
- (5) The load is progressive and equals 32.5 daN (79.19 lbf) maximum.
- (6) Note elevon deflection : 15° plus or minus 30 minutes.
- (7) Increase load up to 42.5 daN (95.71 lbf) in order to deflect control column past the spring pot assembly.
- (8) Fully deflect control column ; necessary load equals 57.5 daN (129.5 lbf) maximum.
- (9) Note :
  - (a) Control column deflection = 11°24 minutes plus or minus 24 minutes.
  - (b) Elevon deflection = 17° plus or minus 30 minutes.
- (10) Release control column to neutral position.

### E. BLUE Electrical Mode Test

- (1) Set Flight Controls in BLUE electrical mode (Ref. 27-00-00, Servicing).
- (2) Repeat procedure described in paragraph "Mechanical Mode Test".

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### F. GREEN Electrical Mode Test

- (1) Set Flight Controls in GREEN electrical mode (Ref. 27-00-00, Servicing).
- (2) Repeat procedure described in paragraph "Mechanical Mode Test".

### G. Close-Up

- (1) Remove units of equipment TE2012000 and TE3019200.
- (2) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in electrical mode).
- (3) Close access door 121FB.
- (4) Remove access platforms.

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### 4. Neutral Tolerance (dead play) Test

#### A. General

The purpose of this test is to check the elevon neutral tolerance ranges.

Before carrying out measurements, it is advised to operate Roll and Pitch control several times.

#### B. Equipment and Materials

DESCRIPTION	PART NO.
Protractor - Elevon and Rudder	TE2012000
Rigging pins - Synchro Pack	D925252000
Access Platform 3.22m (10 ft. 7 in) 4.33m (14 ft. 7 in)	
Circuit Breaker Safety Clips	

#### C. Prepare

- (1) Take the precautions described in the previous WARNING paragraph (p 501)
- (2) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (3) Check that pitch and roll trim controls are set to zero
- (4) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
STICK SHAKER SUP	1-213	W 513	P15

- (5) Check that the following circuit breakers are set :

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW A SYS SUP	1-213	G 292	M17
ADC 1 28 V SUP		1F 74	P12
ADC 1 26 V SUP	2-213	1F 78	A 2
RH UC WEIGHT SW		G 294	B 9
ROLL ART FEEL COMP1 SUP		1C 243	E 3
PITCH ART FEEL COMP1 SUP		1C 244	E 4
ADC 1 115V SUP		1F 73	F 3

- (6) On ADC control panel (centre console)
- (a) Place ADC 1 switch in ON position.
- (b) Place ADC 1 TEST switches in position 1.
- (b1) ADC 1 amber warning light must illuminate.
- (b2) After approximately 30 seconds, Blue TEST indicator light must illuminate.
- (b3) Press, then release ADC 1 amber warning light ; it must go off.
- (7) On overhead panel, on ARTIFICIAL FEEL No.1 engage switch unit, engage ROLL and PITCH switches ; they must remain engaged.
- (8) Open panel 121FB, immobilize Pitch and Roll resolvers with rigging pins D925252001 and D925252003.
- (9) Install protractors TE2012000, set them to zero.
- (10) Remove rigging pins D925252001 and D925252003 from resolvers.

### D. Mechanical Mode Test

- (1) Pull control column to obtain approximately a 10° deflection of elevons.
- (2) Slowly release control column to neutral ; note position of elevon on protractor.
- (3) Push control column to obtain approximately a 10° deflection of elevons.

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- (4) Slowly release control column to neutral ; note on protractor position of elevon.
- (5) Carry out operations (1) to (4) at least three times. Average the readings of stop position taken on protractor for each direction of operation. Check that the average stop values of elevons are in a range of plus or minus 30 minutes maximum.
- (6) In the event that the neutral tolerance ranges are greater than the value indicated above (plus or minus 30 minutes), inspect for chafing along linkage.

### E. BLUE Electrical Mode Test

- (1) Set Flight Controls in BLUE electrical mode (Ref. 27-00-00, Servicing).
- (2) Repeat procedure described in paragraph: Mechanical Mode Test.  
Neutral tolerance range : plus or minus 15 minutes maximum.

### F. GREEN Electrical Mode Test

- (1) Set Flight Controls in GREEN electrical mode (Ref. 27-00-00, Servicing).
- (2) Repeat procedure described in paragraph: Mechanical Mode Test.  
Neutral tolerance range : plus or minus 15 minutes maximum.

### G. BLUE Electrical Mode Test with Trim Operation.

- (1) Set Flight Controls in BLUE electrical mode. (Ref. 27-00-00, Servicing).
- (2) Place ADC 1 switch in OFF position.
- (3) Fully turn pitch trim wheel in nose up configuration.
- (4) Pull control column in nose up direction.
- (5) Release control column to balanced position.  
Note on protractor stop position of LH middle elevon.
- (6) Repeat these operations in nose down and note on protractor stop position of LH middle elevon.
- (7) Carry out these operations and measurements at least

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three times. Average the readings of stop position taken on protractor for each direction of operation. Check that the average stop values of elevons are in a range of plus or minus 15 minutes maximum.

- (8) Repeat these operations with a trim operation in nose down direction.

### H. GREEN Electrical Mode Test with Trim Operation

- (1) Set Flight Controls in GREEN electrical mode. (Ref. 27-00-00, Servicing).
- (2) Repeat procedure of previous paragraph.

### I. Close-Up

- (1) Shut down pressurization of hydraulic systems. (Ref. 27-00-00, Servicing, Procedure to Set Flight Controls in Electrical Mode).
- (2) Remove equipment TE2012000.
- (3) Remove safety clip and tags and set circuit breaker.
- (4) Remove access platform.

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### MECHANICAL CONTROL - INSPECTION/CHECK

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

General check of roll mechanical control cables and pulleys.

#### 2. Cables and Pulleys

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Zero Rigging Device - Relay Chassis	E925019000
Rigging Pin - Mixing Unit Servo Control	D921310000
Rigging Pins - Synchro Pack	D925252000
Access Platform 3.672 m (12 ft.)	
Circuit Breaker Safety Clips	
Special Material (Ref. 20-30-00, No. 124)	
Cleaning (Ref. 20-30-00, No.469)	

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### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Remove access panels 121GB and 121FB, to gain access to cable tension regulators and to resolvers.
- (3) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22
<p><u>WARNING</u> : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.</p> <p>DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.</p> <p>IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.</p>			
(4) Open door 151DB, depressurize Blue, Green and Yellow hydraulic systems.			
(5) Open floor panels 215AF, 215BF, 221AF, 221DF, 221HF, 221LF, 221QF, 221UF, 221XF, 223AF, 223DF, 223LF, 223SF, 231AF, 231DF, 231GF, 231HF, 231JF, 233AF, 233BF, 233CF, 233FF, 233JF, 241AF, 241BF, 241EF, 241HF.			

### C. Check

- (1) Two cables assembly  
(Ref. Fig.601 and 602)

#### (a) Cable wear

On cable lengths moving over pulleys and through fairleads.

(a1) Check cables for traces of wear. Wear must

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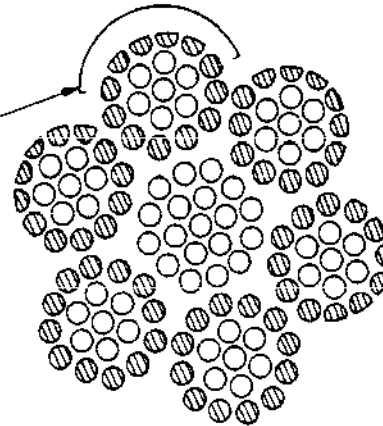
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TYPICAL OUTER WIRE WEAR AREA  
ON CABLE STRAND. HAIRLINE  
CRACKS BETWEEN WIRES OR  
FULLY BLENDED SURFACE APPEARANCE  
OF APPROXIMATELY SIX WIRES PER  
OUTER CABLE STRAND INDICATES  
50 PERCENT WIRE WEAR.



Cable Wear  
Figure 601

not exceed 50 % of the cross section of the  
wires in an outer strand.

(a2) Cables must not show excess of protective  
material ; abrasive particles could adhere to  
this surplus lubricant and cause damage to  
the cables.

(b) Broken wires

Cables must not show any broken wire.

(c) Corrosion

The cable lengths showing internal corrosion tra-  
ces must be replaced (Ref. Removal/Installation).

In case of external corrosion traces, proceed as  
follows :

- Clean the cable with product No.469
- Coat the cable with a protective film of product  
No.124.

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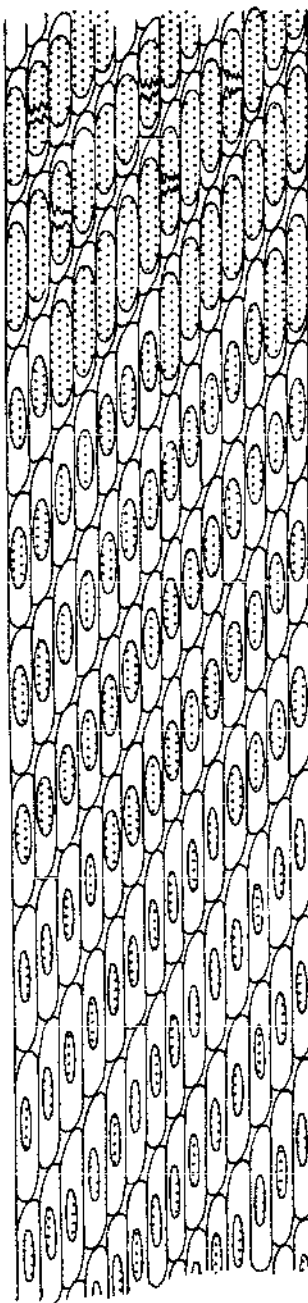
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WEAR ON OUTER WIRES BEYOND 50 PERCENT. NOTE HOURGLASS SHAPE OF WEAR PATTERN ON SOME WIRES PLUS BLENDED APPEARANCE ON OTHERS. NOTE ALSO THE BROKEN WIRES. CABLE SHOULD BE REPLACED IMMEDIATELY.

WEAR ON OUTER WIRES 40 PERCENT TO 50 PERCENT. NOTE BLENDED APPEARANCE OF WIRES. INDIVIDUAL WIRES SOMETIMES HARD TO DISTINGUISH.

WEAR ON OUTER WIRES LESS THAN 40 PERCENT. NOTE SHINY FLAT SPOTS. INDIVIDUAL WIRES EASILY DISTINGUISHABLE. CABLE DOES NOT REQUIRE REPLACEMENT.

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Cable Check  
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### (2) RH Cable

- (a) Check the cable attachment to the tension regulator drum.
- (b) On sleeves, make certain there is no sign of pulling out of cable by reference to painted mark.
  - Sleeve located between frames 15 and 16
  - Sleeve located between frames 20 and 21
  - Sleeve located between frames 50 and 51
  - Sleeve located between frames 54 and 55
- (c) On cable junction fitting, make certain there is no sign of pulling out of cable by reference to painted mark and check the correct position of the lock pins.
  - Cable junction fitting located between frames 10 and 11
  - Cable junction fitting located between frames 10 and 43
- (d) On turnbuckles, make certain there is no sign of pulling out of cable by reference to painted mark and check the correct position of the locking clips.
  - Turnbuckle located between frames 52 and 53
  - Turnbuckle located between frames 64 and 65
- (e) Check cable attachment to the mechanical mixing unit quadrant.

### (3) LH Cable

Carry out the same operations ; only the locations are different

- Sleeve between frames 17 and 18  
between frames 21 and 22  
between frames 51 and 52  
between frames 56 and 57
- Cable junction fittings  
between frames 12 and 13  
between frames 43 and 44
- Turnbuckles  
between frames 53 and 54  
between frames 65 and 66

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

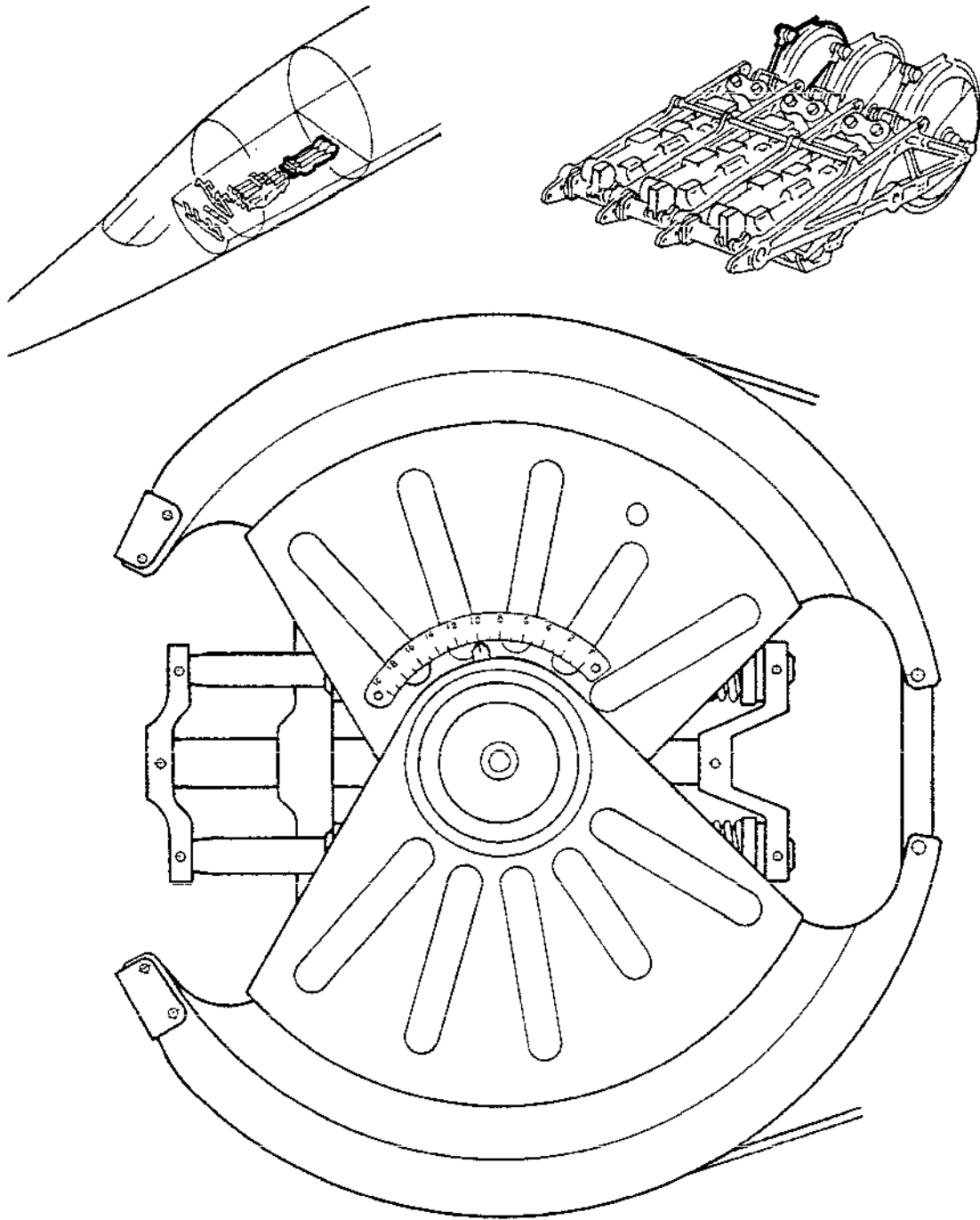
- (4) Guide pulleys between frames 9 and 10 and frames 67 and 68.
  - (a) Check that there are no wear traces on the pulley.
  - (b) Check that there is no play between the pulley and its shaft.
  - (c) Check the attachment and the correct position of the pulley cable guard.  
Clearance between pulley and cable guard must be between 0.022 and 0.060 in. (0.55 and 1.5 mm).
  - (d) Check that clearance between pulley and support flanges is 0.04 in. (1 mm) minimum.
- (5) Place a thermometer in the regulator adjacent area and note temperature.  
Indication read on regulator scale must be the same as that of graph, in relation with temperature noted.  
If not, adjust cable tension (Ref. 27-31-00, Removal/Installation).  
(Ref. Fig.603 and 604)
- (6) Set circuit breaker M626, on panel 15-216, Map. Ref. F22.
- (7) Remove warning notices.
- (8) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (9) Immobilize pitch resolvers with rigging pin D925252003. Install tools E925019010 and E925019012 and immobilize pitch control.
- (10) With rigging pin D921310000, make certain that mixing unit can be easily rigged.  
If rigging pin cannot be inserted, adjust cable tension (Ref. 27-31-00, Removal/Installation).  
Remove rigging pin D921310000.  
  
**WARNING :** WHEN INSERTING AND REMOVING PINS TAKE ALL NECESSARY PRECAUTIONS IN ORDER TO AVOID INTRODUCING INADVERTENTLY TOOLS OR MISCELLANEOUS ITEMS IN MIXING UNIT.
- (11) Remove tools D925019012, D925019010 and rigging pin D925252003.
- (12) Shut down pressurization of hydraulic systems (Ref.

EFFECTIVITY: ALL

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CMA 27 31 00 6 AEMO

Cable Tension Regulator  
Figure 603

EFFECTIVITY: ALL

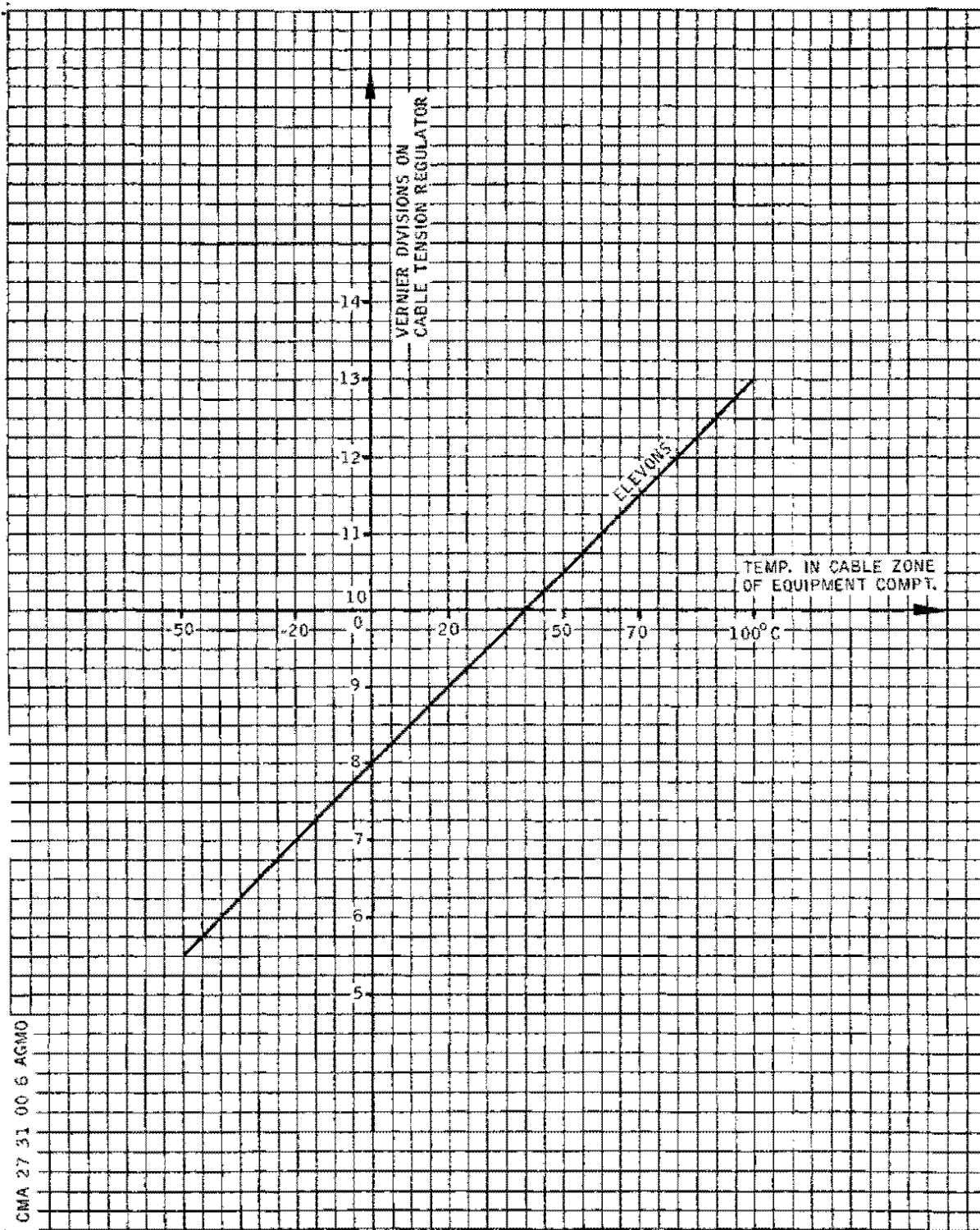
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## MAINTENANCE MANUAL



Cable Tension Graph  
Figure 604

EFFECTIVITY: ALL

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27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).

### D. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close floor panels 215AF, 215BF, 221AF, 221DF, 221HF, 221LF, 221QF, 221UF, 221XF, 223AF, 223DF, 223LF, 223SF, 231AF, 231DF, 231GF, 231HF, 231JF, 233AF, 233BF, 233CF, 233FF, 233JF, 241AF, 241BF, 241EF, 241HF.
- (3) Close access doors 121GB, 121FB and 151DB.
- (4) Remove access platform.

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**END OF THIS  
SECTION**

**NEXT**

# Concorde

## MAINTENANCE MANUAL

### CONTROL COLUMN - LH/RH - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The Captain's and First Officer's control columns are identical ; the removal/installation of the Captain's control column only will be described.

#### 2. Control Column - LH/RH

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Zero Rigging Device - Relay Chassis	E925019000
Rigging Pins - Synchro Pack	D925252000
Rigging Pin - Pitch/Roll Shaft	D925367000
Extractor - Roll, Pitch and Yaw Shafts	D925371000
Warning notices.	
Lockwire (Dia. 1 mm. (0.041 in.) Corrosion Resistant Steel.	

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

DESCRIPTION	PART NO.
-------------	----------

Access Platform 4.47m (14 ft. 8 in.)

Circuit Breaker Safety Clips

### B. Prepare

(1) Take the precautions described in the previous WARNING paragraph.

(2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
---------	-------	--------------------	-------------

#### \*\*ON A/C ALL

STICK SHAKER SUP	1-213	W 513	P15
SAFETY FLT CONT NO1 SUP		1C 651	S20
INS COMPTR SUP 3	2-213	F 3	A 6
ADI 1ST PLT INS 1 SUP & IND		1F 15	B 7
HSI TRUE 1ST PLT INS 1 SUP & IND		1F 21	B 6

#### \*\*ON A/C ALL

SAFETY FLT CONT N°2 SUP	5-213	2C 651	D17
AP/FD COMP 1 SUP	13-215	1C 18	A 5
TRIM COMP 1 SUP		1C 162	C 5
SAFETY FLT CONT COMP N°1, 115V SUP		1C 652	E 6
SAFETY FLT CONT COMP N°1, 26V SUP		1C 653	F 6
SAFETY FLT CONT COMP N°2, 115V SUP	13-216	2C 652	C16
SAFETY FLT CONT COMP N°2, 26V SUP		2C 653	C17

(3) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).

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## MAINTENANCE MANUAL

- (4) Make certain that pitch, yaw and roll trim controls are in zero position.
- (5) Open access panel 121FB and immobilize resolvers with rigging pins ; roll, pin D925252001 ; pitch, pin D925252003 ; yaw, pin D925252002.
- (6) Open access panel 121GB and insert rigging pins of items of equipment E925019010 and E925019012 in pitch control.
- (7) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
- (8) Open access door 151DB and depressurize the Green, Blue and Yellow hydraulic systems (Ref. 29-11-00, Servicing, 29-12-00, Servicing, 29-21-00, Servicing).

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT, PROHIBITING PRESSURIZATION OF AIRCRAFT HYDRAULIC SYSTEMS.

- (9) Remove protective gaiter 211DS or 212DS at the foot of control column, on Captain's and First Officer's control columns.
  - (a) Remove gaiter attachment clamp on column.
  - (b) Remove gaiter attach plate on three-piece base housing.
  - (c) Open zip fastener, remove gaiter 211DS or 212DS and retain gaskets.
- (10) Remove the following components around control column.
  - (a) Captain's side
    - (a1) Remove panel 211CS (centre console)

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## MAINTENANCE MANUAL

- (a2) Remove pedal-base foot rests 211DF, 211FF, 211EF.
  - (a3) Remove pedal gaiters.
  - (a4) Remove control column three-piece base housing (211RF, 211PF, 211QF).
  - (a5) Remove floor panels 211CF and 211BF.
  - (b) First Officer's side.
    - (b1) Remove panel 212CS (centre console).
    - (b2) Remove pedal-base foot rests 212DF, 212FF, 212EF.
    - (b3) Remove pedal gaiters.
    - (b4) Remove three-piece base housing (212RF, 212PF, 212QF).
    - (b5) Remove floor panels : 212CF, 212NF, 212MF.
  - (11) For the First Officer's control column, remove the shock absorber lever (Ref. 27-31-16, Removal/Installation).
  - (12) Open access doors 113DB, 121AB.
  - (13) On roll torque tubes, disconnect rods linking torque tubes and integral trim assembly.
- NOTE: For installing or removing attachment bolts it is necessary to press the plunger on head of bolt to free the locking balls.

### C. Remove

- (1) Remove protective casing (12).
- (2) Remove the locking clips from cable turnbuckles (11).
- (3) Fully slacken cables.
- (4) Beneath the floor, unsafety and unscrew bolts (1) and disengage cable stops (2). Remove cotter and unscrew nuts (9) ; remove washers (8), unsafety and remove bolts (7). Remove cable attach fittings (6) and cable ends from their recesses in the roll tube quadrant (5).

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## MAINTENANCE MANUAL

- (5) Disconnect the electrical connectors from the control column base. Remove link rod (10).
- (6) Unsafety and unscrew bolts (3).
- (7) Remove cotter and unscrew nuts (16), remove washers (17).
- (8) Support the torque tube and, using extractor 0925371000, remove centering bearing (4) from the foot of the control column.  
Remove bolts (15).
- (9) Remove control column.
- (10) Remove stick shaker (Ref. 27-38-11, Removal/Installation).

### D. Preparation of Replacement Component

- (1) Install stick shaker (Ref. 27-38-11, Removal/Installation).

### E. Install

- (1) Position the control column.
- (2) Install bolts (15).
- (3) Install centering bearing (4) and tighten bolts (3).  
Safety with lockwire.
- (4) Install washers (17) and tighten nuts (16).  
Torque to between 27 and 32 lbf. in. (0.30 and 0.35 m.daN).  
Safety with cotters.
- (5) Install the cables on the guide pulleys with the intermediate nipples located in their recesses in the pulleys.
- (6) Install the cable ends in their recesses in the roll tube quadrants (5).  
Install cable attach fittings (6), bolts (7), washers (8) and tighten nuts (9). Safety nuts with cotters. Safety bolts (7) with lockwire.  
Install cable stops (2), tighten bolts (1) and safety with lockwire.
- (7) Tighten cables as follows :

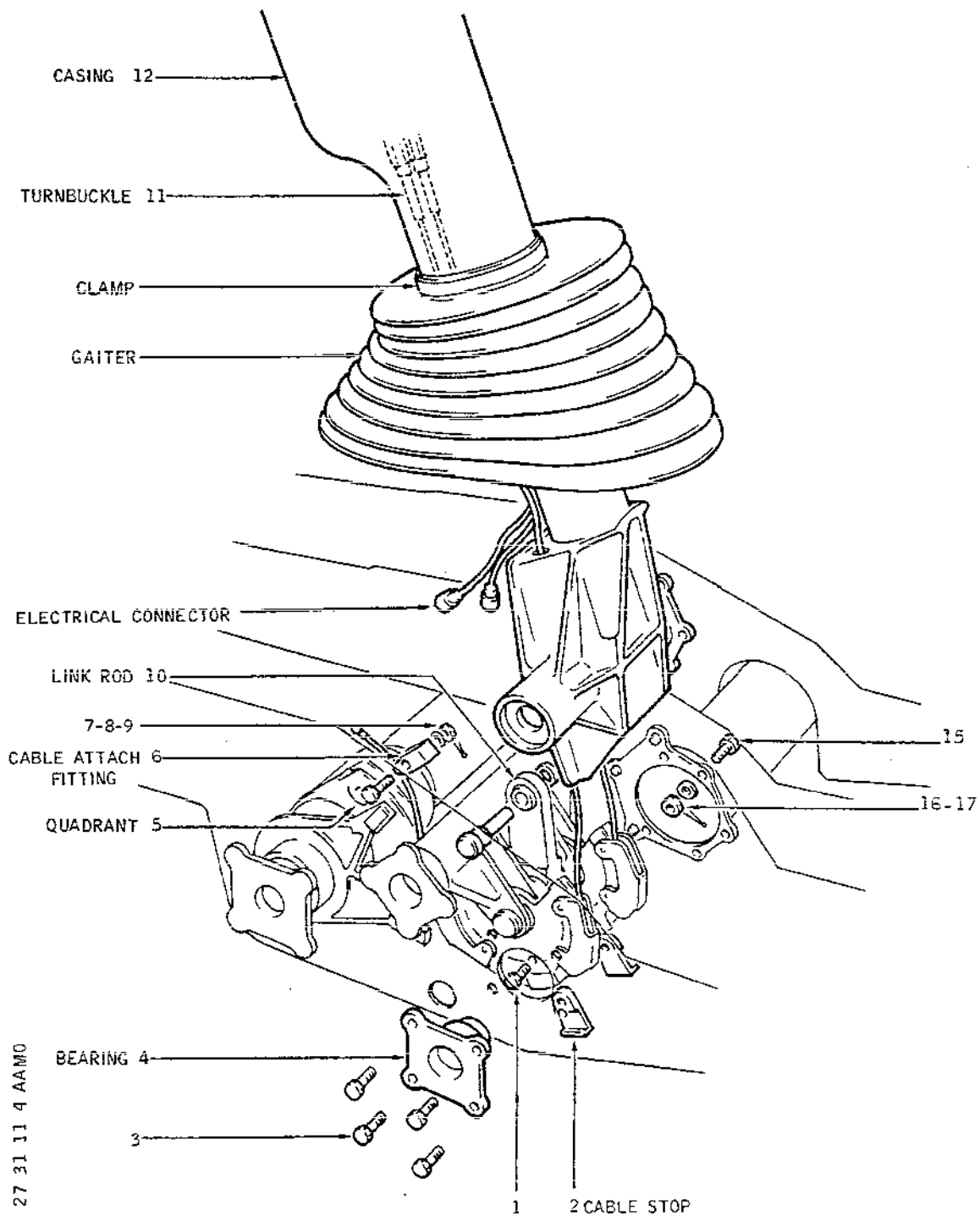
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## MAINTENANCE MANUAL



CMA 27 31 11 4 AAMO

Control Column  
Figure 401

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## MAINTENANCE MANUAL

- (a) On torque tubes connect rods linking torque tubes to integral trim assembly.  
Torque to between 27 and 32 lbf. in (0.03 and 0.36 m.daN). Safety with cotter pin.
  - (b) Immobilize roll and pitch torque tubes by inserting pin D925367000 in mixing cam.
  - (c) Disconnect rods linking integral trim assembly to synchro pack at integral trim assembly level.
  - (d) Temporarily tighten cables up to 90 daN (202.7 lb)
  - (e) Remove rigging pin D925367000 and carry out 20 displacements of control handwheel from stop to stop.
  - (f) Insert rigging pin D925367000 and reduce cable tension to 60 daN (135 lb).
  - (g) Remove rigging pin D925367000 and carry out 20 displacements of control handwheel from stop to stop.
  - (h) Re-insert rigging pin D925367000 and adjust cable tension to 33 plus or minus 3 daN (74.2 lb plus or minus 6.75 lb).  
Once this tension is achieved no threads should remain visible on turnbuckles.
- NOTE : During these operations (d), (f), and (h) check that reference mark engraved on control handwheel lines up with, mark on top of control column, plus or minus 1 millimeter.
- (i) Safety turnbuckles (11).
  - (j) On integral trim assembly connect rods linking integral trim assembly to synchro pack (Torque to between 27 and 32 lbf. in (0.30 and 0.36 m. daN). Safety with cotter pin.
- (8) Install protective casing (12).  
Make certain it is correctly positioned.

NOTE : Clearance between casing and control handwheel = 0.05 in (1.2 mm).  
No friction or binding whatsoever should occur when the handwheel is moved.

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## MAINTENANCE MANUAL

- (9) Connect up the electrical connectors, also link rod (10).
- (10) Remove rigging pin (D925367000) from the pitch and roll torque tubes.
- (11) Set Flight Controls in mechanical mode (Ref, 27-00-00, Servicing).
- (12) Remove tool E925019000.
- (13) Remove pins D925252001 and D925252003 from resolvers.
- (14) Shut down pressurization of hydraulic systems (Ref, 27-00-00, Servicing, procedure to set Flight Controls in mechanical mode).
- (15) For First Officer's control column, install the shock absorber control lever (Ref. 27-31-16, Removal/Installation).
- (16) Make certain that clearance between protective casing (12) and instrument panel is within the following limits :  
Theoretical clearance : 0.394 in. (10 mm)  
Minimum clearance : 0.236 in. (6 mm)

### F. Tests.

- (1) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (2) Carry out roll and pitch operational tests (Ref. 27-11-00, Adjustment/Test and 27-31-00, Adjustment/Test). Carry out Adjustment/Test procedure (Ref. 27-31-11, Adjustment/Test).
- (3) Insert roll and pitch resolver rigging pins D925252001 and D925252003.
- (4) Check that rigging pin D925367000 can be inserted and removed freely. Remove rigging pin.
- (5) Remove rigging pins D925252001 and D925252003 from resolvers.
- (6) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in mechanical mode).
- (7) Before closing access doors and panels, carry out

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a double inspection of work performed and area affected as per instructions detailed in 05.55.11

### G. Close-Up.

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Remove warning notices.
- (3) Install the following components around control column.
  - (a) Captain's side.
    - (a1) Install floor panels 211CF and 211BF.
    - (a2) Install pedal gaiter.
    - (a3) Install three-piece base housing 211RF, 211PF and 211QF.
    - (a4) Install pedal-base foot rests 211DF, 211FF, 211EF.
    - (a5) Install access panel 211CS (centre console).
  - (b) First Officer's side.
    - (b1) Install floor panels 212CF, 212NF, 212MF.
    - (b2) Install pedal gaiter.
    - (b3) Install three-piece base housing 212RF, 212PF, and 212QF.
    - (b4) Install pedal-base foot rests 212DF, 212FF, 212EF.
    - (b5) Install access panel 212CS.
- (4) Install gaiter at the foot of Captain's or first Officer's control column.
  - (a) Install gaiter on control column and close zip fastener.
  - (b) Install gaskets and gaiter on three-piece base housing.  
Install attach plate.
  - (c) Install gaiter attachment clamp on control column

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- (5) Close access doors and panels 121AB, 113DB, 121FB, 121GB and 151DB
- (6) Remove safety clips and tags and reset circuit breakers
- (7) Remove access platforms.

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### CONTROL COLUMN - ADJUSTMENT/TEST

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

Tests described in this topic must be carried out after removal/installation of Captain's and First Officer's control column handwheels.

##### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Electrical Ground Power Unit	
------------------------------	--

Ground Power Unit - Hydraulic - Power and Preliminary Testing	
--	--

\*\*ON A/C ALL

Two Boom Headsets

##### B. Prepare

(1) Take the precautions described in the previous WARNING paragraph.

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- (2) Aircraft must be on the ground, shock absorbers compressed.
- (3) On centre console
  - (a) On ADC control panel, make certain that :
    - ADC1 and ADC2 switches are in OFF position
    - ADC1 and ADC2 TEST selector switches are in NORM position
- (4) On overhead panel
  - (a) On SERVO CONTROLS unit, make certain that the two selector switches are in NORMAL position.
  - (b) On RELAY JACK unit, make certain that switch is in NORM position.
  - (c) On Flight Control Unit, make certain that :
    - BLUE INVERTER and GREEN INVERTER switches are in PWR OFF position
    - OUTER AND MIDDLE ELEVONS and INNER ELEVONS switches are in MECH position.
    - The two ANTI STALL SYSTEM switches are in OFF position.
- (5) On Captain's and First Officer's control handwheels make certain that RAD-INT push-to-talk switch is in middle position.
- (6) On Captain's and First Officer's audio selector panel (console 7-211) make certain that :
  - (a) All keys on keyboard are disengaged.
  - (b) All the reception selection push-buttons are disengaged.
  - (c) R/T-INT switch is in middle position.
  - (d) BOOM-MASK switch is in BOOM position.
  - (e) Push-button of VOICE filter is disengaged.
- (7) On Captain's and First Officer's side console (1-211) and (2-212), make certain that :
  - (a) LOUDSPEAKER ON-OFF switch is in OFF position.

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## MAINTENANCE MANUAL

- (8) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
NAV-INS 1ST PLT SW SUP	1-213	1F 34	E15
ATT-INS 1ST PLT SW SUP		1F 13	G16
COMPASS COUPLER SYS 1		1F 134	F14
SW SUP			
RAD/INS 1ST PLT SW SUP		1F 26	G17
ATT/INS 1ST PLT SW SUP		R 89	K19
**ON A/C ALL			
INNER ELVN CONT & MON GRN SUP 1		1C 53	M11
MID & OUTER ELVN CONT & MON GRN SUP		1C 55	M12
OUTER ELEVON NEUTRLN GRN SUP		1C 58	M13
INNER ELEVON CONT & MON GRN SUP 2		1C 59	M14
P.F.C.S. INV GRN FAIL IND		1C 73	M15
LH UC WEIGHT SW "A" SYS SUP		Q 292	M17
RH UC WEIGHT SW "A" SYS SUP		G 295	M18
AUDIO WARN SYS SUP 1		W 371	M21
RUDDER CONT & MON GRN SUP		1C 62	N11
RUDDER MON LOGIC GRN SUP		1C 63	N12
P.F.C.S. ALL SURFACES MON GRN SUP		1C 54	N13
P.F.C.S. INV BLUE FAIL SUP		1C 67	N14
P.F.C.S. INV GRN PROTN CONT		1C 68	N15
RELAY JACK HYD SEL IND & SUP		C 281	N17
P.F.C. IND		C 287	N18
M.W.S. SUP 1		W 252	N21
P.F.C.S. INV GRN SUP		1C 66	P11
ADC1 28V SUP		1F 74	P12
WARN 8 LDG DISPLAY SUP 1		1C 192	P13
WARN 8 LDG DISPLAY SUP 2		1C 193	P14
STICK SHAKER SUP		W 513	P15
YELL/GRN-GRN FAIL-PFC & RELAY JACK "A" SYST CONT		C 285	P16
YELL/BLUE BLUE FAIL-PFC & RELAY JACK "A" SYST CONT		C 286	P17
YELL LL PFC & RELAY JACK "A" SYST CONT		C 288	P18
TRIM 1 CONT		1C 161	Q11
AP/FD SYS 1 CONT		1C 17	Q13

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FD1/FD2 1ST PLT SW SUP		1C 27	Q15
FLT CONT POSN IND CONT		C 83	R11
SAFETY FLT CONT No.1 SUP		1C 651	S20
1ST PLT ADC INST SUP	2-213	1F 75	B 5
ADC1 26V SUP		1F 78	A 2
FLT CONT POSN IND 26V		C 84	B 4
400 Hz SUP			
INS COMPTR SUP 2		F 3	A 6
ADI 1ST PLT INS 1 SUP		1F 15	B 7
& IND			
LAT ACCELMTR 1 26V SUP		1C 42	A 4
HSI TRUE 1ST PLT INS 1		1F 21	B 6
SUP & IND			
OUTER ELEVON AMP BLUE SUP		2C 44	C 1
INNER ELEVON BLUE CONT SUP		2C 94	C 2
MID ELEVON AMP BLUE SUP		2C 93	C 3
MID & OUTER ELEVON BLUE		2C 92	C 4
CONT SUP			
AP/FD SYS 1 SUP		1C 20	C 5
INNER ELEVON MON BLUE SUP		2C 47	D 1
MID & OUTER ELEVON MON		2C 46	D 2
BLUE SUP			
RUDDER MON BLUE SUP		2C 49	D 3
RUDDER BLUE 26V 1800Hz		2C 76	D 4
CONT SUP			
P.F.C.S. INV BLUE PROTN		2C 71	D 5
SUP			
AUTO STAB 1 COMP SUP		1C 37	E 5
INS 1 HTR SUP		1F 14	E 6
ADC 1 115V SUP		1F 73	F 3
LDG DISPLAY SYS 1 SUP		1C 191	F 4
INS 1 SUP		1F 20	F 6
COMPASS COUPLER 1 SUP		1F 130	F 8
INNER ELEVON MON GRN SUP		1C 47	G 1
MID & OUTER ELEVON MON		1C 46	G 2
GRN SUP			
RUDDER MON GRN SUP		1C 49	G 3
RUDDER GRN 26V 1800Hz CONT		1C 76	H 6
SUP			
P.F.C.S. INV GRN PROTN SUP		1C 71	G 5
OUTER ELEVON AMP GRN SUP		1C 44	E 1
INNER ELEVON GRN CONT SUP		1C 94	F 1
MID ELEVON AMP GRN SUP		1C 93	F 2
MID & OUTER ELEVON GRN		1C 92	H 5
CONT SUP			

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
YELL L/LEVEL PFC & RELAY JACK "B" SYST CONT	3-213	C 282	A 8
YELL/GRN GRN FAIL PFC & RELAY JACK "B" SYST CONT		C 283	A 9
YELL/BLUE BLUE FAIL PFC & RELAY JACK "B" SYST CONT		C 284	A10
LH UC WEIGHT SW "B" SYS SUP		G 293	B 8
RH UC WEIGHT SW "B" SYS SUP		G 294	B 9
No.2 INPH SUP		R 90	A 2
**ON A/C ALL			
AP/FD SYS 2 CONT	5-213	2C 17	A11
FD1/FD2 2ND PLT SW SUP		2C 27	A13
WARN & LDG DISPLAY 2 SUP 1		2C 192	B11
WARN & LDG DISPLAY 2 SUP 2		2C 193	B12
TRIM 2 CONT		2C 161	B13
P.F.C.S. INV BLUE SUP		2C 66	B14
RUDDER CONT & MON BLUE SUP		2C 62	C11
RUDDER MON LOGIC BLUE SUP		2C 63	C12
P.F.C.S. IN GRN FAIL SUP		2C 67	C13
P.F.C.S. INV BLUE PROTN CONT		2C 68	C14
AUDIO WARN SYS SUP 2		W 372	C17
INNER ELEVON CONT & MON BLUE SUP 1		2C 53	D11
MID & OUTER ELEVON CONT & MON BLUE SUP		2C 55	D12
OUTER ELEVON NEUTRLN BLUE SUP		2C 58	D13
INNER ELEVON CONT & MON BLUE SUP 2		2C 59	D14
M.W.S. SUP 2		W 251	D15
SAFETY FLT CONT No.2 SUP		2C 651	D17
P.F.C.S. INV BLUE FAIL IND		2C 73	E11
P.F.C.S. ALL SURFACES MON BLUE SUP		2C 54	E12
ADC2 28V SUP		2F 74	F12
AP/FD COMP 1 SUP	13-215	1C 18	A 5
P.F.C.S. TEST UNIT AC SUP		C 113	A 6
AFCS MODE SYS 1 LTS SUP		1C 273	B 5
COMPASS COUPLER 2ST BY SUP		2F 131	B 7
TRIM COMP 1 SUP		1C 162	C 5
AT SYNCHRO SYS 1 SUP		1C 181	D 5
TRIM SYNCHRO SYS 1 SUP		1C 163	E 5
SAFETY FLT CONT COMP No.1 115V SUP		1C 652	E 6
SAFETY FLT CONT COMP No.1		1C 653	F 6

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
26V SUP			
2ND PLT ADC INST SUP	13-216	2F 75	A14
ADC2 26V SUP		2F 78	F14
TRIM SYNCHRO SYS 2 SUP		2C 163	A16
AP/FD SYS 2 SUP		2C 20	A17
INS COMPTN SUP 3		F 2	B15
LAT ACCELMTR2 26V SUP		2C 42	B16
AT SYNCHRO SYS 2 SUP		2C 181	B17
ADI 2ND PLT INS 2 SUP & IND		2F 15	C13
HSI TRUE 2ND PLT INS 2 SUP & IND		2F 21	C15
SAFETY FLT CONT COMP No.2 26V SUP		2C 653	C16
SAFETY FLT CONT COMP No.2 115V SUP		2C 652	C17
**ON A/C ALL			
INS 2 SUP		2F 20	G15
INS 2 HTR SUP		2F 14	D14
**ON A/C ALL			
COMPASS COUPLER 2 NORM SUP		2F 130	D15
AUTO STAB 2 COMP SUP		2C 37	D17
ATT/INS 2ND PLT SW SUP		2F 13	D21
TRIM COMP 2 SUP		2C 162	E16
AFCS MODE SYS 2 LTS SUP		2C 273	E17
ADC2 115V SUP		2F 73	F15
LDG DISPLAY SYS 2 SUP		2C 191	F16
A/P/FD COMP 2 SUP		2C 18	F18
P.F.C.S. TEST UNIT DC SUP	15-215	C 114	A 5
COMPASS COUPLER SYS 2 SW SUP	15-216	2F 134	A21
NAV-INS 1ST PLT SW SUP		2F 34	C21
ROOF PNL LT TEST SUP		L1002	D13
ATT-INS 1ST PLT SW SUP		2F 13	D21
RAD/INS 1ST PLT SW SUP		2F 26	E21

(9) On Captain's and First Officer's jack panels located respectively on consoles (1-211 and 1-212) :

(a) Connect a boom headset to both the HEADSET and

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MIC sockets of BOOMSET panel section.

- (10) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).
- (11) Pressurize Blue and Green hydraulic systems (Ref. 29-11-00 and 29-12-00, Servicing).
- (12) Make certain that Pitch, Roll and Yaw trim controls are set to zero.
- (13) On Flight Engineer's panel, on EQUIPMENT BAY COOLING unit, make certain that rack cooling operates (Ref. 21-25-00, Servicing).

WARNING : IF, DURING THE TEST, ON EQUIPMENT BAY COOLING UNIT (FLIGHT ENGINEER'S PANEL) "FLOW" INDICATOR LIGHTS ILLUMINATE OWING TO A VENTILATION FAILURE, IMMEDIATELY STOP INERTIAL NAVIGATION SYSTEMS BY PLACING MODE SELECTOR SWITCHES ON MSU UNITS IN OFF POSITION (FLIGHT ENGINEER'S STATION).

- (14) On overhead panel, on Flight Control Unit.
  - (a) Place BLUE INVERTER and GREEN INVERTER switches in ON position.
  - (b) Place OUTER AND MIDDLE ELEVONS, INNER ELEVONS and RUDDER switches in BLUE position.
  - (c) Press then release the 3 RESET push-buttons.
- (15) On ICOVOL indicator (Flight Control Surface Position Indicator), on First Officer's instrument panel :
  - (a) The 8 magnetic indicators must display B.
  - (b) If required, press ALARM RESET button to extinguish the ICOVOL red warning lights.
- (16) At Flight Engineer's Station, make certain that MSU switches are in OFF position.  
On compass coupler unit place DG-MAG switch in MAG position.
- (17) At Captain's station, on AFCS control unit, place RAD/INS switches in INS position.
- (18) On Captain's instrument panel place switches :

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- ATT INS1/INS3 in INS1 position
  - COMP1/COMP2 in COMP1 position
  - DEV1/DEV2 in DEV1 position
  - NAV INS1/INS2 in INS1 position
- (19) On First Officer's instrument panel place switches :
- ATT INS2/INS3 in INS2 position
  - COMP1/COMP2 in COMP2 position
  - DEV1/DEV2 in DEV2 position
  - NAV INS1/INS2 in INS2 position
- (20) At Captain's station, on AFCS control unit press TRK/HDG 1 and 2 knobs in TRK position.
- (21) On Captain's side console, turn DIGITS potentiometer in BRIGHT direction.
- (22) At Flight Engineer's station, place MSU INS1 and MSU INS2 switches in STBY position.
- (23) At Flight Engineer's Station, on COMPASS unit place both DG-MAG switches in MAG position.
- (24) On centre console
- (a) On ADC1 and ADC2 control panels :
    - Make certain that the two TEST selector switches are in NORM position.
    - Place both switches in ON position.
    - If required, press then release amber ADC1 and ADC2 warning lights to extinguish them.
  - (b) On AFCS datum adjust unit check that TURN switch is in centre position.
- (25) On overhead panel
- (a) On ANTI STALL SYSTEM unit place the two ON-OFF switches in ON position.
  - (b) On ELECTRIC TRIM unit engage switches 1 and 2.
  - (c) On AUTO STAB No.1 and AUTO STAB No.2 units engage the 3 PITCH, ROLL and YAW switches.
- (26) On instrument panels place :
- Captain's FD1/FD2 switch in FD1 position
  - First Officer's FD1/FD2 switch in FD2 position.

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### C. Test of AP DISC (Autopilot instinctive disconnection) Switch

#### (1) Captain's control handwheel

NOTE : Make certain that Flag G is not visible on the ADI's.

- (a) On AFCS control unit engage AP1 switch.
- (b) On Captain's control handwheel press AP/DISC switch. AP1 switch must disengage.
- (c) Press again AP/DISC switch ; red AP warning lights must go off.
- (d) On AFCS control unit engage AP2 switch.
- (e) On Captain's control handwheel press AP/DISC switch.  
AP2 switch must disengage.
- (f) Press again AP/DISC switch ; red AP warning lights must go off.

#### (2) First Officer's control handwheel.

Procedure identical with that of Captain's control handwheel.

### D. Test of pitch Attitude Automatic Display on the ADI's

- (1) On Captain's and First Officer's control handwheels adjust to zero° the attitude presetting knobs (F27-F136)
  - On Captain's and First Officer's ADI's pitch attitude display pointer is lined up with zero on drum.
- (2) On Captain's control handwheel.
  - (a) Turn knob F27 clockwise up to 15° graduation
    - Captain's ADI pointer rises and indicates the angle displayed by the knob.
  - (b) Return knob to zero
    - ADI pointer returns to zero.
- (3) Make certain that rotation of knob is smooth.
- (4) On First Officer's control handwheel.
  - (a) Procedure identical with that of Captain's control

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handwheel.

### E. Test of Control Column Push-to-Talk Switches

#### (1) Captain's push-to-talk switch

##### (a) On Captain's audio selector panel

- Place R/T-INT switch in INT position.
- Engage INT reception selection push-button and adjust the potentiometer incorporated in this button at mid-travel.

##### (b) On First Officer's audio selector panel

- Engage INT reception selection push-button and adjust the potentiometer incorporated in this button at mid-travel.

##### (c) Place and hold Captain's control column RAD-INT push-to-talk switch in RAD position, speak in Captain's boom headset microphone and check :

- That reception is perceived in First Officer's boom headset earphones.

##### (d) Release Captain's RAD-INT push-to-talk switch.

##### (e) Place Captain's control column RAD-INT push-to-talk switch in INT position, speak in Captain's boom headset microphone and check :

- That reception is perceived in First Officer's boom headset earphones.

##### (f) Place Captain's control column RAD-INT push-to-talk switch in middle position.

#### (2) First Officer's push-to-talk switch.

- ##### (a) Repeat Captain's push-to-talk switch procedure, replacing Captain by First Officer and First Officer by Captain.

### F. Test of Pitch Trim Control

#### (1) Captain's handwheel

- ##### (a) Press PITCH TRIM switch in UP then DOWN direction.
- Check that trim operates in required direction.
- ##### (b) On overhead panel, on Electric Trim control unit disengage electric trim switch No.1 then press

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PITCH TRIM switch in UP then DOWN direction.

- Check that trim operates in ordered direction.

(2) First Officer's handwheel.

Procedure identical with that of Captain's handwheel.

### G. Zeroing of Control Column Force Detectors and Test of Emergency Flight Control System Engagement

(1) Press NULL RESET push-button located on front face of SFC computer No.1 (unit 1C650 on shelf 6-215) during 5 seconds approximately, to reset force detectors plus SFC computer.

NOTE : No load must be applied to Captain's and First Officer's control columns during the reset.

(2) Repeat the same test with SFC computer No.2 (unit 2C650 on shelf 6-216).

(3) At the junction of Captain's control handwheel yoke press emergency flight control test button and hold it.

- EMERG CONT caption light must illuminate on Captain's control handwheel.

NOTE : The Emergency Flight Control System engage switch is located on Captain's handwheel only.

### H. Stick Shaker and Aural Stall Warning Test

NOTE : This test is to be carried out only after removal/ installation of Captain's control column.

(1) On ADC control panel (centre console)

(a) Place ADC1 TEST selector switch in position 1

NOTE : Do not take into account aural and visual warnings which are not mentioned

- Amber ADC1 warning light must illuminate.
- After approximately 30 seconds the Blue ADC1 TEST indicator light must illuminate.
- Captain's and First Officer's control columns must vibrate.
- On Captain's control column, aural stall warning must sound.

(b) Place ADC1 TEST selector switch in NORM position.

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- The Blue ADC1 TEST indicator light must go off.
- Captain's and First Officer's control columns must stop vibrating.
- On Captain's control column, aural stall warning must stop sounding.

### I. Close-Up

- (1) On overhead panel, on Flight Control Unit :
  - (a) Place OUTER AND MIDDLE ELEVONS, INNER ELEVONS and RUDDER switches in MECH position.
  - (b) Place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position.
- (2) Shut down pressurization of Blue and Green hydraulic systems (Ref. 29-12-00 and 29-11-00, Servicing).
- (3) On Captain's and First Officer's audio selector panels
  - (a) Place R/T-INT switch in middle position.
  - (b) Disengage INT reception selection push-button and set the potentiometer incorporated in this button at counterclockwise stop.
- (4) On Captain's and First Officer's jack panels
  - (a) Disconnect boom headset from corresponding HEADSET and MIC sockets.
- (5) Place ADC2 and ADC1 switches in OFF position.
- (6) At Flight Engineer's station place switch of INS1 MSU and INS2 MSU units in OFF position.
- (7) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

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### TORQUE TUBES - (CAPTAIN AND FIRST OFFICER) REMOVAL/INSTALLATION

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

Captain's and First Officer's torque tubes transmit linkage mechanical movements between control wheels and link rods.

#### 2. Torque Tube

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Zero Rigging Device - Relay Chassis	E925019000
Rigging Pin - Pitch/Roll Shaft	D925367000
Rigging Pins - Synchro Pack	D925252000
Access Platform 3.672 m (12 ft.)	
Circuit Breaker Safety Clips	
Standard Grease (Ref. 20-30-00, No.51)	

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DESCRIPTION	PART NO.
-------------	----------

Lockwire (Dia. 1 mm (0.041 in.)  
Corrosion Resistant Steel

### B. Prepare

- (1) Take the precautions described in the previous "WARNING" paragraph.
- (2) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (3) Check that pitch, roll and yaw trim controls are set to zero.
- (4) Remove panel 121FB and immobilize Pitch and Roll resolvers with rigging pins D925252003 and D925252001. Remove panel 121GB and install items of equipment E925019010, E925019012 and immobilize pitch linkage.
- (5) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
- (6) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY ALSO A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZATION SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

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- (7) Open door 151DB and depressurize Blue, Green and Yellow hydraulic systems.
  - (8) Remove panels 113DB and 121AB giving access to torque tubes.
  - (9) Remove the following components around control columns.
    - (a) Captain's side
      - (a1) Remove panel 211CS (centre console)
      - (a2) Remove pedal base footrests 211DF, 211FF, 211EF.
      - (a3) Remove pedal gaiter 211AX and disengage control column gaiter 211DS.
      - (a4) Remove the three-piece base housing (211RF, 211PF, 211QF).
      - (a5) Remove floor panels 211CF and 211BF.
    - (b) First Officer's side
      - (b1) Remove panel 212CS (centre console)
      - (b2) Remove pedal base footrests 212DF, 212FF, 212EF.
      - (b3) Remove pedal gaiter 212AX and disengage control column gaiter 212DS.
      - (b4) Remove three piece base housing 212RF, 212PF, 212QF.
      - (b5) Remove floor panels 212CF, 212NF, 212MF.
- C. Remove Captain's Torque Tube (Ref. Fig. 401 )
- (1) Disconnect rods (3) linking the torque tube cranks to the integral trim assembly levers.
- NOTE : For installing or removing attachment bolts, it is necessary to press plunger located on head of bolt to free the locking system balls.
- (2) Remove the captain's control column (Ref. 27-31-11, Removal/Installation).

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- (3) Disconnect position potentiometer link (4).
- (4) Cut and remove lockwire and unscrew bolts (2) attaching bearings (10) and (11) to the centre support beam. Recover washers (1).
- (5) Disengage the shoulder of bearing (11) from the machining in the beam and remove the torque tube.

### D. Install Captain's Torque Tube

- (1) Position the torque tube, engaging the shoulder of bearing (11) in the machining of the support beam. Grease nipple (8) must be positioned downwards.
- (2) Attach bearing (11) to the support beam using bolts (2) and washers (1). Torque to between 60 and 70 lbf. in (0.68 and 0.79 m.daN). Safety with lockwire.
- (3) Support the tube in position.
- (4) Install the captain's control column (Ref. 27-31-11, Removal/Installation).
- (5) Grease the ball race of bearing (11) through grease nipple (8) using Product No.51.
- (6) Connect position potentiometer link (4).
- (7) Connect link rods (3) between torque tube cranks and integral trim assembly levers. Bolt, washer and nut. Torque to between 27 and 32 lbf./in. (0.30 and 0.36 m.daN). Safety nut with cotter pin.
- (8) Check that pin D925367000 on roll/pitch mixing cam can be inserted and removed easily. Remove pin.
- (9) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (10) Remove items of equipment E925019012 and E925019010 and rigging pins D925252001 and D925252003 from resolvers.
- (11) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).

### E. Remove First Officer's Torque Tube

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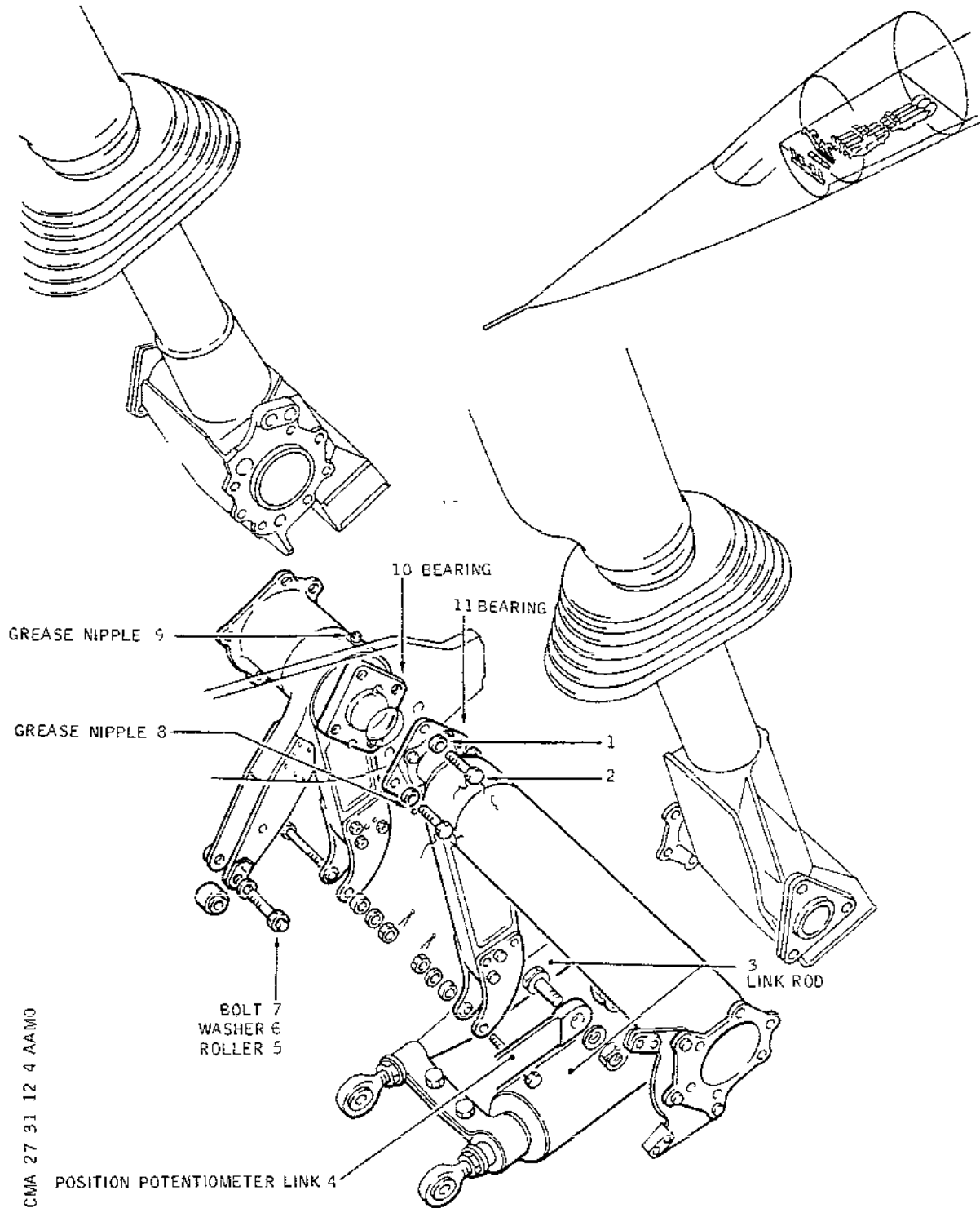
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Torque Tube - Captain/First Officer  
Figure 401

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- (1) Disconnect rods (3) linking the torque tube cranks to the integral trim assembly levers.

NOTE : For installing or removing attachment bolts, it is necessary to press plunger located on head of bolt to free the locking system balls.

- (2) Unsafety, unscrew and remove bolt (7). Remove roller (5) with its spacers.
- (3) Remove the pitch shock absorber control link (Ref. 27-31-16, Removal/Installation).
- (4) Remove the First Officer's control column (Ref. 27-31-11, Removal/Installation).
- (5) Cut and remove lockwire and unscrew bolts (2) attaching bearings (10) and (11) to the centre support beam. Retain washers (1).
- (6) Disengage the shoulder of bearing (10) from the machining in the support beam and remove the torque tube.

### F. Install First Officer's Torque Tube

- (1) Position the torque tube and engage the shoulder of bearing (10) in the machining in the support beam.
- (2) Attach bearing (10) to the centre support beam using bolts (2) and washers (1). Torque to between 60 and 70 lbf.in. (0.68 and 0.79 m.daN). Safety with lockwire.
- (3) Support the tube in position.
- (4) Install the First Officer's control column (Ref. 27-31-11, Removal/Installation).
- (5) Install the pitch shock absorber control link (Ref. 27-31-16, Removal/Installation).
- (6) Grease the ball race of bearing (10) through grease nipple (9) using Product No.51.
- (7) Install the hollow arm of the lever on the roll tube cam. Position roller (5) complete with spacers and install bolt (7) with washer (6). Tighten and safety with lockwire.
- (8) Connect rods between torque tube cranks and integral trim assembly levers.

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Bolt, washers and nuts.

Torque to between 27 and 32 lbf./in. (0.30 and 0.36 m.daN).

Safety with cotter pin.

- (9) Check that pin D925367000 of pitch/roll mixing cam can be inserted and removed easily. Remove pin.
- (10) Set circuit breaker M 626, on panel 15-216, Map Ref F22
- (11) Remove warning notices.
- (12) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (13) Remove items of equipment E925019012, E925019010 and rigging pins D925252001 and D925252003 from resolvers.
- (14) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).

### G. Test

- (1) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (2) Carry out an operational test (Ref. 27-31-00, Adjustment/Test).
- (3) Install rigging pins D925252001 and 925252003 on Pitch and Roll resolvers.
- (4) Check that pin D925367000 can be easily removed or inserted. Remove pin.
- (5) Remove rigging pins D925252001 and D925252003 from resolvers.
- (6) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
- (7) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### H. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

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- (2) Install the following components around control columns.
  - (a) Captain's side :
    - (a1) Install floor panels 211CF and 211BF.
    - (a2) Install pedal gaiter 211AX.
    - (a3) Install three piece base housing 211RF, 211PF and 211QF.
    - (a4) Install control column gaiter 211DS.
    - (a5) Install pedal base footrests 211DF, 211EF, 211FF.
    - (a6) Install panel 211CS (centre console)
  - (b) First Officer's side :
    - (b1) Install floor panels 212CF, 212NF, 212MF.
    - (b2) Install pedal gaiter 212AX.
    - (b3) Install three-piece base housing 212RF, 212PF, 212QF.
    - (b4) Install control column gaiter 212DS.
    - (b5) Install pedal base footrests 212RF, 212FF, 212EF.
    - (b6) Install panel 212CS (centre console).
- (3) Close access door 151DB, 121AB, 113DB, 121GB and 121FB.
- (4) Remove access platforms.

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### SHOCK ABSORBER ASSEMBLY (PITCH) - REMOVAL/INSTALLATION

#### 1. General

- A. The pitch shock absorber is linked by spherical eye end fittings to the floor structure, body side, and piston side, to a lever integral with First Officer's torque tube.

#### 2. Pitch Shock Absorber Assembly

##### A. Equipment and Materials

DESCRIPTION	PART NO.
-------------	----------

Access platform 4.47 m (14 ft. 8 in.)

##### B. Prepare

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

(1) In the flight compartment, First Officer's side :

(a) Remove attach plate securing gaiter 212DS on base housing ; lift gaiter 212DS on control column and recover gaskets.

(b) Remove panel 212CS (centre console).

(c) Remove pedal base footrests 212DF, 212FF and 212EF.

(d) Remove three piece base housing 212RF, 212PF and 212QF.

(e) Remove floor panels 212NF and 212MF.

##### C. Remove

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## MAINTENANCE MANUAL

- R NOTE : In order to remove or to install bolts, it is  
R necessary to press retaining spring blade.
- (1) Disconnect the shock absorber rod from lever (8).  
Remove cotter and unscrew nut (7). Remove washer (6)  
and bolt (5).
- (2) Disconnect the shock absorber body from attachment  
bracket (1). Remove cotter and unscrew nut (4).  
Remove washer (3) and bolt (2).
- D. Preparation of Replacement Component
- R Not applicable.
- E. Install
- R (1) Install the shock absorber body in fork end of  
attachment bracket (1). Install bolt (2), washer (3)  
and tighten nut (4). Safety with cotter.
- (2) Connect the shock absorber rod to lever (8). Install  
bolt (5), washer (6) and tighten nut (7). Safety with  
cotter.
- F. Tests
- R Before closing access doors and panels, carry out a double  
R inspection of work performed and area affected as per  
R instructions detailed in 05-55-11.
- G. Close-Up
- (1) Make certain that working area is clean and clear of  
tools and miscellaneous items of equipment.
- (2) Install floor panels 212NF and 212MF.
- R (3) Install three piece base housing 212RF, 212PF, and  
212QF.
- R (4) Install pedal base footrests 212DF, 212FF and 212EF.
- (5) Install panel 212CS (centre console).
- R (6) Install gaiter 212DS on base housing. (Gaskets and  
attach plate).
- (7) Remove warning notices.
- (8) Remove access platform.

EFFECTIVITY: ALL

BA

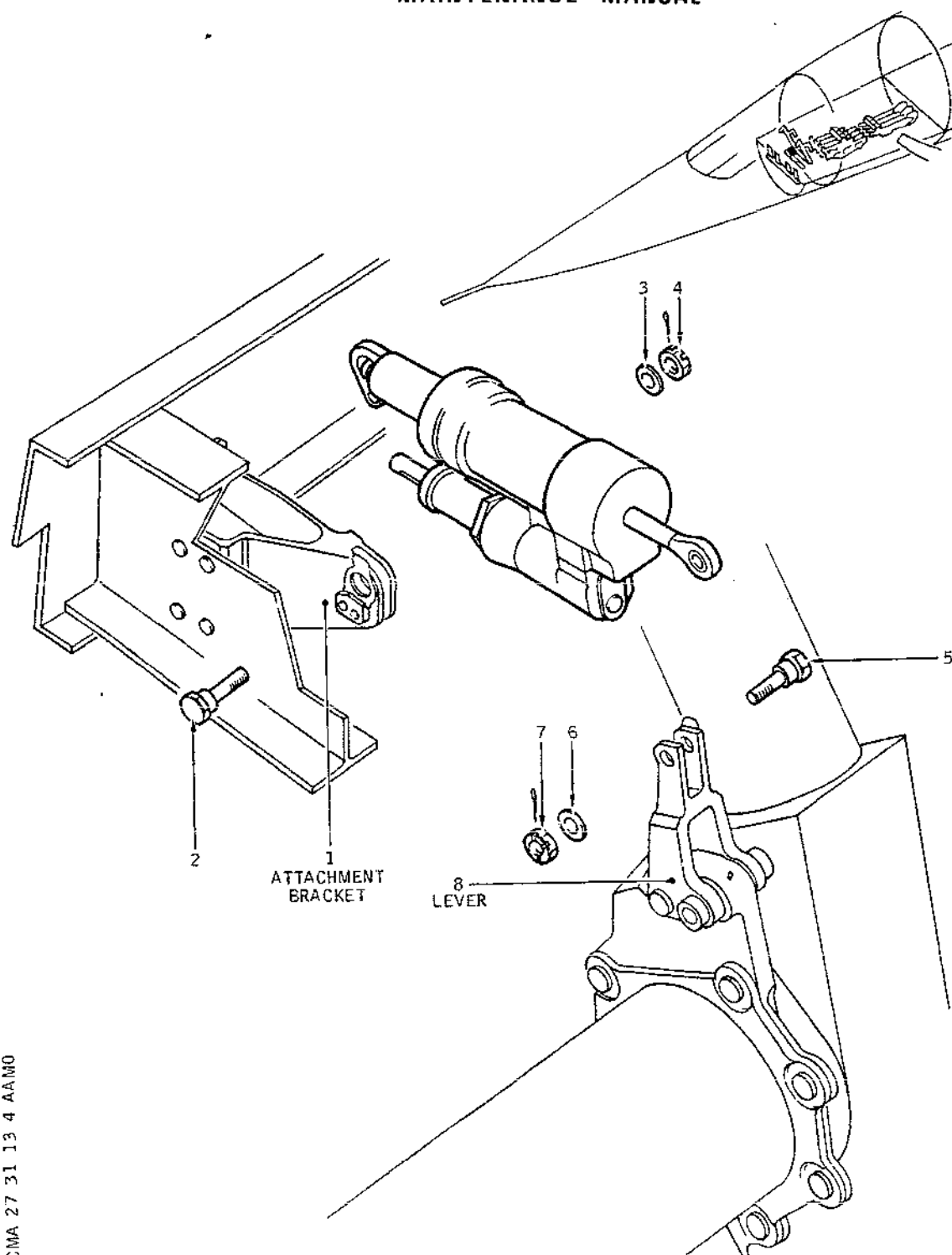
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## MAINTENANCE MANUAL



CMA 27 31 13 4 AAM0

Pitch Shock Absorber Assembly  
Figure 401

EFFECTIVITY: ALL

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R

BA

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## MAINTENANCE MANUAL

### SHOCK ABSORBER ASSEMBLY - (PITCH) - INSPECTION/CHECK

#### 1. General

The purpose of the following operations is to carry out inspection/check procedure of pitch shock absorber assembly.

#### 2. Shock Absorber Level Check

##### A. Equipment and Materials

DESCRIPTION	PART NO.
-------------	----------

Access Platform 4.47 m (14 ft. 8 in.)

##### B. Prepare

(1) Remove pedal base footrest 212DF, First Officer's side.

(2) Remove floor panel 212MF.

##### C. Level Check

(Ref. Fig. 601 )

Level indicator marker travel range must be 10 mm on each side of level indicator window centre position (Green paint).

##### D. Close-Up

(1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2) Install floor panel 212MF.

(3) Install pedal base footrest 212DF.

EFFECTIVITY: ALL

BA

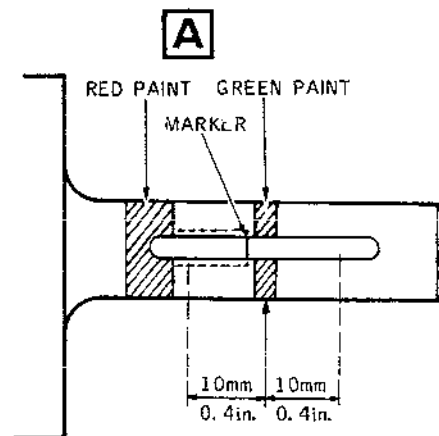
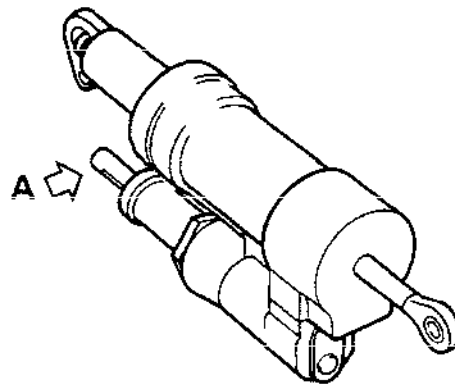
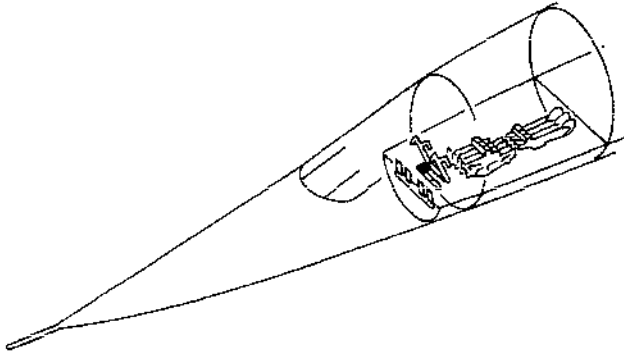
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## MAINTENANCE MANUAL



Level Indicator  
Figure 601

CMA 27 31 13 6 AAM0

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## MAINTENANCE MANUAL

### 3. Shock Absorber Inspection/Check

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 4.47 m (14 ft. 8 in.)	

#### B. Prepare

- (1) Remove attach plate securing gaiter on three-piece base housing, First Officer's side.
- (2) Disengage gaiter, recover gaskets. Lift gaiter on control column.
- (3) Remove pedal footrests 212DF and 212FF.
- (4) Remove pedal gaiter.
- (5) Remove three-piece base housing 212RF, 212 PF and 212QF.
- (6) Remove floor panels 212CF, 212NF and 212MF.

#### C. Check

- (1) Check shock absorber assembly for cracks, dents and corrosion traces.
- (2) Check shock absorber assembly for hydraulic fluid leakage.
- (3) Check piston rod (3) for scores or corrosion marks.
- (4) Check that attachment bolt (2) at attachment bracket point (1) is not broken by pressing down on shock absorber. Check for correct safetying (cotter pin) on bolt nut.
- (5) Check that attachment bolt (9) (at lever (4) attachment) is not broken by pressing down on piston rod. Check for correct safetying (cotter pin) on bolt nut.
- (6) Check that shear pin (7) is not broken by applying a force to lever (4). Check for correct safetying (cotter pin (5)).
- (7) Check for correct safetying (cotter pin) of torque

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

tube (6) bolt (8) nut.  
(Ref. Fig. 602 )

### D. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Install floor panels 212CF, 212NF and 212MF.
- (3) Install three-piece base housing 212RF, 212PF, 212QF.
- (4) Install pedal gaiter.
- (5) Install pedal-base foot rests 212DF and 212FF.
- (6) Install gaskets and gaiter on three-piece base housing.
- (7) Install and secure attach plate on gaiter.

EFFECTIVITY: ALL

BA

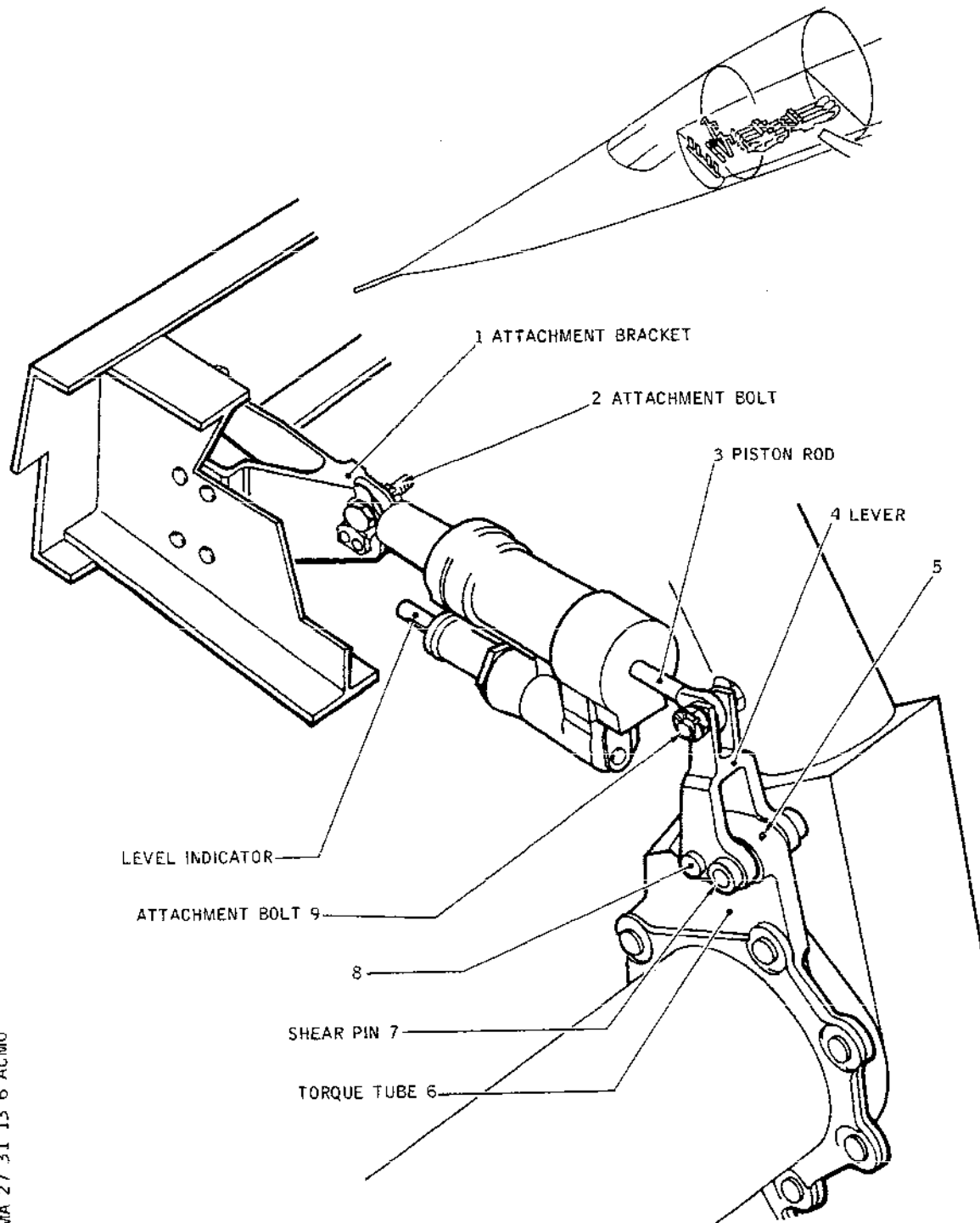
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## MAINTENANCE MANUAL



CMA 27 31 13 6 ACMO

Pitch Shock Absorber  
Figure 602

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## MAINTENANCE MANUAL

### LOAD LIMITING MECHANISM - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISMS SAFETY DEVICES ARE IN POSITION.

#### 1. General

Load limiting mechanism protects control linkage.

#### 2. Load Limiting Mechanism

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Zero Rigging Device - Relay Chassis	E925019000
Rigging Pins - Synchro Pack	D925252000
Rigging Pin - Mixing Unit Servo Control	D921310000
Access platform 3.672 m (12 ft)	
Circuit Breaker Safety Clips	

##### B. Prepare

(1) Take the precautions described in the previous

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

WARNING paragraph.

- (2) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (3) Check that pitch, roll and yaw trim controls are in zero position.
- (4) Open panel 121FB, immobilize pitch and roll resolvers with rigging pins D925252003 and D925252001.
- (5) Open floor panel 241HF. Immobilize mixing unit with rigging pin D921310000.

WARNING : WHEN INSERTING AND REMOVING PINS TAKE ALL NECESSARY PRECAUTIONS IN ORDER TO AVOID INTRODUCING INADVERTENTLY TOOLS OR MISCELLANEOUS ITEMS IN MIXING UNIT.

- (6) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in mechanical mode).
- (7) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

ALSO DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING OPERATION OF HYDRAULIC GROUND PRESSURIZATION SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (8) Open door 151DB and relieve pressure in Green, Blue and Yellow hydraulic system.

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## MAINTENANCE MANUAL

- (9) Open door 121GB, to gain access to load limiting mechanisms.

### C. Remove (Ref. Fig. 401 )

- (1) Remove cotter and unscrew nut (14) ; remove washers (13) and (12) and remove bolt (11). Disconnect jam detection strut (10).
- (2) Remove cotter and unscrew nut (4) ; remove washers (5) and (6) and remove bolt (7). Disconnect relay jack (18).
- (3) Remove cotter and unscrew nuts (1) ; remove washers (2) and disconnect ground bonding strip (17).
- (4) Support the load limiting mechanism and remove bolt (3). Remove load limiting mechanism.
- (5) Remove supports (8) and (16) from the pivot shaft of the load limiting mechanism, also washers (9) and (15).

### D. Preparation of Replacement Component

### E. Install

- (1) Install washers (9) and (15) and supports (8) and (16) on the load limiting mechanism pivot shaft.
- (2) Position load limiting mechanism and install bolt (3) attaching the pivot supports to the chassis beams.
- (3) Connect ground bonding strip (17).
- (4) Install washers (2) and tighten nuts (1). Safety with cotters.
- (5) The sideways play in the installed assembly must be between 0.05 mm and 0.13 mm (0.002 in. and 0.005 in.).
  - (a) If play is above limits replace washer (15).
  - (b) If play is below limits adjust washer (15).
- (6) Connect jam detection strut (10) without modifying its length. Install bolt (11), washers (12) and (13), and tighten nut (14).  
Torque to between 45 and 50 lbf.in. (0.5 and 0.6 m.daN)  
Safety with cotter pins.

EFFECTIVITY: ALL

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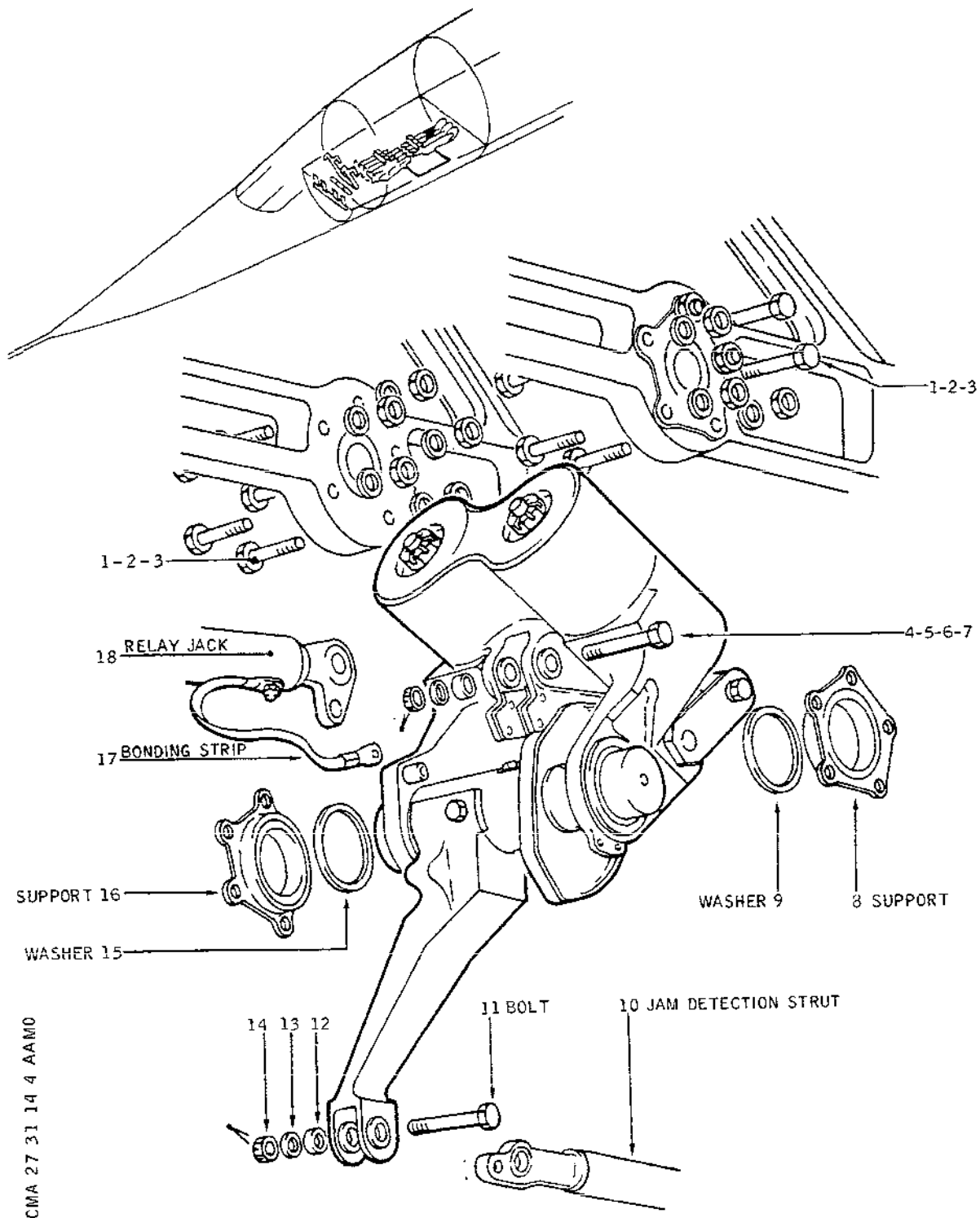
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## MAINTENANCE MANUAL



CMA 27 31 14 4 AAM0

Load Limiting Mechanism  
Figure 401

R

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (7) Connect relay jack (18) to the body of the load limiting mechanism. Install bolt (7), washers (6) and (5), and tighten nut (4). Safety with cotter.
- (8) Remove warning notices.
- (9) Set circuit breaker M 626, panel 15-216, Map Ref F22.
- (10) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (11) Remove rigging pin D921310000 from mixing unit.
- (12) Install equipment E925019000 attachment support on relay chassis.  
(Ref. Fig. 402 )
- (13) Install equipment E925019010. Install equipment E925019012 on equipment E925019010 and on load limiting mechanism output lever by means of rigging pins E925019105. Pins must be inserted freely ; if not adjust length of the AP force limiter as follows :
  - (a) Cut lockwire, loosen nut (22), disengage washers (21) and (20).
  - (b) Turn by hand the rod and outer sleeve assembly in order to lengthen or shorten the AP force limiter, until rigging pin E925019105 can be inserted and removed freely.
  - (c) Position lockwasher (20), tab in recess located on the front face of rod (19).
  - (d) Engage the second lockwasher (21).
  - (e) Tighten nut (22).  
Torque to between 170 and 180 lbf.in. (1.2 and 2 m.daN).
- (14) Check adjustment of relay jack sensor (Ref. 22-12-61, Adjustment/Test).
- (15) Remove units of equipment E925019012, E925019010, and rigging pins D925252003 and D925252001 from resolvers.
- (16) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).

### F. Test

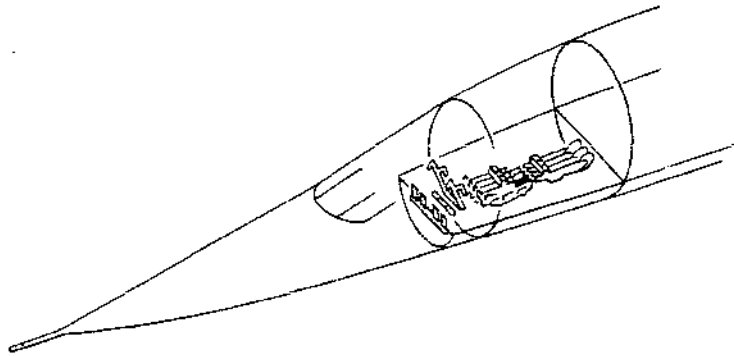
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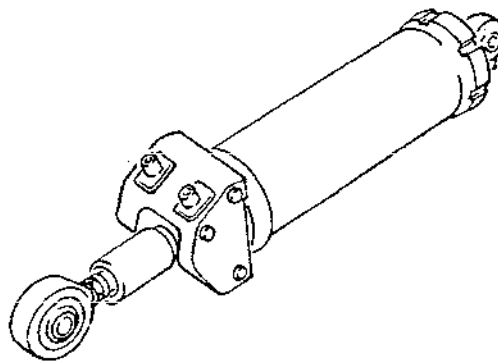
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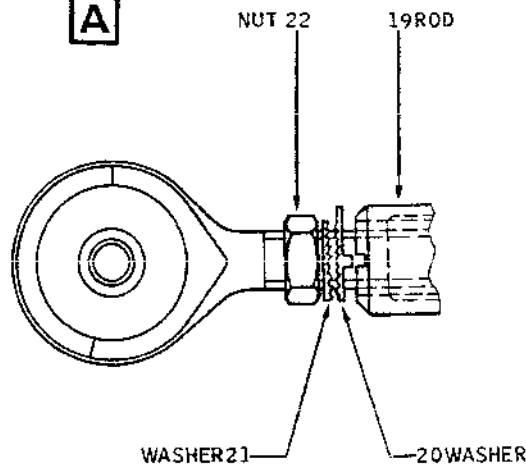
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A →



A



Adjustment of AP Force Limiter.  
Figure 402

CMA 27 31 14 4 ACM0

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- (1) Set Flight Controls in mechanical mode (Ref. 22-00-00, Servicing).
- (2) Carry out an operational test (Ref. 27-31-00, Servicing).
- (3) Immobilize pitch resolvers with rigging pin D925252003.
- (4) Install items of equipment E925019010 and E925019012. Make certain that rigging pins can be easily inserted on pitch axis. If not, adjust AP force limiter.
- (5) Remove items of equipment E925019012 and E925019010, remove rigging pin D925252003 from resolvers.
- (6) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing ; Procedure to set Flight Controls in mechanical mode).
- (7) Before closing access doors and panels carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Install floor panel 241HF.
- (3) Close access doors and panels 121FB, 151DB, 121GB.
- (4) Remove access platforms.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### LOAD LIMITING MECHANISM - INSPECTION/CHECK

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The purpose of the following procedure is to check the pitch channel load limiting mechanism.

#### 2. Load Limiting Mechanism

##### A. Equipment and Materials

DESCRIPTION	PART NO.
-------------	----------

Access Platform 3.672 m (12 ft)

##### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) On overhead panel, on Flight Control Unit, make certain that BLUE INVERTER and GREEN INVERTER switches are in PWR OFF position.

On SERVO CONTROLS unit, make certain that selector switches are in NORMAL position.

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- (3) Remove access panel 121GB, giving access to load limiting mechanism.

### C. Check

- (1) Check relay jack rod attachment to load limiting mechanism corresponding fork end for correct lockwiring of nut and for absence of end play.  
Check bonding strip for correct condition.
- (2) Check jam detection strut attachment to load limiting mechanism lower bellcrank for correct lockwiring of nut and for absence of end play.
- (3) Check roller for correct condition.  
Check that there are no wear marks, due to roller displacement, on cam roller track.

### D. Tests

### E. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access door 121GB.

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## MAINTENANCE MANUAL

### CABLE TENSION REGULATOR - REMOVAL/INSTALLATION

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The cable tension regulator is mounted on the relay chassis located between frames 7 and 8. Access is obtained through door 121GB.

The cable tension regulator maintains constant cable tension at all temperatures.

#### 2. Cable Tension Regulator

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Cable Grip	D921620000
Rigging Pin - Mixing Unit Servo Control	D921310000
Locking Equipment - Cable Tension Regulator	D921606000
Zero Rigging Device - Relay Chassis	E925019000

EFFECTIVITY: ALL

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DESCRIPTION	PART NO.
Rigging Pins - Synchro Pack	D925252000
Tensiometer	
Lockwire (dia. 1 mm (0.041 in.)) Corrosion Resistant Steel	
Circuit Breaker Safety Clips	
Access Platform 3.672 m (12 ft.)	
Warning Notices	

**B. Prepare**

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Set flight controls in mechanical mode (Ref. 27-00-00, Servicing).
- (3) Check that pitch and roll trim controls are set to zero.
- (4) Open panel 121FB, immobilize pitch and roll resolvers with rigging pins D925252003 and D925252001.
- (5) Open floor panel 241HF, immobilize mixing unit with rigging pin D921310000.

**CAUTION** : WHEN INSERTING AND REMOVING PINS TAKE ALL NECESSARY PRECAUTIONS IN ORDER TO AVOID INTRODUCING INADVERTENTLY TOOLS OR MISCELLANEOUS ITEMS IN MIXING UNIT.

- (6) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in Mechanical Mode).
- (7) Trip, safety and tag the following circuit breaker :

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F 22
<p><u>WARNING</u> : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING BLUE, GREEN AND YELLOW HYDRAULIC SYSTEM PRESSURIZATION BY HYDRAULIC GROUND POWER UNIT.</p> <p>DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.</p> <p>IF A HYDRAULIC GROUND POWER UNIT IS USED, DISPLAY A WARNING NOTICE ON THIS UNIT, PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.</p> <p>MAKE CERTAIN THAT PERSONNEL DO NOT WORK ON MECHANICAL LINKAGE BETWEEN MIXING UNIT AND ELEVONS.</p>			

- (8) Open door 151DB. Depressurize Green, Blue and Yellow hydraulic systems (Ref. 29-11-00, Servicing ; 29-12-00, Servicing ; 29-21-00, Servicing).
- (9) Open floor panel 231JF, giving access to turnbuckles.
- (10) Open floor panel 215AF giving access to cable tension regulators.  
Open door 121GB, giving access to cable tension regulators.

### C. Remove (Ref. Fig. 401 )

- (1) Remove cotter pins and nuts (33) ; remove washers (34), bolts (31) and spacers (32).
- (2) Remove cotter pins and nuts (37) ; remove washers (38) and bolts (36).  
Remove guard struts (35) from between the hydraulic lines and the control rods.
- (3) Remove cotter pins and nuts (5) ; remove washers (6) and bolts (7).
- (4) Remove cotter pins and nuts (1) ; remove washers (2), bolts (3) and spacers (4). Remove cable guard (8).

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- (5) Unsafety locknuts and adjusting screw (39) loosen locknuts draw back cable guard (40) from regulator pulley by means of adjusting screw.
- (6) Remove locking clips from turnbuckles on cables routed over pitch regulator.  
Turn turnbuckles symmetrically to obtain a tension allowing installation of locking equipment D921606000 on regulator.  
Install locking equipment.  
Slacken cables so that they can be removed from regulator cable quadrants.
- (7) Remove cotter pin and nut (17) ; remove washers (18) and bolt (19). Disconnect rod (30) from control lever.
- (8) Install cable grip D921620000 to immobilize cables.
- (9) Remove cotter pin and nut (20) ; remove washer (21) and bolt (22). Tilt cable attachment fitting (23) on fixed pin and disengage lower cable.
- (10) Remove cotter pin and nut (14) ; remove washer (15) and bolt (16). Tilt cable attachment fitting (13) on fixed pin and disengage upper cable.
- (11) Remove cotter pins and nuts (24) and (27) ; remove washers (25) and (28). Support tension regulator in order to remove bolts (26) and (29) : remove cable tension regulator.

### D. Preparation of Replacement Component (Ref. Fig. 402 )

- (1) Check that locking equipment D921606000 is in place on new regulator. This equipment maintains the two flanges at adjustment point 10.
- (2) On new regulator, make certain that dimension A is the same as on the removed regulator. Adjust if necessary.

### E. Install

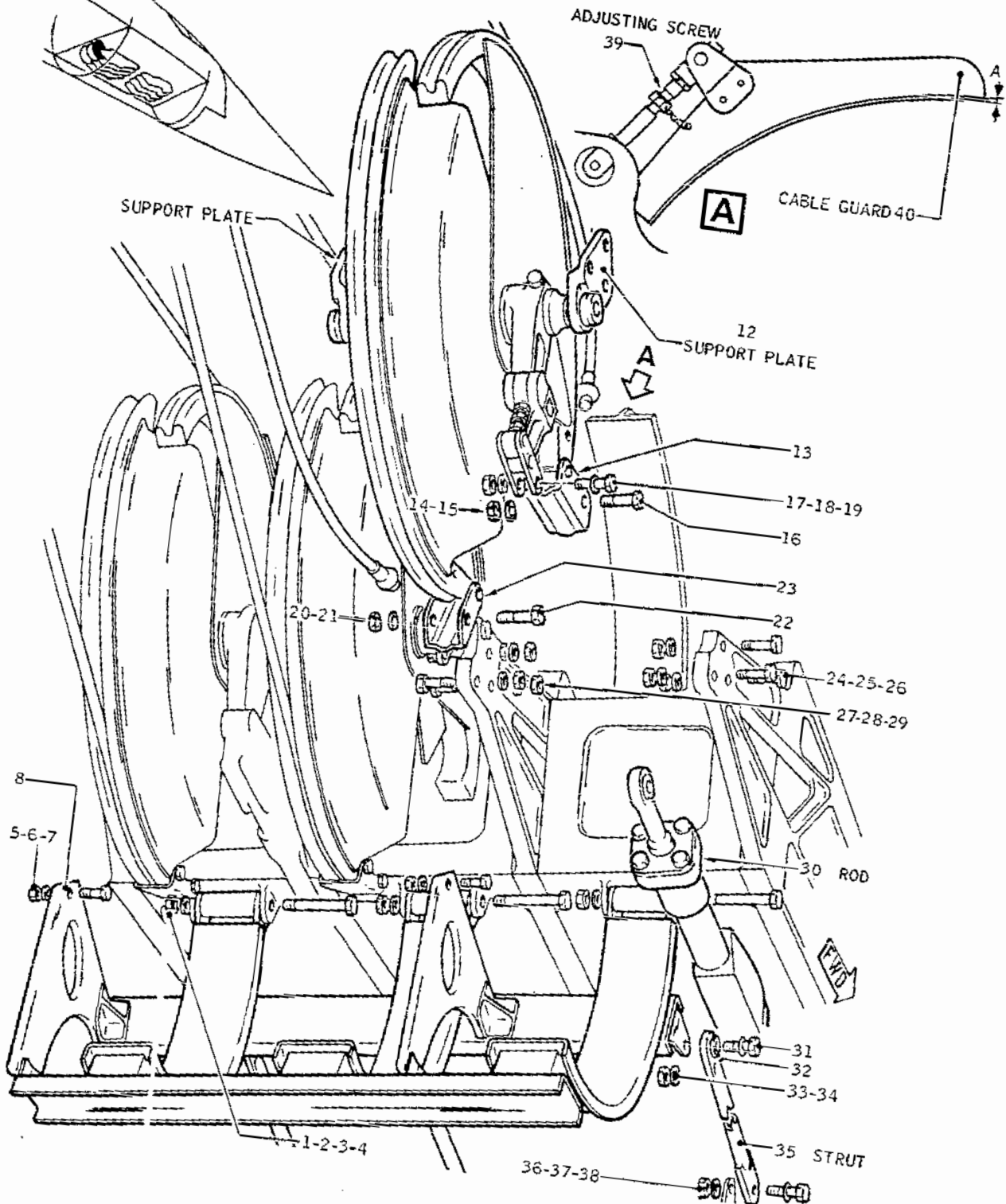
- (1) Remove equipment D921620000.
- (2) Position tension regulator and attach support plates (12) and (11) to chassis using bolts (29) and (26), washers (25) and (28) and nuts (24) and (27). Safety with cotter pin.
- (3) Engage end fitting of upper cable in its recess on the quadrant. Tilt cable attachment fitting (13) on

EFFECTIVITY: ALL

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Cable Tension Regulator  
Figure 401

EFFECTIVITY: ALL

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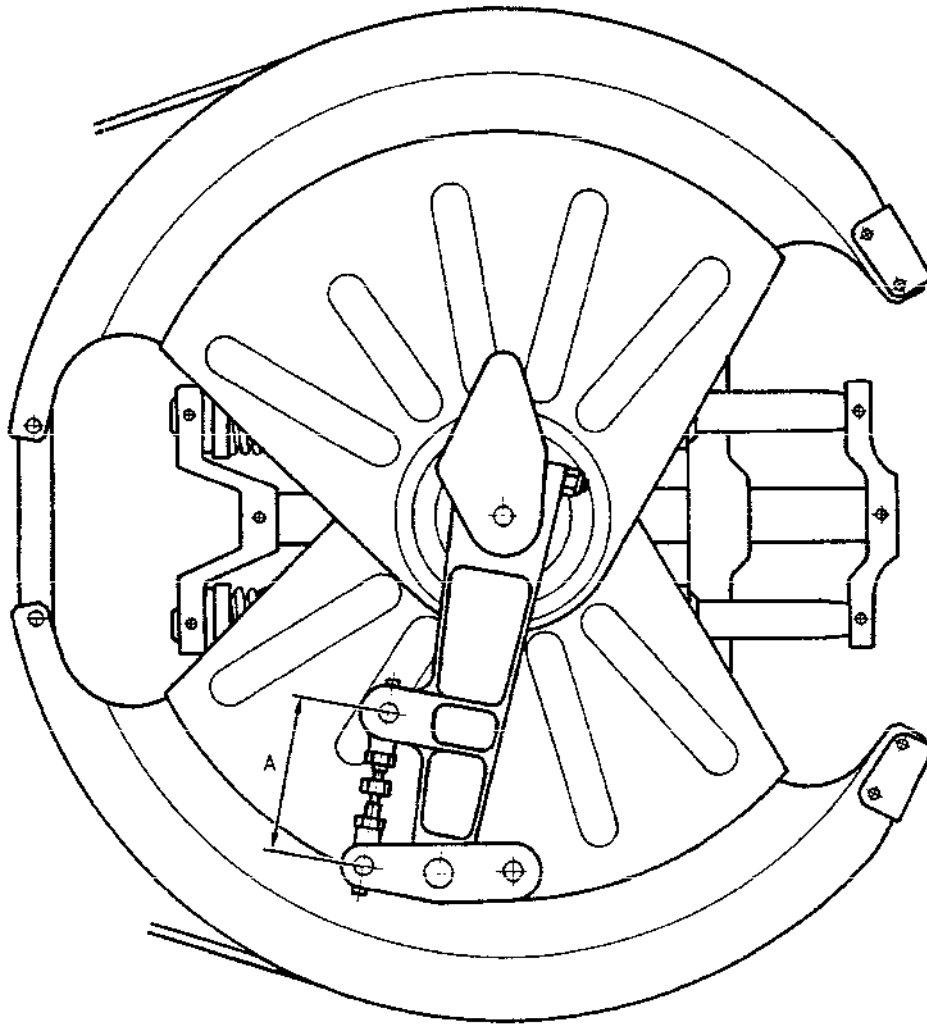
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CMA 27 31 15 4 ABMO

Adjustment of Control Lever  
Figure 402

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fixed pin and engage bolt (16). Install washer (15), nut (14). Tighten nut and safety with cotter pin.

- (4) Rotate tension regulator and engage end fitting of lower cable in its recess on the quadrant. Tilt cable attachment fitting (23) and engage bolt (22). Install washer (21) and nut (20). Tighten nut (20) and safety with cotter pin.
- (5) Connect rod (30) to control lever and install bolt (19), washers (18) and nut (17). Torque nut to between: 27 and 32 lbf.in. (0.30 and 0.36 m.daN). Safety with cotter pin.
- (6) Cable tension adjustment (Ref. Fig. 403 )
  - (a) Install equipment E925019010 and immobilize pitch control with equipment E925019012.
  - (b) Screw up turnbuckles symmetrically until sufficient and balanced tension of the two cables is obtained to enable the rigging pins securing the cable tension regulator locking equipment E921606000 to be freely withdrawn.
  - (c) Remove the cable tension regulator locking equipment E921606000.
  - (d) Adjust cable tension as a function of the temperature in the equipment compartment as per adjustment graph. TENSION = 25 daN (56.2 lbf.).
  - (e) Check that tension is equally distributed between both cables by removing rigging pins (equipment E925019012) (easy removal of rigging pins).
  - (f) Safety the turnbuckles with locking clips.
- (7) Install lower cable guard (8). Install spacers (4), bolts (3), washers (2) and nuts (1). Torque nuts to between 12 and 15 lbf.in. (0.14 and 0.17 m.daN). Safety with cotter pins.
- (8) Install bolts (7), washers (6) and tighten nuts (5). Safety with cotter pins.
- (9) Check that clearance between cable guard and cable tension regulator is between 0.03 and 0.08 in. (0.762 and 2.03 mm).
- (10) Turn adjusting screw (39) so that clearance between

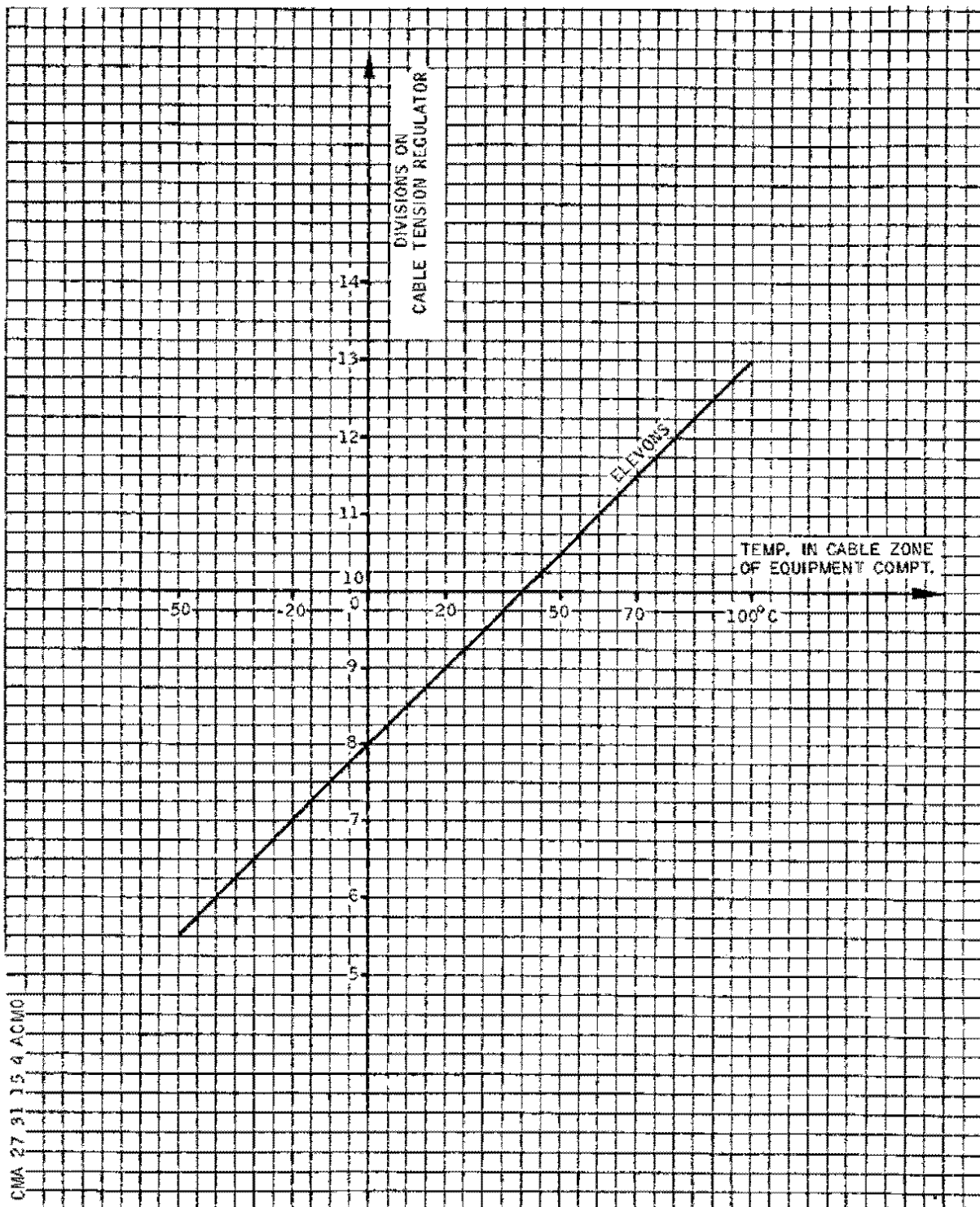
EFFECTIVITY: ALL

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## MAINTENANCE MANUAL



Cable Tension Adjustment Graph  
Figure 403

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

cable guard (40) and regulator pulley is between 0.03 and 0.08 in. (0.762 and 2.03 mm)

Tighten locknuts.

Safety adjusting screw and locknuts with lockwire as per 20-21-13.

Torque to between 27 and 32 lbf. in. (0.305 and 0.361 m.daN)

- (11) Install guard struts (35) between the hydraulic lines and the control rods.
- (12) Install bolts (31), washers (34), spacers (32), washers (34) and tighten nuts (33). Safety with cotter pins.
- (13) Install bolts (36), washers (38) and tighten nuts (37). Safety with cotter pins.
- (14) Remove warning notices.
- (15) Set circuit breaker M626.
- (16) Set flight controls in mechanical mode (Ref. 27-00-00, Servicing).
- (17) Remove rigging pin D921310000 from mixing unit.
- (18) Remove rigging pins D925252003 and D925252001 from resolvers and items of equipment E925019012 and E925019010 from pitch mechanical linkage.
- (19) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing - Procedure to set Flight Controls in Mechanical Mode).

### F. Tests

- (1) Set flight controls in mechanical mode (Ref. 27-00-00, Servicing).
- (2) Carry out an operational test (Ref. 27-31-00, Servicing).
- (3) Immobilize pitch resolvers with rigging pin D925252003.
- (4) Install equipment E925019010 and immobilize pitch mechanical linkage with equipment E925019012.
- (5) Check that rigging pin D921310000 can be removed or inserted easily in mixing unit.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (6) Remove equipment E925019010 and equipment E925019012 from pitch linkage and rigging pin D925252003 from resolvers.
- (7) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing - Procedure to set Flight Controls in Mechanical Mode).
- (8) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close floor panels : 241HF, 231JF, 215AF.
- (3) Close access doors and panels : 121FB, 151DB, 121GB.
- (4) Remove access platforms.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### CABLE TENSION REGULATOR - INSPECTION/CHECK

**WARNING :** MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The purpose of the following procedure is to check the cable tension regulator of the pitch channel.

#### 2. Cable Tension Regulator

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 3,672 m (12 ft.)	
Rigging Pins - Synchro pack	DE925252000

##### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Open door 121GB and floor panel 215AF to gain access to the cable tension regulators.

##### C. Check (Ref. Fig. 601 )

EFFECTIVITY: ALL

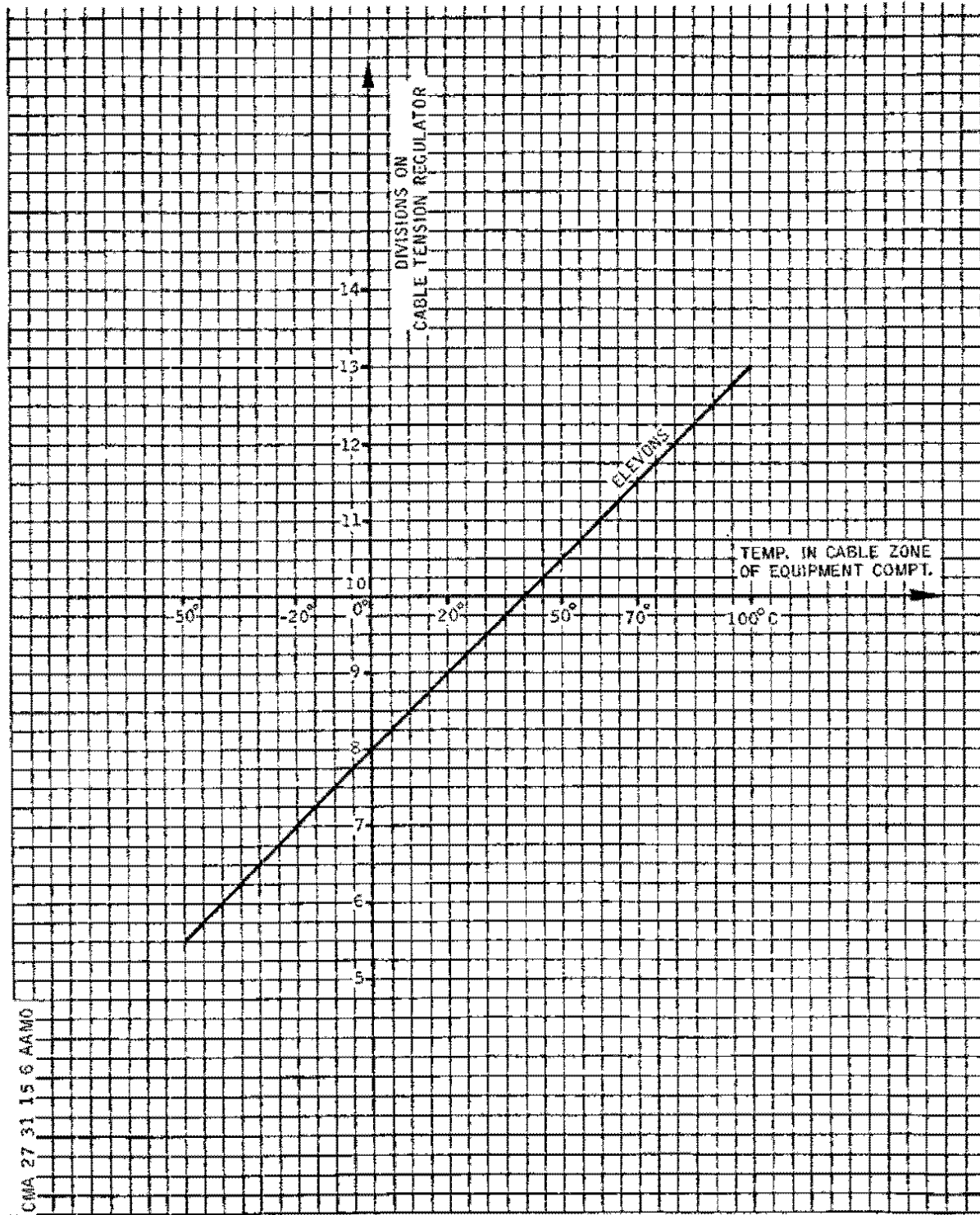
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## MAINTENANCE MANUAL



Cable Tension Adjustment Graph  
Figure 601

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (1) On cable quadrants
  - Check attachment of cable ends and cable attachment fittings
  - Check that there are no wear and damage marks on the cable quadrants grooves.
- (2) Check lockwiring of rod adjusting screw.
- (3) Make certain there is no play at the adjustable control lever fulcrums.
- (4) Set Flight Controls in Blue electrical mode (Ref. 24-00-00, Servicing).
- (5) Open door 121FB and immobilize pitch resolvers with rigging pin D925252003.
- (6) On the regulator.
  - (a) Note value indicated by the regulator marker.
  - (b) Near the regulator, bring together manually the two cables and check the balance arm displacement on locking shaft.
  - (c) Release the two cables.
  - (d) Make certain that the value indicated by the marker is identical with that noted previously.
- (7) Place a thermometer in the regulator immediate area and note temperature.  
By means of cable tension adjustment graph, make certain that value indicated by the marker corresponds to value in accordance with temperature shown on graph.
- (8) Remove rigging pin D925252003
- (9) Shut down pressurization of hydraulic system (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in electrical mode).
- (10) Check that clearance between lower and upper cable guards and tension regulator pulley is between 0.03 and 0.08 in. (0.762 and 2.03 mm).

### D. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (2) Close door 121GB and floor panel 215AF.
- (3) Remove access platform.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### SHOCK ABSORBER LEVER - REMOVAL/INSTALLATION

#### 1. General

#### 2. Shock Absorber Lever

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 4.47m (14 ft. 8 in.)	
R Lockwire (dia 1 mm (0.041 in.) Corrosion resistant steel	
R Standard Grease (Ref. 20-30-00 No.51)	

##### B. Prepare

- R  
R WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3  
PROHIBITING PRESSURIZATION OF BLUE, GREEN AND  
YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND  
POWER UNIT.
- DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S  
STATION PROHIBITING USE OF GROUND PRESSURIZING  
SYSTEM ELECTRIC PUMPS.
- R IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED,  
R DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING  
R PRESSURIZATION OF HYDRAULIC SYSTEMS.
- R (1) In Flight compartment, First Officer's side
- R (a) Remove attach plate securing gaiter 212DS to three  
R piece base housing, lift gaiter 212DS on control  
R column and retain gaskets.
- R (b) Remove panel 212CS.
- R (c) Remove pedal-base footrests 212DF, 212FF and  
R 212EF.
- R (d) Remove three-piece base housing 212RF, 212PF and  
R 212QF.
- R (e) Remove floor panels 212NF and 212MF.  
R

EFFECTIVITY: ALL

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# *Concorde*

## MAINTENANCE MANUAL

### C. Remove

R NOTE : In order to install or remove bolts it is necessary  
R to press retaining spring blade.

- (1) Disconnect shock absorber (1) from the lever. Remove cotter and unscrew nut (13). Remove washer (14) and bolt (2).
- (2) Cut and remove lockwire (5) and (8), remove cotter (6). Remove safety pin (7).
- (3) Remove cotter and unscrew nut (3). Remove washer (4) and bolt (10) complete with washer (11). Remove sleeve (12) and, finally, lever (15).

### D. Preparation of Replacement Component

R Not applicable.

### E. Install

- (1) Position lever (15) on torque tube (9) and install sleeve (12).  
Install bolt (10) complete with washer (11). Install washer (4) and tighten nut (3).  
Torque to between : 27 and 32 lbf.in. (0.30 and 0.36 m.daN). Safety with cotter.

CAUTION : A SAFETY PIN IS USED TO ATTACH THE LEVER TO  
THE TORQUE TUBE.  
THIS PIN MUST ONLY BE REPLACED BY USING A  
GENUINE, IDENTICAL REPLACEMENT.

- (2) Install safety pin (7). Coat the pin with Product No.51 and insert it in the machined holes of lever (15) and its support.  
Install cotter (6) and safety with lockwire (5) and (8)
- (3) Connect shock absorber rod (1) to lever, (15). Install bolt (2), washer (14) and tighten nut (13). Safety with cotter.

### R F. Test

R Before closing access doors and panels, carry out a double  
R inspection of work performed and area affected as per  
R instructions detailed in 05-55-11.

### R G. Close-Up

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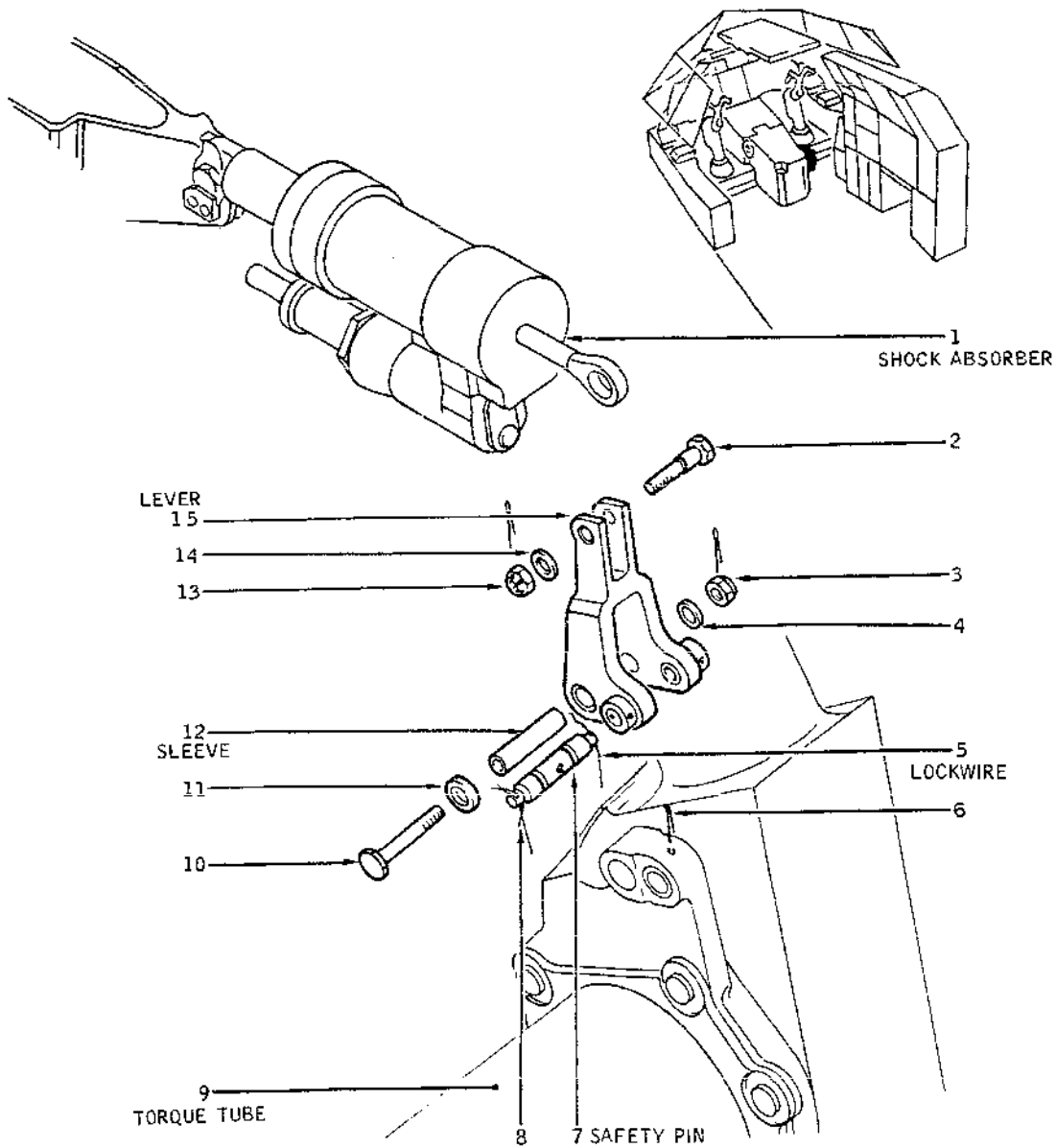
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## MAINTENANCE MANUAL



CMA 27 31 16 4 AAM0

Shock Absorber Lever  
Figure 401

R

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- R (2) Install floor panels 212MF, 212NF.
- R (3) Install three-piece base housing 212RF, 212PF and  
R 212QF.
- R (4) Install pedal-base foot rests 212DF, 212FF, and  
R 212EF.
- R (5) Install panel 212CS.
- R (6) Install gaiter 212DS on three-piece base housing  
R (gasket and attach plate).
- R (7) Remove warning notices.
- R (8) Remove access platform.

EFFECTIVITY: ALL

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# *Concorde*

## MAINTENANCE MANUAL

### AUTO PILOT FORCE LIMITER - REMOVAL/INSTALLATION

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The auto pilot force limiter ensures the automatic disengagement of the AP when loads applied to linkage reach its threshold value. It is located level with frame 6 in zone 121.

#### 2. Auto Pilot Force Limiter

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Zero Rigging Device - Relay Chassis	E925019000
Rigging Pins - Synchro Pack	D925252000
Lockwire (dia. 0.041 in. (1 mm) Corrosion Resistant Steel	
Access Platform 3.67 m (12 ft.)	
Circuit Breaker Safety clips	

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## MAINTENANCE MANUAL

### B. Prepare

- (1) Take the precautions described in the previous "WARNING" paragraph.
- (2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER		MAP REF.
AP/FD SYS1 CONT	1-213	1C	17	Q13
AP/FD SYS1 SUP	2-213	1C	20	C 5
AP/FD SYS2 CONT	5-213	2C	17	A11
AP/FD COMP1 SUP	13-215	1C	18	A 5
AP/FD COMP2 SUP	13-216	2C	18	F18
AP/FD SYS2 SUP		2C	20	A17

- (3) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (4) Make certain that pitch and roll trim controls are in zero position.
- (5) Remove access panel 121FB and immobilize the pitch resolvers with rigging pin D925252003.
- (6) Remove access panel 121GB and install items of equipment E925019010 and E925019012 on the pitch mechanical control.
- (7) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in mechanical mode).
- (8) Open door 151DB and depressurize the Green Blue and Yellow hydraulic systems (Ref. 29-11-00, 29-12-00 and 29-21-00, Servicing).

**WARNING :** DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.  
DISPLAY ALSO A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZATION SYSTEM ELECTRIC PUMPS.

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## MAINTENANCE MANUAL

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

### C. Remove

NOTE : For installing or removing attachment bolt it is necessary to press the plunger located on head of bolt to free the locking system balls.

- (1) Cut lockwire, unscrew and remove screws (9) attaching protective housings (4) and (8) to chassis. Lower housing (4) and lift housing (8).
- (2) Disconnect electrical connectors (10).
- (3) Remove cotter and unscrew nut (3) ; remove washer (2).
- (4) Remove cotter and unscrew nut (7) ; remove washer (6).
- (5) Support the force limiter (11) and remove bolt (1).
- (6) Remove rigging pin D925252003 from resolvers. Rotate pitch trim wheel (in nose up direction) until bolt (5) can be removed easily. Remove bolt (5) and AP force limiter (11). Handle with care.

### D. Preparation of Replacement Component

- (1) Adjust the replacement force limiter to the same length as that of the removed component and tighten nut (18). Torque to between 170 and 180 lbf.in. (1.8 and 2 m.daN). Safety with lockwire.

### E. Install

- (1) Position force limiter (11), install bolt (5) attaching forward end of force limiter to synchro pack lever. Rotate trim wheel to neutral and install bolt (1) attaching force limiter (11) to relay jack.
- (2) Install washer (2) and tighten nut (3). Torque to between 27 and 32 lbf.in. (0.30 and 0.35 m.daN). Safety with cotter
- (3) Install washer (6) and tighten nut (7). Torque to between 45 and 50 lbf.in. (0.50 and 0.56 m.daN). Safety with cotter
- (4) Remove warning notices.

EFFECTIVITY: ALL

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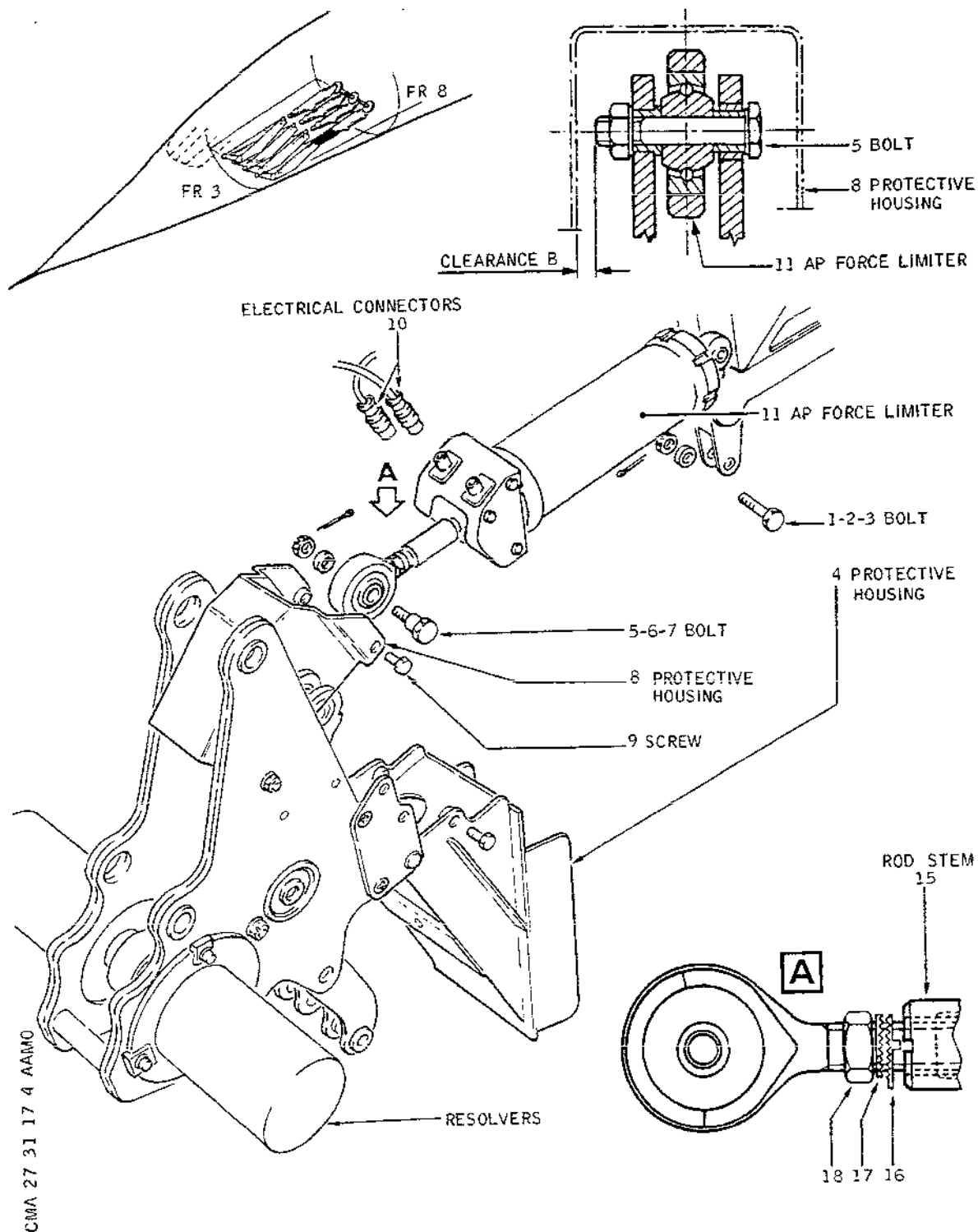
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## MAINTENANCE MANUAL



Auto Pilot Force Limiter  
Figure 401

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (5) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (6) Make certain that pin E925019105 of equipment E925019012 on load limiting mechanism can be removed easily. If not adjust the length of AP force limiter as follows :
  - (a) Cut lockwire and loosen nut (18), disengage washers (17 and 16).
  - (b) Manually rotate rod stem (15) to lengthen or shorten AP force limiter until rigging pin E925019105 can be inserted and removed easily.
  - (c) Engage lockwasher (16), tab in slot provided on front face of rod stem (15).
  - (d) Engage second lockwasher (17).
  - (e) Tighten nut (18). Torque to between 170 and 180 lbf.in. (1.8 and 2 m.daN). Safety with lockwire (Ref. 20-21-13)
  - (f) Check adjustment of relay jack sensor (Ref. 22-12-61, Adjustment/Test).
- (7) Remove items of equipment E925019012 and E925019010 and rigging pin D925252003.
- (8) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in mechanical mode).
- (9) Connect electrical connectors (10).
- (10) Install protective housings (4) and (8), tighten screws (9). Safety with lockwire (Ref. 20-21-13).

### NOTE (Ref. Fig. 401 )

Check that clearance B between bolt (5) and protective housing (8) is within the following limits :

Nominal clearance : 0.1181 in. (3 mm)

Minimum clearance : 0.078 in. (1.98 mm)

- (11) Remove safety clips and tags and set the following circuit breakers :

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## MAINTENANCE MANUAL

SERVICE	PANEL	CIRCUIT BREAKER		MAP REF.
AP/FD SYS 1 CONT	1-213	1C	17	Q13
AP/FD SYS 1 SUP	2-213	1C	20	C 5
AP/FD SYS 2 CONT	5-213	2C	17	A11
AP/FD COMP 1 SUP	13-215	1C	18	A 5
AP/FD COMP 2 SUP	13-216	2C	18	F18
AP/FD SYS 2 SUP		2C	20	A17

### F. Test

- (1) Carry out an operational test (Ref. 27-11-00, Adjustment/Test).
- (2) Carry out an AP force limiter test (Ref. 22-10-00, Adjustment/Test, paragraph 3.F (1)).
- (3) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (4) Immobilize pitch resolvers with rigging pin D925252003.
- (5) Install items of equipment E925019010 and E925019012 and check that rigging pins can be inserted and removed easily. If not, adjust AP force limiter.
- (6) Remove items of equipment E925019010, E925019012 and rigging pin D925252003.
- (7) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in mechanical mode).
- (8) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access doors and panels 121FB, 121GB and 151DB.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

(3) Remove access platforms.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### AUTO-PILOT FORCE LIMITER - INSPECTION/CHECK

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The purpose of the following procedure is to check the pitch channel AP force limiter.

#### 2. AP Force Limiter

##### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Access Platform 3,672 m (12 ft)	
---------------------------------	--

##### B. Prepare

(1) Take the precautions described in the previous WARNING paragraph.

(2) On overhead panel, on Flight Control Unit make certain that BLUE INVERTER and GREEN INVERTER switches are in PWR OFF position.

On SERVO CONTROLS unit make certain that selector switches are in NORMAL position.

EFFECTIVITY: ALL

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- (3) Open door 121FB.
- (4) Remove protective case of pitch resolvers.

### C. Check

- (1) Rod attachment on synchro pack lever.
  - (a) Check bolt at rod fork end for absence of end play.
  - (b) Check bolt nut for correct lockwiring.  
Check rod adjusting nut for correct lockwiring.
- (2) Check electrical connectors of microswitch box for correct attachment.
- (3) Check lockwiring condition of microswitch box nuts.
- (4) Check rod fork end attachment to the relay jack spool valve for absence of end play.  
Check rod attaching bolt nut for correct lockwiring.

### D. Tests

### E. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Install resolver protective case.
- (3) Close door 121FB.

EFFECTIVITY: ALL

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# *Concorde*

## MAINTENANCE MANUAL

### SPRING POT ASSEMBLY - ELEVON DEFLECTION LIMITING - REMOVAL/INSTALLATION

#### 1. General

The spring pot assembly, attached to frame 2A, in zone L211, limits deflection of elevons to a first stage of 15° nose up. However, when applying an additional load to the control column, the spring pot assembly is compressed so that a maximum deflection of elevons can be obtained.

#### 2. Spring Pot Assembly

##### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Access Platform 4.47 m (14 ft. 8 in.)

##### B. Prepare

(1) Remove floor panels 211BF and 211CF.

##### C. Remove

(1) Remove cotter pin, loosen nuts (2), retain washers (3). Remove bolts (4).

(2) Remove spring pot assembly (1).

##### D. Preparation of Replacement Component

##### E. Install

(1) Position spring pot assembly (1).

(2) Insert bolts (4), install washers (3). Tighten nuts (2). Safety with cotter pin.

##### F. Test

(1) Carry out an operational test (Ref. 27-31-00, Adjustment/Test).

(2) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

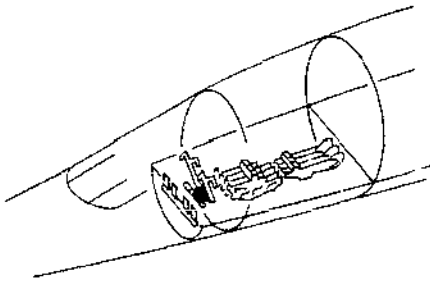
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**27-31-19**

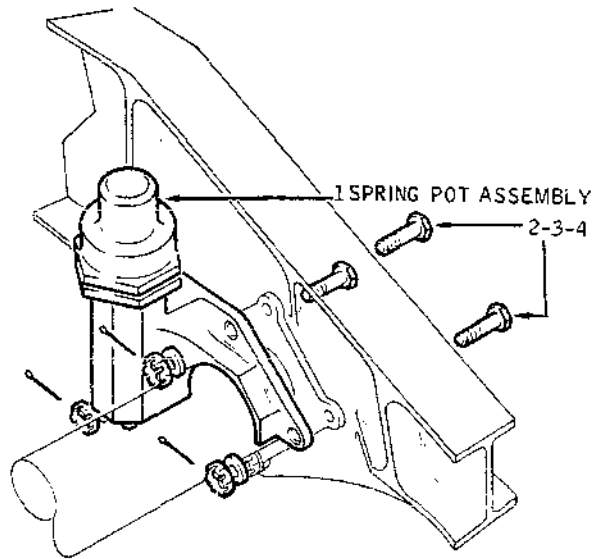
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## MAINTENANCE MANUAL



CMA 27 31 19 4 AAMO



Spring Pot Assembly  
Figure 401

### G. Close-Up

- (1) Close floor panels 211BF and 211CF.
- (2) Remove access platform.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### JAM DETECTION STRUT - REMOVAL/INSTALLATION

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The jam detection strut causes an indicator light to illuminate on Flight Control Unit should a jamming of the pitch mechanical linkage occur after the relay jack.

#### 2. Jam Detection Strut

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins - Synchro Pack	D925252000
Rigging Pin - Mixing Unit Servo Control	D921310000
Zero Rigging Device - Relay Chassis	E925019000
Electrical Ground Power Unit	
Access Platform 3.672 m (12 ft.)	
Circuit Breaker Safety Clips	

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### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER		MAP REF.
PFCS ALL SURFACES MON GRN SUP	1-213	1C	54	N13
PFCS ALL SURFACES MON BLUE SUP	5-213	2C	54	E12
HYD GNRD CHECK OUT SEL VALVE CONT	15-216	M	626	F22

- (3) Remove access panels 121GB, 121FB and access door 151DB.

- (4) Depressurize Green, Blue and Yellow hydraulic systems (Ref. 29-11-00, 29-12-00 and 29-21-00, Servicing).

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT, PROHIBITING PRESSURIZATION OF HYDRAULIC SYSTEMS.

- (5) Rotate pitch trim control to full nose down position.

### C. Remove

- (1) Disconnect electrical connector (6).
- (2) Remove cotter pin, remove nut (1), washers (2) and (3). Apply light jerking movements to control column in nose down direction to remove bolt (4) connecting jam detection strut (5) to load limiting mechanism.

NOTE : To remove or install attachment bolt, it is ne-

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cessary to press plunger on head of bolt to release locking mechanism.

- (3) Remove cotter pin, remove nut (7), washers (8) and (9). Remove bolt (10).

### D. Preparation of Replacement Component

### E. Install

- (1) Position jam detection strut and secure on regulator. Install bolt (10) washers (8) and (9) and tighten nut (7).  
Torque to between 0.30 and 0.36 m.daN (27 and 32 lbf. in.). Safety with cotter pin.
- (2) Engage bolt (4) connecting jam detection strut (5) to load limiting mechanism ; To this end, apply light jerking movements to control column in nose down direction. Install washers (2) and (3) and tighten nut (1).  
Torque to between, 0.50 and 0.55 m.daN (45 and 50 lbf. in.). Safety with cotter pin.
- (3) Connect electrical connector.
- (4) Remove safety clips and tags and set the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFCs ALL SURFACES MON GRN SUP	1-213	1C 54	N13
PFCs ALL SURFACES MON BLUE SUP	5-213	2C 54	E12
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

- (5) Remove warning notices
- (6) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (7) Set pitch, roll and yaw trim controls to zero.
- (8) Immobilize pitch, roll and yaw resolver packs with rigging pins D925252003, D925252001 and D925252002.

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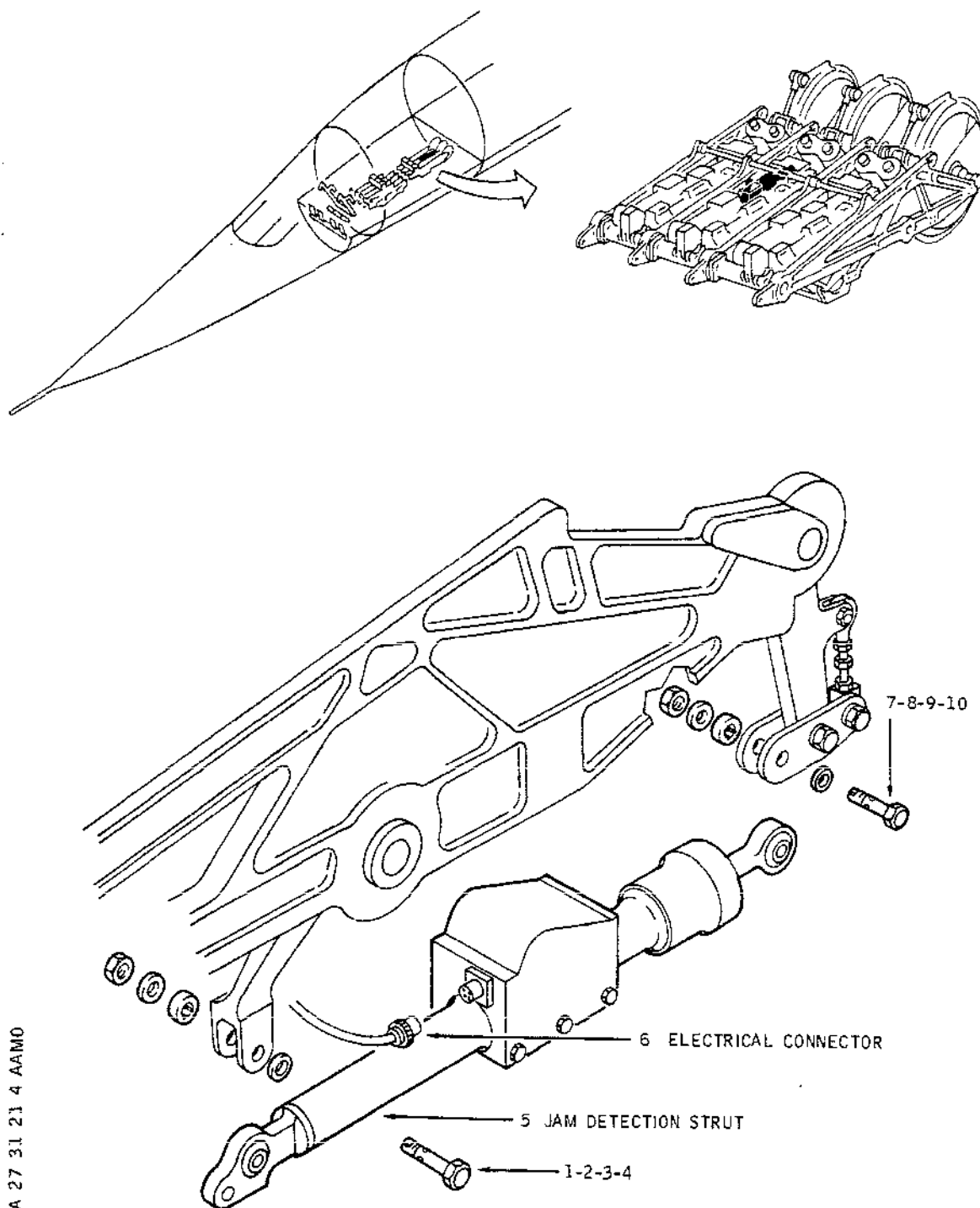
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Jam Detection Strut  
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(9) Install tools E925019010 and E925019012.

(10) Open floor panel 241HF.

WARNING : WHEN INSERTING AND REMOVING PINS TAKE ALL NECESSARY PRECAUTIONS IN ORDER TO AVOID INTRODUCING INADVERTENTLY TOOLS OR MISCELLANEOUS ITEMS IN MIXING UNIT.

(11) Check that rigging pin D921310000 can be inserted easily in mixing unit. If not, adjust cable tension (Ref. 27-31-00, Removal/Installation).

(12) Remove rigging pin D921310000 from mixing unit.

(13) Install floor panel 241 HF.

(14) Remove tools E925019012 and E925019010.

(15) Remove rigging pins from pitch, roll and yaw resolver packs (Rigging pins D925252001, D925252003 and D925252002).

(16) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).

### F. Test

(1) Carry out a test (Ref. 27-31-21, Adjustment/Test)

(2) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

(1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

(3) Close access doors and panels 121GB, 121FB, 151DB.

(4) Remove access platform.

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### JAM DETECTION STRUT - ADJUSTMENT/TEST

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The following operations serve as a functional test of the pitch mechanical linkage jam detection strut.

#### 2. Jam Detection Strut Test

##### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Electrical Ground Power Unit	
------------------------------	--

Access Platform 3.672 m (12 ft.)	
----------------------------------	--

##### B. Prepare

(1) Take the precautions described in the previous WARNING paragraph.

(2) On Flight Control Unit on overhead panel, place BLUE INVERTER and GREEN INVERTER switches in INV OFF position.

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- (3) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER		MAP REF.
PFCs ALL SURFACES MON GRN SUP	1-213	1C	54	N13
PFCs ALL SURFACES MON BLUE SUP	5-213	2C	54	E12
PFCs INV GRN FAIL IND	1-213	1C	73	M15
PFCs INV BLUE FAIL IND	5-213	2C	73	E11

### C. Test

- (1) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing)
- (2) On Flight Control Unit, MECH JAM warning light shall illuminate.
- (3) Set Flight Controls in Blue electrical mode (Ref. 27-00-00, Servicing).
- (4) Press MECH JAM warning light which shall extinguish.
- (5) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing - Procedure to set Flight Controls in Electrical Mode).
- (6) Place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position.
- (7) Disconnect electrical power unit and de-energize the aircraft electrical network (Ref. 24-41-00, Servicing).

### D. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Remove access platform

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### 3. Electrical Redundancy Test

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	

#### B. Prepare

- (1) On Flight Control Unit on overhead panel, place BLUE INVERTER and GREEN INVERTER switches in INV OFF position.
- (2) Check that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFCs ALL SURFACES MON GRN SUP	1-213	1C 54	N13
PFCs ALL SURFACES MON BLUE SUP	5-213	2C 54	E12
PFCs INV GRN FAIL IND	1-213	1C 73	M15
PFCs INV BLUE FAIL IND	5-213	2C 73	E11

- (3) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing)

#### C. Test

- (1) On Flight Control Unit on overhead panel, MECH JAM warning light shall illuminate.
- (2) Trip circuit breaker 1C54 ; MECH JAM warning light shall remain illuminated.
- (3) Trip circuit breaker 2C54 ; MECH JAM warning light shall extinguish.
- (4) Set circuit breaker 1C54 ; MECH JAM warning light shall illuminate.
- (5) Set circuit breaker 2C54.

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### D. Close-Up

- (1) On Flight Control Unit on overhead panel, place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position.
- (2) Disconnect electrical ground power unit and de-energize the aircraft electrical network (Ref. 24-41-00, Servicing).

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## MAINTENANCE MANUAL

### JAM DETECTION STRUT - INSPECTION/CHECK

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The purpose of the following procedure is to check the jam detection strut of the pitch channel.

#### 2. Jam Detection Strut

##### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Electrical Ground Power Unit	
------------------------------	--

Access Platform 3.672 m (12 ft)	
---------------------------------	--

##### B. Prepare

(1) Take the precautions described in the previous WARNING paragraph.

(2) On overhead panel, on Flight Control Unit, make certain that BLUE INVERTER and GREEN INVERTER switches are in INV OFF position.

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- (3) Open door 121GB, giving access to jam detection struts.
- (4) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFCs ALL SURFACES MON GRN SUP	1-213	1C 54	N13
PFCs ALL SURFACES MON BLUE SUP	5-213	2C 54	E12
PFCs INV GRN FAIL IND	1-213	1C 73	M15
PFCs INV BLUE FAIL IND	5-213	2C 73	E11

### C. Check

- (1) Make certain that there is no end play in the strut attachment to the load limiting mechanism bellcrank. Check lockwiring of bolt nut.
- (2) Make certain that there is no end play in the strut attachment to the tension regulator control bellcrank. Check lockwiring of bolt nut.
- (3) Check attachment of electrical connector.
- (4) Connect electrical ground power unit and energize the aircraft electrical network. (Ref. 24-41-00, Servicing)
- (5) On overhead panel, MECH JAM warning light shall illuminate.
- (6) Set Flight Controls in Blue electrical mode (Ref. 27-00-00, Servicing).
- (7) On overhead panel, press MECH JAM warning light which shall extinguish.
- (8) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing - Procedure to set Flight Controls in electrical mode).
- (9) On overhead panel, MECH JAM warning light shall illuminate.

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- (10) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

### D. Tests

### E. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access doors.
- (3) Remove access platform.

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### MECHANICAL MIXING UNIT - REMOVAL/INSTALLATION

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The mixing unit is located between frames 69 and 70 under the passenger cabin floor. It consists of two independent stages : the upper stage controls the inner elevons and the lower stage controls the middle and outer elevons.

#### 2. Mechanical Mixing Unit

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging pin - Mixing Unit - Servo Control	D92131000
Locking equipment - Cable Tension regulator	D921606000
Cable Grip	D921620000
Zero Rigging Device - Relay Chassis	E925019000
Rigging Pins - Synchro Pack	D925252000

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DESCRIPTION	PART NO.
Rigging Pin - Quadrant	D25422000
Circuit Breaker Safety Clips	
Tensiometer	
Access Platforms 4m (13ft. 7in.) 11.25m (36ft. 11in.)	
Lockwire ; dia 1 mm (0.041 in.) Corrosion Resistant Steel	
Warning Notice	

### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Make certain that pitch, roll and yaw trim controls are in zero position.
- (3) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).
- (4) Remove panel 121FB and immobilize resolvers with rigging pins ;  
Roll : rigging pin D925252001  
Yaw : rigging pin D925252002  
Pitch : rigging pin D925252003.
- (5) Open floor panel 121GB and install equipment E925019010 :  
Roll : E925019012  
Yaw : E925019014  
Pitch : E925019013.
- (6) Remove panel 323NR and immobilize cable quadrant in fin with rigging pin D925422000.
- (7) On RH and LH wings, remove PFCU fairings :  
LH wing : 551JB, 552JB, 553JB  
RH wing : 651JB, 652JB, 653JB.

Disconnect actuating rods from PFCU input levers.

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- (8) Open door 151DB, depressurize the Green, Blue and Yellow hydraulic systems.

WARNING : DISPLAY NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (9) Open floor panel 233JF for access to cable turnbuckles.
- (10) Open floor panels 241HF and 241JF for access to mechanical mixing unit.
- (11) Remove protective casings, 165DZ and 166DZ.

C. Remove (Ref. Fig. 401 )

- (1) Cut lockwire, remove screws (11) and (6), remove cable guides (12) and (5).
- (2) Cut lockwire, remove screws (9), remove cable guide (10).
- (3) Remove locking clips from cable turnbuckles. Turn turnbuckles symmetrically until a tension enabling installation of locking equipment (D921606000) on cable tension regulators is obtained.  
Install equipment D921606000 on pitch, yaw and roll cable tension regulators.
- (4) Slacken cables.
- (5) As soon as cables are sufficiently slackened, separate the junctions of the two yaw cables (safety pin, turnbuckle barrel). Install equipment D921620000.
- (6) When cables are sufficiently slackened, remove cotter pins and nuts (2), retain washers (3), remove bolts (4), disengage cables.
- (7) Cut lockwire and remove screws (8) attaching cable

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guide (7), retain washers, remove cable guide (7) separate yaw cables.

- (8) Remove cotter pins and nut (15), remove washer (14), bonding strip (17), remove bolt (13), disconnect rods (16).
- (9) Remove coppers pins and nuts (18), retain washers (19), remove bolts (21) and (20).
- (10) Disconnect bonding strip (1).
- (11) Remove cotter pin and nut (24), remove washer (23), bolt (22).
- (12) Remove mechanical mixing unit and cable quadrant assembly.

### D. Preparation of Replacement Component

### E. Separation of Quadrant Assembly and Bellcrank Assembly (Ref. Fig. 402 )

- (1) Mark the position of the rods connecting the quadrants to mixing unit bellcranks.  
Remove cotter pin and nuts (30), retain washers (29), disengage bolts (28). Remove rods.
- (2) Remove cotter pins and nuts (33), retain washers (32), remove bolts (31) attaching upper beam (34) to mixing unit support.
- (3) Remove cotter pin and nuts (37), retain washers (36), remove bolts (35) attaching lower beam (38) to mixing unit support (39).
- (4) Separate quadrants from mixing unit bellcranks.

### F. Quadrant and Bellcrank Assembly

- (1) Install bolts (35) attaching lower beam (38) to mixing unit support (39). Install washers (36), tighten nuts (37). Safety with cotter pins.
- (2) Install bolts (31) attaching upper beam (34) to mixing unit support (39). Install washers (32), tighten nuts (33). Safety with cotter pin.
- (3) Install in their initial position, the rods connecting mixing unit bellcranks to cable quadrants.  
Install bolts (28), washers (29), tighten nuts (30).

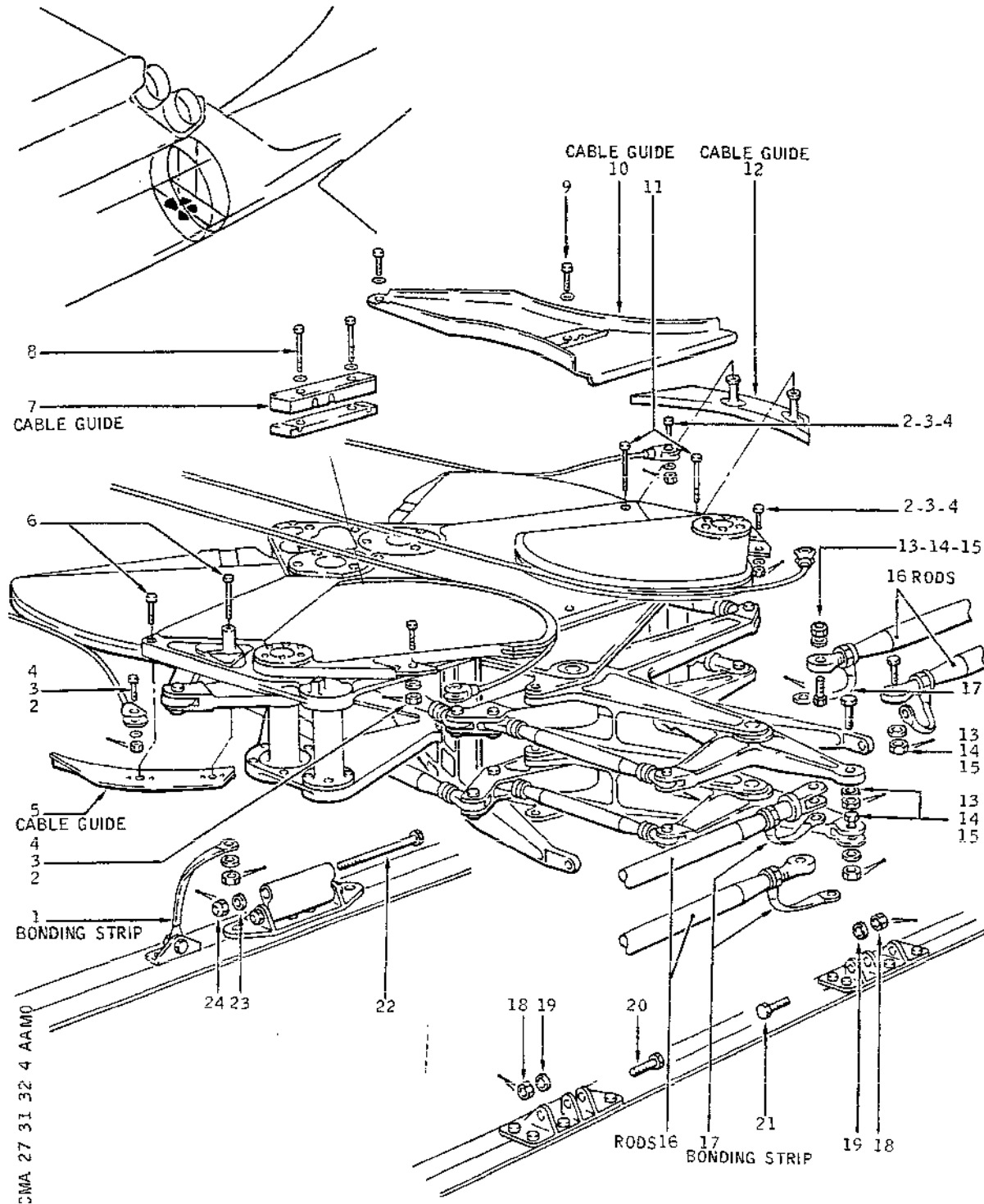
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Mechanical Mixing Unit  
Figure 401

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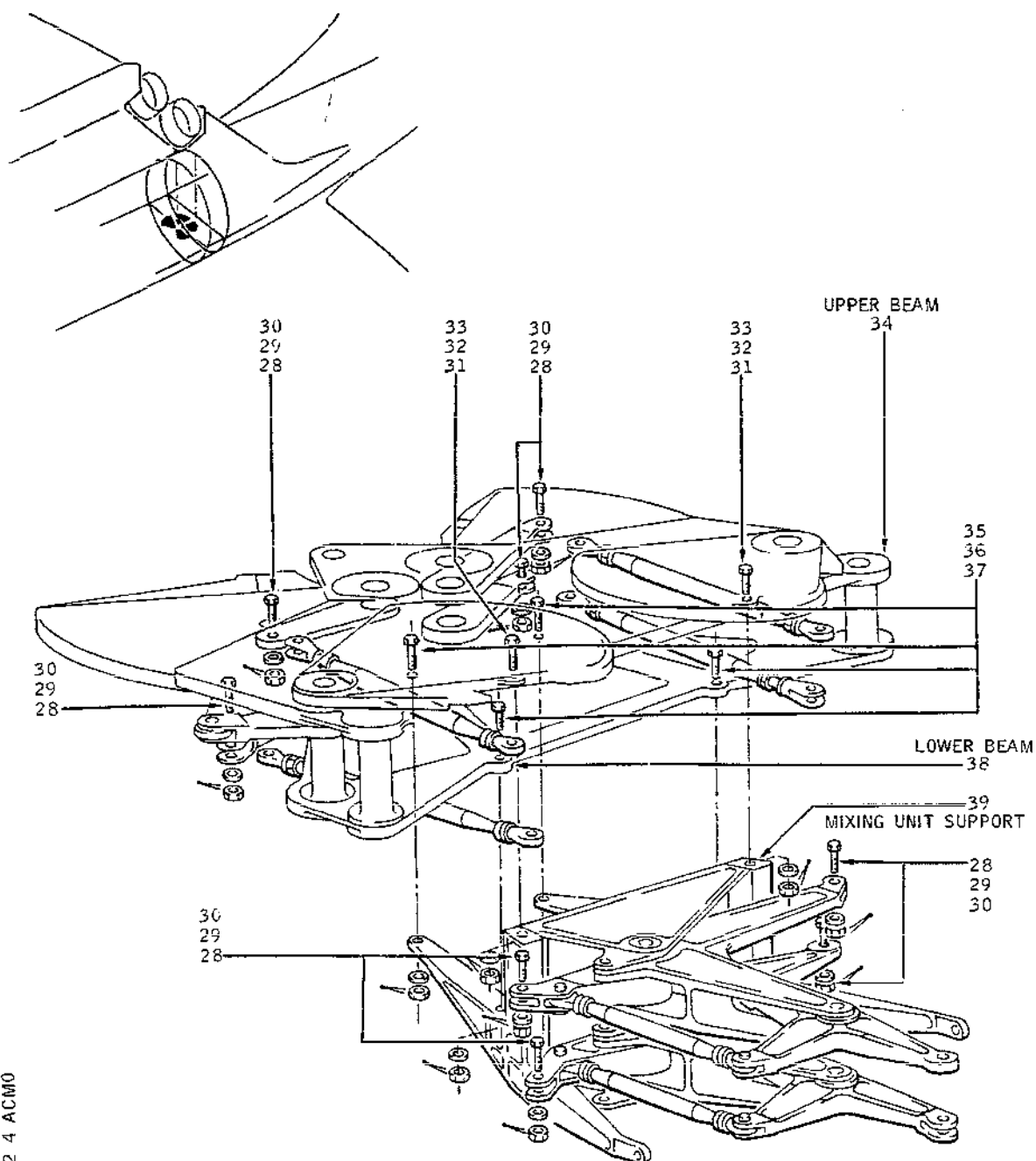
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Separation : Mixing Unit/Cable Quadrants  
Figure 402

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Safety with cotter pin.

- (4) Check that clearances a and b are within limits :  
a- minimum : 0.0197 in. (0.5 mm)  
b- minimum : 0.984 in. (2.5 mm)  
(Ref. Fig. 403 )

### G. Install

- (1) Position quadrant and mixing unit assembly : facing its attachments, on to structure.
- (2) Install bolt (22) into forward attachment.  
Install bolts (21) and (20) into rear attachment.
- (3) Install washer (23), tighten nut (24). Safety with cotter pin.
- (4) Install, washers (19), tighten nuts (18). Safety with cotter pins.
- (5) Install bonding strip (1).
- (6) Connect the rods (16) to mixing unit bellcranks. For each rod, install bolt (13), bonding strip (17), washer (14), tighten nut (15). Safety with cotter pin.

NOTE : Bolt (13) of RH upper rod will be fitted head downwards.

- (7) Assemble yaw cable junctions at the level of floor panel, tighten cables slightly.
- (8) Install cable guide (7), make certain that cables are free in their sheath. Install washers, tighten and wirelock screws (8).
- (9) Connect cables to roll and pitch quadrants, bolts (4), washers (3), nuts (2). Safety with cotter pin.
- (10) Install cable guide (10), tighten and wirelock screws (9).
- (11) Install cable guides (5) and (12), tighten and wirelock screws (6) and (11).
- (12) Remove equipment D921620000
- (13) Insert rigging pin D921310000 in mixing unit.

WARNING : WHEN INSERTING AND REMOVING PINS TAKE ALL

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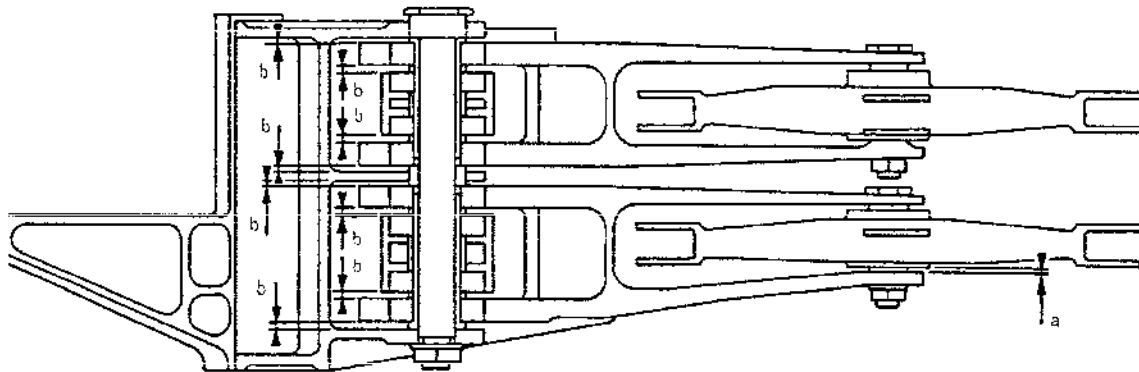
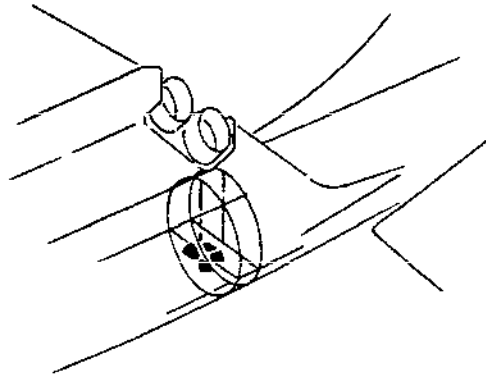
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CMA 27 31 32 4 ADMO

Mixing Unit Assembly Clearances  
Figure 403

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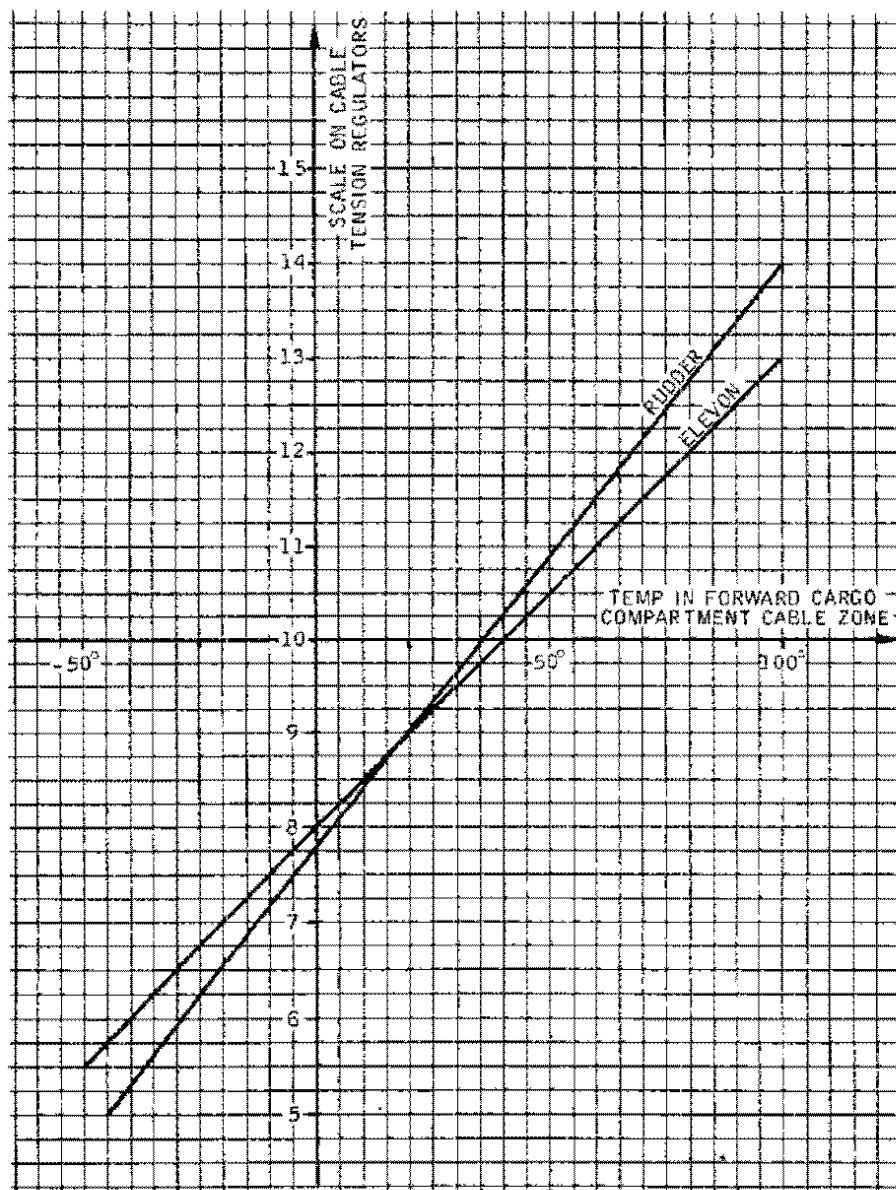
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CMA 27 31 32 4 AEMO

Cable Tension Adjustment Graph  
Figure 404

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NECESSARY PRECAUTIONS IN ORDER TO AVOID  
INTRODUCING INADVERTENTLY TOOLS OR MISCELLANEOUS ITEMS IN MIXING UNIT.

- (14) Adjustment of Cable Tension  
(Ref. Fig. 404 )
- (a) Cable tension regulator locking equipment maintains the 2 flanges at adjustment mark 10.
  - (b) Tighten turnbuckles symmetrically until sufficient and balanced tension of the two cables is obtained, enabling rigging pins of cable tension regulator locking equipment D921606000 to be removed without effort.
  - (c) Remove locking equipment D921606000 from cable tension regulators.
  - (d) Adjust cable tension according to compartment temperature, as per adjustment graph.  
TENSION : 25 daN (56.2 lbf).
  - (e) Make certain that cable tension is equally distributed between cables by removing rigging pins E925019012, E925019014, E925019013, rigging pin D921310000 on mixing unit and rigging pin D925422000 on cable quadrant in fin (easy removal of pins).
  - (f) Safety turnbuckles.
- (15) Make certain that control rod and bellcrank at RIB24 and control rod and bellcrank at RIB9 can be immobilized easily with rigging pins D921311000 and D921337000.  
If not, adjust rod between rod and bellcrank assemblies at RIB24 and RIB26, or rod between rod and bellcrank assembly at RIB15 and RIB19 (Ref. 27-31-00, Adjustment/Test).
- (16) Remove items of equipment E925019013, E925019014, E925019012 and E925019010. Remove rigging pin D921310000 from mixing unit and rigging pin D925422000 from cable quadrant in fin. Remove rigging pins D925252001, D925252002, D925252003 from resolvers.
- (17) Remove warning notices.
- (18) Connect actuating rods to PFCU input levers.  
PFCU at RIB24 : Torque to between 0.25 and 0.30 m.daN

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(23 and 26.541 lbf.in.).

PFCU at RIB3 and 9 : Torque to between 0.31 and 0.37 m.daN (27.42 and 32.73 lbf.in.).

Safety with cotter pin.

(19) Check that clearances a and b are within limits :

a : clearance between panel rail and mixing unit lever

Nominal clearance : 0.3937 in. (10 mm)

Minimum clearance : 0.2756 in. ( 7 mm)

b : clearance between Teflon cable guide and cable  
(safety allowance)

Nominal clearance : 0.1181 in. ( 3 mm)

Minimum clearance : 0.0984 in. ( 2.5 mm).

(Ref. Fig. 405 )

### H. Tests

(1) Carry out operational tests

27-11-00, Adjustment/Test

27-21-00, Adjustment/Test

27-31-00, Adjustment/Test.

(2) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### I. Close-Up

(1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2) Install protective casings.

(3) Install PFCU fairings 551JB, 552JB, 553JB, 651JB, 652JB, 653JB.

(4) Close floor panels 241HF, 233JF, 241JF.

(5) Close access doors and panels 121FB, 121GB, 323NR, 151DB.

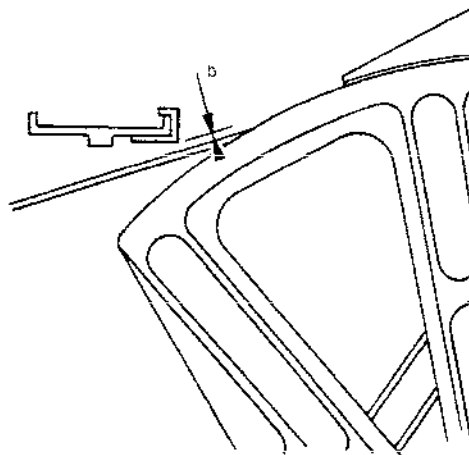
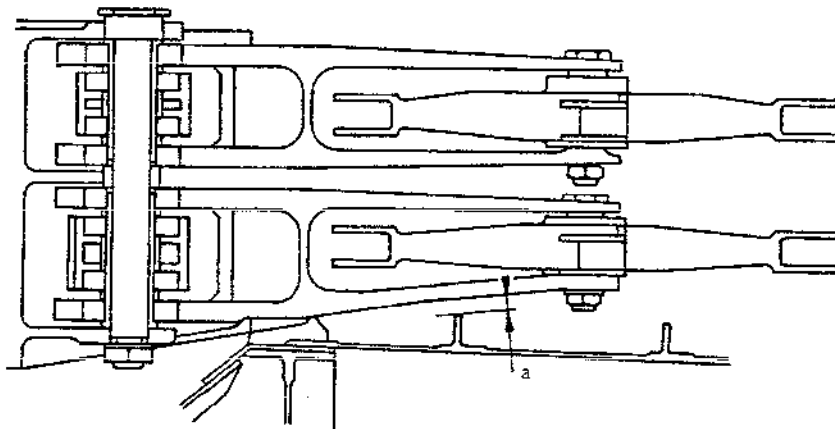
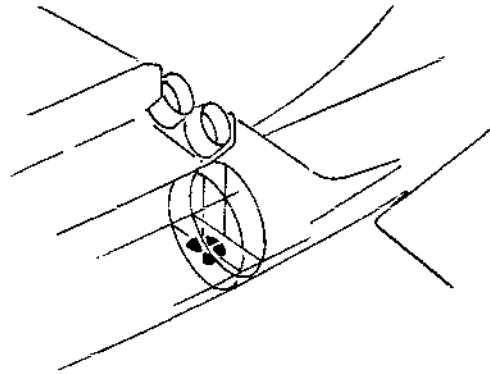
(6) Remove access platforms.

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CMA 27 31 32 4 ACMO

Mixing Unit Clearances  
Figure 405

R

EFFECTIVITY: ALL

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# *Concorde*

## MAINTENANCE MANUAL

### CONTROL ROD AND BELLCRANK AT WING RIB26 REMOVAL/INSTALLATION

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

Rod and bellcrank assembly, at wing RIB26, transmits movements of the elevon control linkage.

#### 2. Control Rod and Bellcrank at Wing RIB26

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging pin - Torque Tube at RIB24	D921311000
Rigging pin - Torque Tube at RIBS3 and 9	D921337000
Rigging Pin - Mixing Unit Servo Control	D921310000
Rigging Pins - Synchro Pack	D925252000
Access Platforms 3.084 m (10 ft. 1 in.) 2.70 m (8 ft. 9 in.)	

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

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### DESCRIPTION

### PART NO.

---

Lockwire, dia. 1 mm (0.041 in.)  
Corrosion Resistant Steel

Circuit Breaker Safety Clips

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).
- (3) Check that trim controls are in zero position.
- (4) Remove panel 121FB, immobilize Roll and Pitch resolvers with rigging pins D925252001 and D925252003.
- (5) Open floor panel 241HF and immobilize mixing unit with rigging pin D921310000.

WARNING : WHEN INSERTING AND REMOVING PINS TAKE ALL NECESSARY PRECAUTIONS IN ORDER TO AVOID INTRODUCING INADVERTENTLY TOOLS OR MISCELLANEOUS ITEMS IN MIXING UNIT.

- (6) The following operations are carried out on RH or LH wing, depending on the rod and bellcrank assembly to be removed.
  - (a) Remove PFCU fairings : 551JB, 552JB, 553JB for LH wing or 651JB, 652JB, 653JB for RH wing.
  - (b) At the level of the input levers, disconnect the actuating rods from the PFCU input levers.
- (7) Stop pressurization of hydraulic systems (Ref. 27-00-00 Servicing, Procedure to set Flight Controls in electrical mode).
- (8) Open door 151DB and depressurize Blue, Green and Yellow hydraulic systems.

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS USED, DISPLAY A WARNING NOTICE ON THIS UNIT, PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

(9) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

(10) Immobilize rod and bellcrank assemblies at RIBS24 and 9 with rigging pins D921311000 and D921337000.

(11) Open doors 541AB or 641AB, access to control bellcranks at RIB26.

NOTE : During Removal/Installation procedure, for installing or removing rod attachment bolts, it is necessary to press plunger on head of bolt to release retaining balls.

#### C. Remove

- (1) Remove cotter and unscrew nuts (2) ; remove washers (3) and bolts (4). Disconnect rods (1) and (9).
- (2) Remove cotter and unscrew nuts (5) ; remove washers (6) and bolts (7).
- (3) Disengage control crank assembly (10) complete with upper and lower supports (11) and (8).
- (4) Remove the upper support.
- (5) Remove cotter and unscrew nut (13) ; remove washer (12).
- (6) Remove the lower support.

#### D. Preparation of Replacement Component

EFFECTIVITY: ALL

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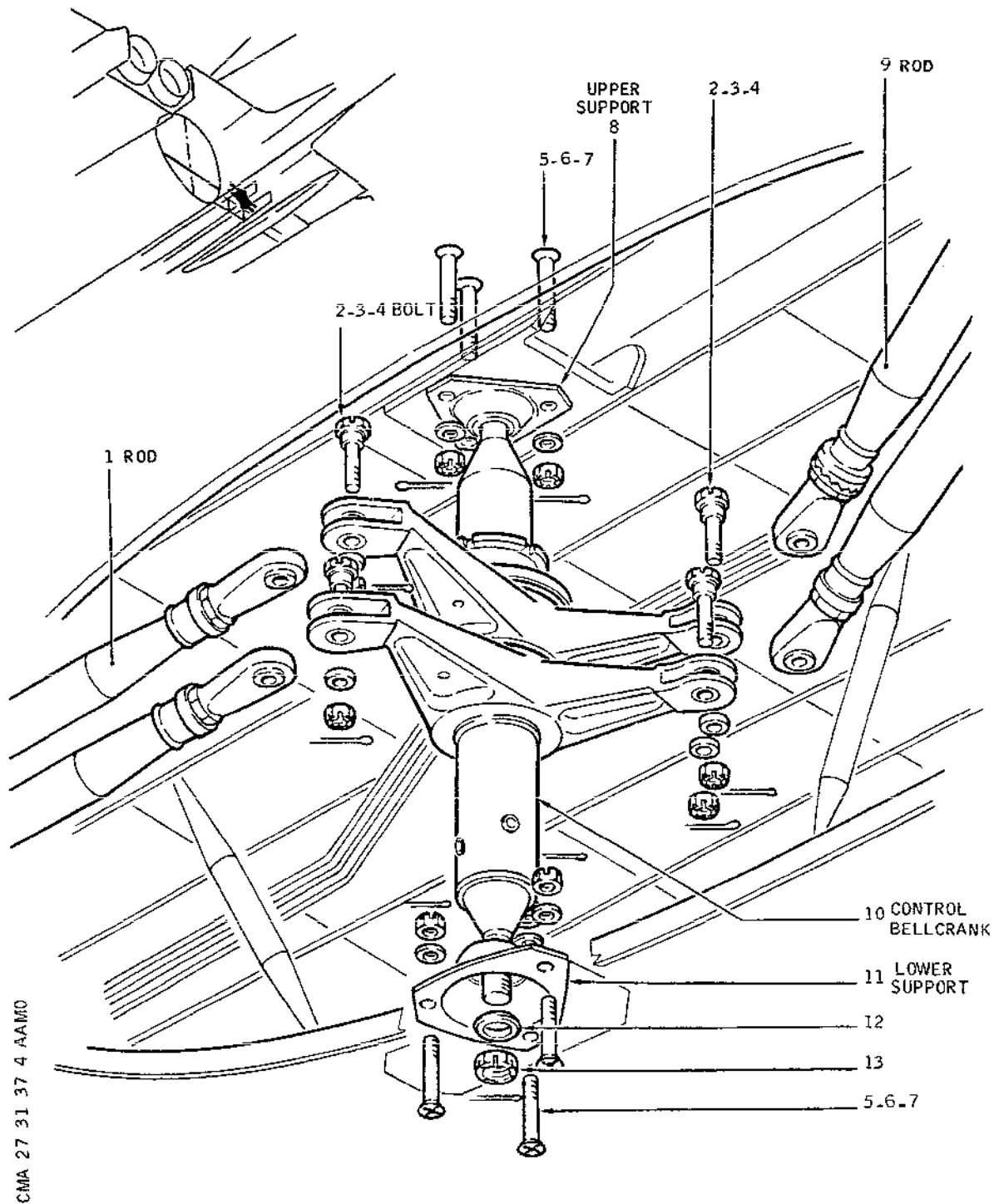
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Control Rod and Bellcrank at Wing RIB26  
Figure 401

EFFECTIVITY: ALL

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### E. Install

- (1) Assemble lower support (11) and control crank (10) ; install washer (12) and tighten nut (13).  
Torque to between : 1.6 and 1.78 m.daN (141.55 and 150.5 lbf.in.).  
Safety with cotter.
- (2) Assemble upper support (8) on crank (10).
- (3) Install the crank assembly in its location, on its supports.
- (4) Install bolts (7), washers (6) and tighten nuts (5).  
Safety with cotters.
- (5) Connect actuating rods (1) and (9) ; install bolts (4) and washers (3). Tighten nuts (2) and safety with cotters.

If control rods cannot be connected easily to rod and bellcrank assembly, adjust length of upper rod between RIB24 and RIB26 and rod between RIB19 and RIB15. (When adjustment is completed, wirelock rod ends as per 20-21-13).

- (6) Connect actuating rods to PFCU input levers.  
  
PFCU at RIB24. Torque to between 0.25 and 0.30 m.daN (23 and 26.541 lbf.in.).  
PFCU at RIB3 and 9. Torque to between 0.31 and 0.37 m.daN (27.425 and 32.733 lbf.in.).  
Safety with cotter pin.
- (7) Remove warning notices.
- (8) Set circuit breaker M626, Panel 15-216, Map Ref. F22.
- (9) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).
- (10) Check that rigging pin D921310000 on mixing unit, and rigging pins D921311000 and D921337000 on rod and bellcrank assemblies at RIB24 and 9 can be easily inserted and removed.  
Remove rigging pins D921337000, D921311000, D921310000, D925252001 and D925252003.
- (11) Shut down pressurization of hydraulic systems (Ref. 27-00-00 Servicing, Procedure to set Flight Controls in electrical mode).

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### F. Tests

- (1) Carry out operational tests (Ref. 27-31-00, Adjustment/Test).
- (2) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of miscellaneous items of equipment.
- (2) Install floor panel 241HF.
- (3) Close access doors and panels 121FB, 151DB, 541AB or 641AB.
- (4) Install the PFCU fairings 551JB, 552JB, 553JB, or 651JB, 652JB, 653JB.
- (5) Remove access platforms.

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# Concorde

## MAINTENANCE MANUAL

### CONTROL ROD AND BELLCRANK AT WING RIB24 - REMOVAL/INSTALLATION

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The rod and bellcrank assembly, at wing RIB24, transmits the movements of the control linkage.

#### 2. Control Rod and Bellcrank at Wing RIB24

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins - Synchro Pack	D925252000
Rigging Pin - Mixing Unit Servo Control	D921310000
Rigging Pin - Torque Tube at RIB24	D921311000
Rigging Pin - Torque Tube at RIBS3 and 9	D921337000
Access Platform 3.084 m (10 ft.1 in.) 2.70 m (8 ft.9 in.)	
Circuit Breaker Safety Clips	

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DESCRIPTION	PART NO.
-------------	----------

Lockwire Dia. 1. mm (0.041 in.)  
Corrosion Resistant Steel

### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Set Flight Controls in electrical mode (Ref.27-00-00, Servicing).
- (3) Check that trim controls are at zero position. Remove access panel 121FB and immobilize pitch and roll resolvers with rigging pins D925252001 and D925252003.
- (4) Open floor panel 241HF and immobilize mixing unit with rigging pin D921310000.

WARNING : WHEN INSERTING AND REMOVING PINS TAKE ALL NECESSARY PRECAUTIONS IN ORDER TO AVOID INTRODUCING INADVERTENTLY TOOLS OR MISCELLANEOUS ITEMS IN MIXING UNIT.

NOTE : The following operations are carried out on RH or LH wing, according to the rod and bell-crank assembly to be removed.

- (5) Remove PFCU fairings ; 551JB, 552JB, 553JB for LH wing or 651JB, 652JB, 653JB for RH wing.
- (6) At PFCU input levers, disconnect the PFCU actuating rods.
- (7) Shut down pressurization of hydraulic systems. (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in electrical mode).
- (8) Open door 151DB and depressurize Blue, Green and Yellow hydraulic systems.

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S

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## MAINTENANCE MANUAL

STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

(9) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

(10) At RIB9, immobilize rod and bellcrank control assembly with rigging pin D921337000.

(11) Open door 541AB or 641AB allowing access to rod and bellcrank assembly at wing RIB24.

NOTE : For removing or inserting attachment bolts it is necessary to press plunger on head of bolt in order to free the locking system balls.

C. Remove - LH Wing

\*\*ON A/C 002-002,  
(Ref. Fig. 401 )

After SB 27-011 For A/C 002-002,  
(Ref. Fig. 402 )

- (1) Remove cotter and unscrew nut (6) ; remove washers (7) and bolt (8). Disconnect rod (5) from upper crank (4). Remove cotter and unscrew nut (43), remove bolt (41) and rod (40) from lower crank (23).
- (2) Remove cotter and unscrew nut (31) ; remove washer (32) and bolt (33). Disconnect rod (30) from double crank (19).
- (3) Remove cotter and unscrew nut (16) ; remove washer (17). Remove bolt (18) and disconnect rod (15) from double crank (19).

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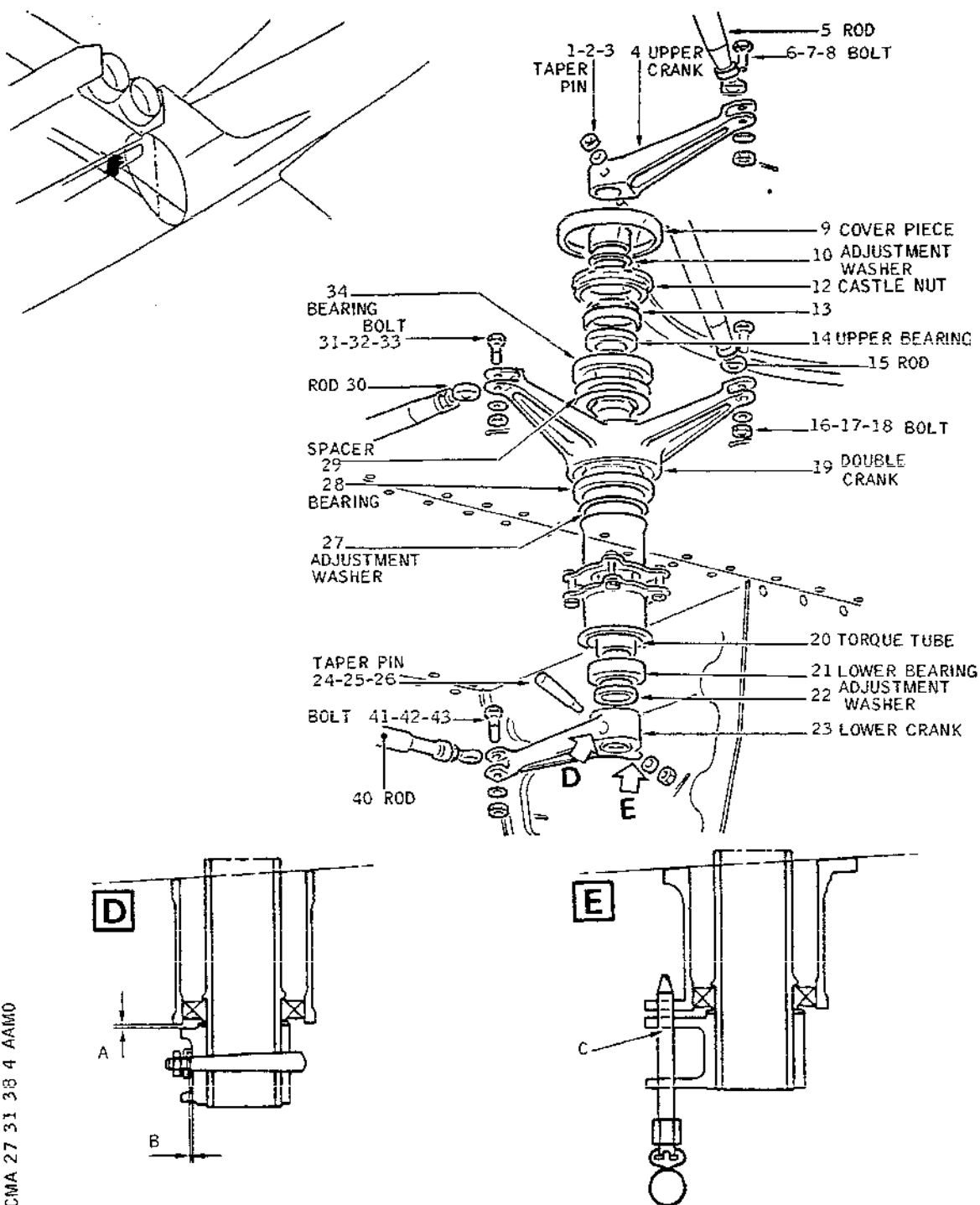
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CMA 27 31 38 4 AAM0

Rod and Bellcrank Assembly at Wing RIB24, LH. side  
Figure 401

R EFFECTIVITY: 002-002,

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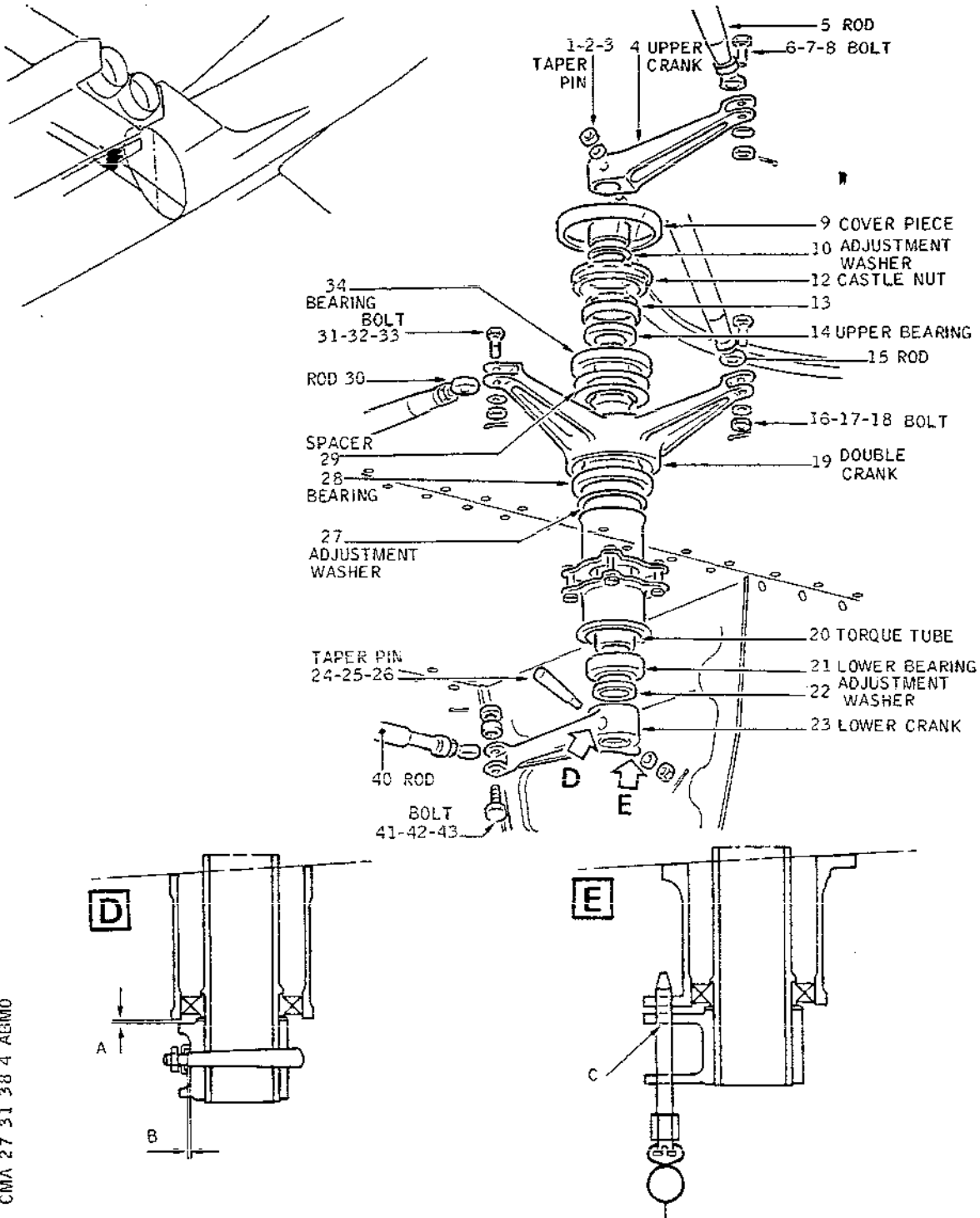
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## MAINTENANCE MANUAL



Rod and Bellcrank Assembly at Wing RIB24 - LH.side  
Figure 402

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- (4) Remove cotter and unscrew nut (1) and remove washer (2).  
Drive out taper pin (3) and remove upper crank (4).
- (5) Remove cover piece (9) and retain washer (10).
- (6) Cut and remove lockwire and unscrew castle nuts (12) and (13).
- (7) Remove double crank (19), retaining spacer (29), washer (27) and bearings (28) and (34).
- (8) Remove cotter and unscrew nut (24), remove washer (25) and drive out taper pin (26).
- (9) Remove lower crank (23), retain washer (22).
- (10) Remove torque tube (20) by pulling it downwards.  
Retain upper and lower bearings (14) and (21).

### D. Preparation of Replacement Component

### E. Install - LH Wing

- (1) Install torque tube (20) inside its barrel.
- (2) Install upper and lower bearings (14) and (21).
- (3) Install washer (27) in upper barrel.
- (4) Install lower bearing (28) of double crank (19).
- (5) Install double crank (19), making certain that lower bearing (28) is correctly engaged in its housing.
- (6) Install spacer (29).
- (7) Install upper bearing (34) of double crank (19).
- (8) Tighten castle nut (13). Torque to between 3 and 4 m.daN (24 and 30 lbf.in.).
- (9) Tighten castle nut (12). Torque to between 3 and 4 m.daN (24 and 30 lbf.in.).
- (10) Safety castle nuts (12) and (13) with lockwire, also passing it through the upper barrel.
- (11) Install washer (10) and cover piece (9).
- (12) Install upper crank (4). Install taper pin (3),

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washer (2) and tighten nut (1). Safety with cotter.

- (13) Install washer (22).
  - (14) Install lower crank (23) and check that clearance A is not less than 1 mm (0.0393 in.). Install taper pin (26), washer (25) and tighten nut (24). Safety with cotter. Check that Dimension B (maximum projection of taper pins) is not greater than 1.5 mm (0.0591 in.).
  - (15) Drill and ream rigging hole C (dia 8 mm plus 0.15, 0.10 (0.3150 in. plus 0.0059, 0.0039 in.). Insert rigging pin D921311000 on torque tube at RIB24.
  - (16) Connect end of rod (15) to fork end of double crank (19). Install bolt (18), washer (17) and tighten nut (16). Safety with cotter.
  - (17) Connect end of rod (30) to fork end of double crank (19).  
Install bolt (33), washer (32) and nut (31). Tighten nut and safety with cotter.
  - (18) Connect end of rod (5) to fork end of crank (4).  
Install bolt (8), washer (7) and nut (6). Tighten nut and safety with cotter.  
Connect rod (40) to lower crank (23), bolt (41), washer (42), nut (43). Safety with cotter pin.
- NOTE : Make certain that bolts at rod to crank attachment points can be inserted freely. If required, adjust length of rods (30) and (5). Tighten and safety rod ends with lockwire (Ref. 20-21-13).
- (19) Connect PFCU actuating rods to PFCU input levers.  
  
PFCU, RIB24 : Torque to between 0.25 and 0.30 m.daN (23 and 26.541 lbf.in.).  
PFCU, RIBS3 and 9 : Torque to between 0.31 and 0.37 m.daN (27.425 and 32.733 lbf.in.). Safety with cotter.
  - (20) Remove warning notices.
  - (21) Set circuit breaker M626.
  - (22) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).
  - (23) Check that rigging pin D921310000 on mixing unit and rigging pins D921311000 and D921337000 on rod and bell-crank assemblies at RIBS24 and 9 can be easily inser-

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ted or removed.

Remove pins D921311000, D921337000, D921310000,  
D925252001, D925252003.

- (24) Shut down pressurization of hydraulic systems.  
(Ref. 27-00-00, Servicing. Procedure to set Flight  
Controls in electrical mode).

### F. Remove - RH Wing

\*\*ON A/C 002-002,  
(Ref. Fig. 403 )

After SB 27-011 For A/C 002-002,

(Ref. Fig. 404 )

- (1) Remove cotter and unscrew nut (5) ; remove washer (6) and bolt (7). Disconnect rod (4) from upper crank (8). Remove cotter and unscrew nut (43), remove bolt (41). Disconnect rod (40) from lower crank (22).
- (2) Remove cotter and unscrew nuts (9) ; remove washers (10) and bolts (11).  
Disconnect rods (28) and (12) from crank (13).
- (3) Remove cotter and unscrew nut (1) and remove washer (2).  
Drive out taper pin (3) and remove upper crank (8).
- (4) Remove cover piece (31) and retain washer (30).
- (5) Cut and remove lockwire and unscrew castle nuts (29) and (25).
- (6) Remove crank (13), retaining spacer (15), washer (17) and bearings (14) and (16).
- (7) Remove cotter and unscrew nut (19), retain washer (20) and drive out taper pin (21).
- (8) Remove lower crank (22), retain washer (23).
- (9) Remove torque tube (24) by pulling it downwards.  
Recover upper and lower bearings (26) and (18).

### G. Preparation of Replacement Component

### H. Install - RH Wing

- (1) Install torque tube (24) inside its barrel.

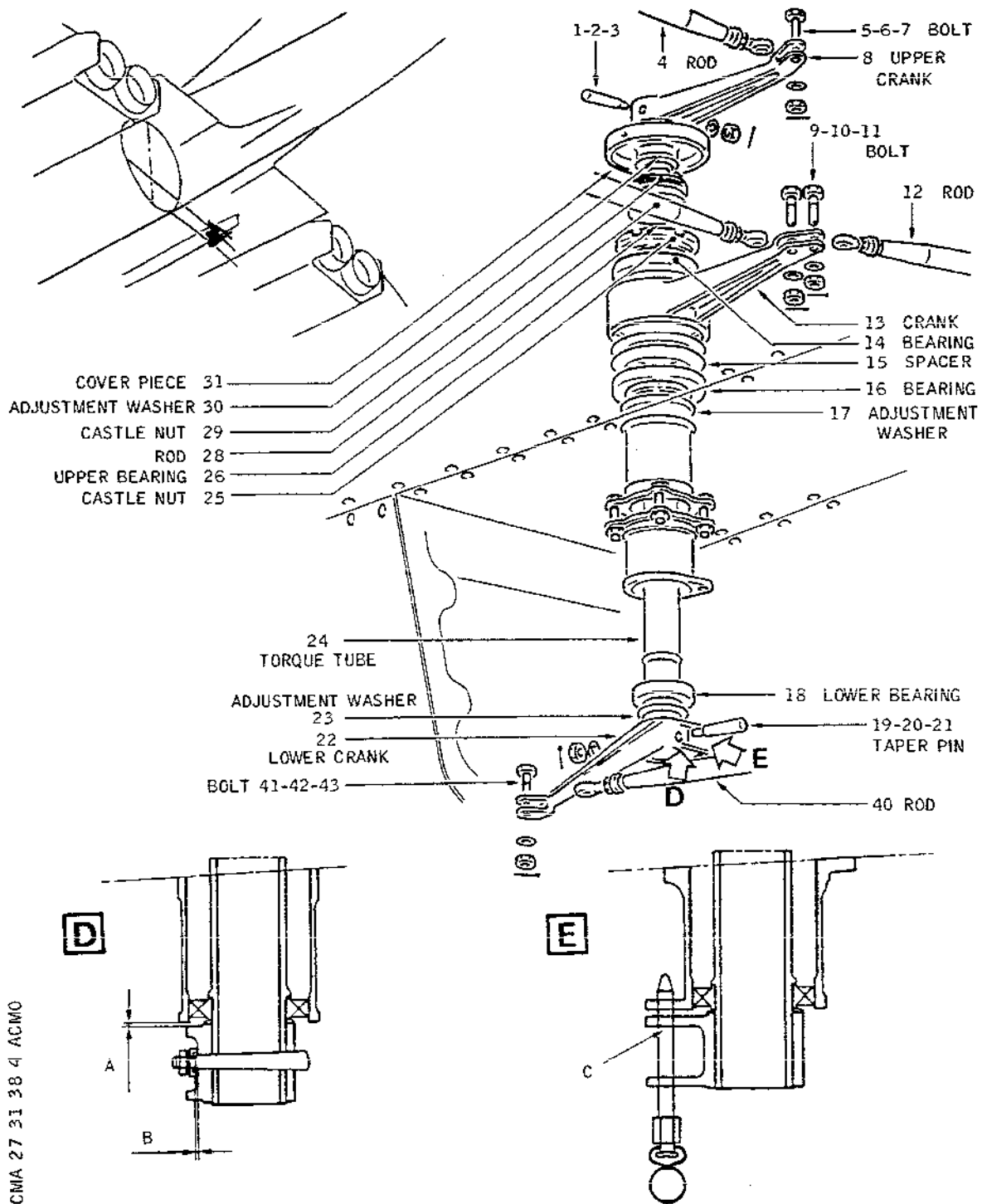
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Control Rod and Bellcrank at Wing RIB24 - RH side  
Figure 403

R EFFECTIVITY: 002-002,

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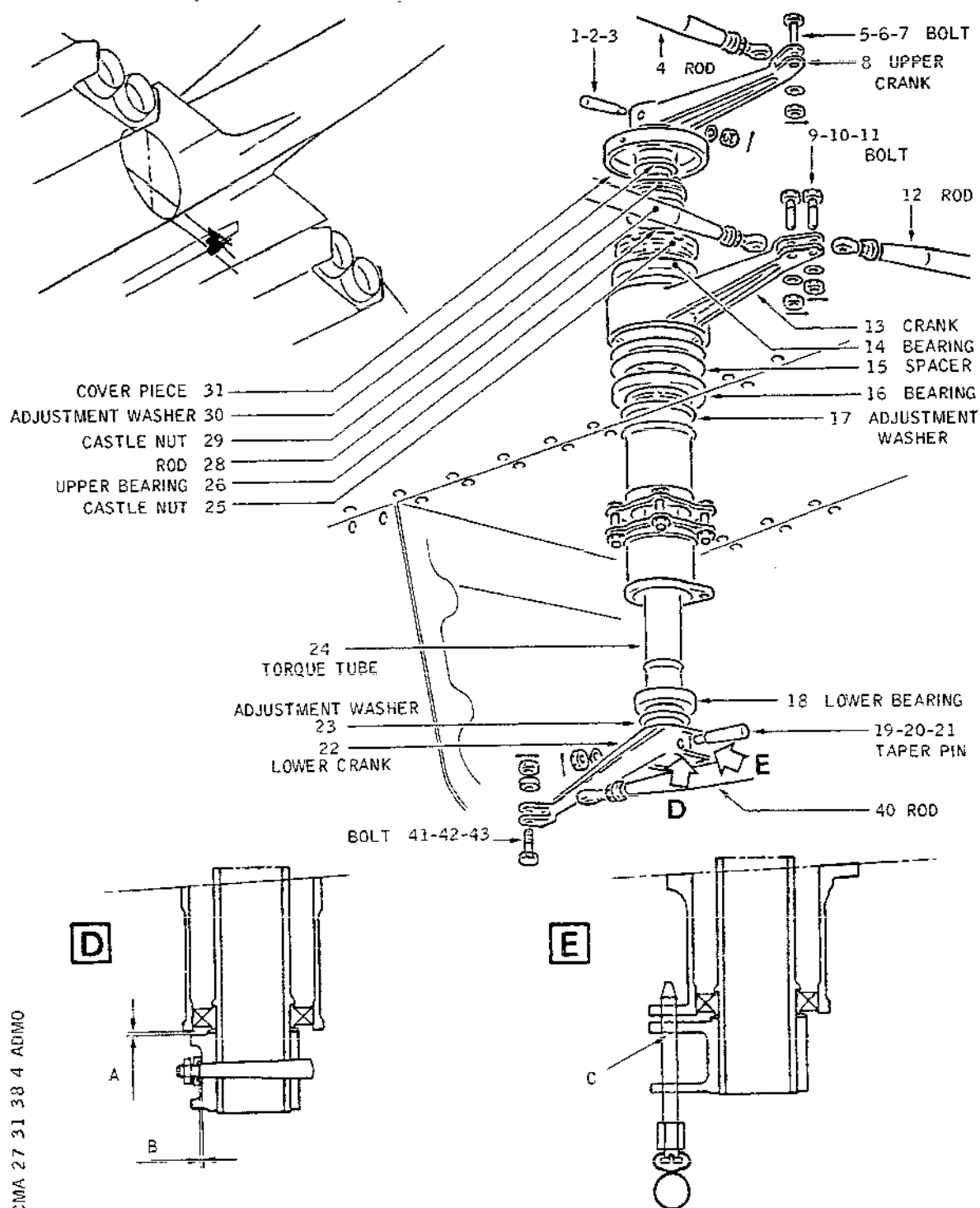
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CMA 27 31 38 4 ADMO

Control Rod and Bellcrank at Wing RIB24 - RH side  
Figure 404

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- (2) Install upper and lower bearings (26) and (18).
- (3) Install washer (17) on upper barrel.
- (4) Install lower bearing (16) of crank (13).
- (5) Install crank (13), making certain that lower bearing (16) is correctly engaged in its housing.
- (6) Install spacer (15).
- (7) Install upper bearing (14) of crank (13).
- (8) Tighten castle nut (29). Torque to between 3 and 4 m.daN (24 and 30 lbf.in.).
- (9) Tighten castle nut (25). Torque to between 3 and 4 m.daN (24 and 30 lbf.in.).
- (10) Safety castle nuts (29) and (25) with lockwire, also passing it through the upper barrel.
- (11) Install washer (30) and cover piece (31).
- (12) Install upper crank (8). Install taper pin (3), washer (2) and tighten nut (1). Safety with cotter.
- (13) Install washer (23). This washer is used to obtain required clearance A.
- (14) Install lower crank (22) and check that clearance A is not less than 1 mm (0.0393 in.). Install taper pin (21), washer (20) and tighten nut (19). Safety with cotter. Check that dimension B (projection of taper pins) does not exceed 1.5 mm (0.059 in.).
- (15) Drill and ream rigging hole C (dia. 8 mm plus 0.15, 0.10 (0.3150 in. plus 0.0059, 0.0039). Insert rigging pin D921311000 in torque tube at RIB24.
- (16) Connect end of rods (28) and (12) to fork end of crank (13). Install bolts (11), washers (10) and tighten nuts (9). Safety with cotteners.
- (17) Connect end of rod (4) to fork end of upper crank (8). Install bolt (7), washer (6) and nut (5). Tighten nut and safety with cotter.  
Connect rod (40) to lower crank (22) ; bolt (41) washer (42), nut (43). Safety with cotter pin.

NOTE : Make certain that bolts at rod to crank attach-

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ment points can be inserted freely. If required, adjust length of rod (4) and rod at RIB19. Tighten and safety rod ends with lockwire (Ref. 20-21-13).

- (18) Connect PFCU actuating rods to PFCU input levers.

PFCU, RIB24. Torque to between 0.25 and 0.30 m.daN (23 and 26.541 lbf.in.).

PFCU, RIBS9 and 3. Torque to between 0.31 and 0.37 m.daN (27.425 and 32.733 lbf.in.). Safety with cotter.

- (19) Remove warning notices.

- (20) Set circuit breaker M626.

- (21) Set Flight Controls in electrical mode. (Ref. 27-00-00, Servicing).

- (22) Check that rigging pin D921310000 on mixing unit and rigging pins D921311000 and D921337000 on rod and bell-crank assemblies at RIBS24 and 9 can be easily inserted or removed.

Remove rigging pins D921311000, D921337000, D921310000, D925252001, D925252003.

- (23) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in electrical mode).

### I. Tests

- (1) Carry out an operational test (Ref. 27-31-00, Adjustment/Test).

- (2) Make certain that clearance between RIB24 and upper crank is within the following limits when control is in maximum position :

Nominal clearance 10 mm (0.3937 in.)

Minimum clearance 7 mm (0.2756 in.)

- (3) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### J. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

- (2) Install fairings 551JB, 552JB, 553JB for LH wing or

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651JB, 652JB, 653JB for RH wing.

- (3) Install floor panels 241HF.
- (4) Close access doors and panels 121FB, 151DB, 541AB or 641AB.
- (5) Remove access platforms.

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## MAINTENANCE MANUAL

### CONTROL ROD AND IDLER ARM AT WING RIB22 - REMOVAL/INSTALLATION

**WARNING :** MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The rod and bellcrank assembly, at wing RIB 22, transmits movements of the elevon control linkage.

#### 2. Control Rod and Bellcrank at Wing RIB22

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pin - Mixing Unit Servo Control	D921310000
Rigging Pin - Torque Tube at RIBS3 and 9	D921337000
Rigging Pins - Synchro Pack	D925252000
Access Platforms 3.084 m (10 ft. 1 in.) 2.70 m (8 ft. 9 in.)	
Circuit Breaker Safety Clips	

EFFECTIVITY: ALL

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### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).
- (3) Check that trim controls are set to zero ; remove access panel 121FB and immobilize roll and pitch resolvers with rigging pin D925252001 and D925252003.
- (4) Open floor panel 241HF and immobilize mixing unit with rigging pin D921310000.

WARNING : WHEN INSERTING AND REMOVING PINS TAKE ALL NECESSARY PRECAUTIONS IN ORDER TO AVOID INTRODUCING INADVERTENTLY TOOLS OR MISCELLANEOUS ITEMS IN MIXING UNIT.

NOTE : The following steps are carried out on RH or LH wing, according to the rod and bellcrank assembly to be removed.

- (5) Remove PFCU fairings 552JB, 553JB for LH wing or 652JB, 653JB for RH wing.
- (6) Disconnect actuating rods of outer and middle elevon PFCU at PFCU lever level.

NOTE : For removing or inserting rod attaching bolts, it is necessary to press plunger located on head of bolt to free the locking system balls.

- (7) Shut down pressurization of hydraulic systems. (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in electrical mode).
- (8) Open door 151DB and depressurize Blue, Green and Yellow hydraulic systems.

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNec-

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TED, DISPLAY A WARNING NOTICE ON THIS UNIT  
PROHIBITING PRESSURIZATION OF THE AIRCRAFT  
HYDRAULIC SYSTEMS.

- (9) Trip, safety and tag the following circuit breaker

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

- (10) Immobilize rod and bellcrank control assembly at RIB 9 with rigging pin D921337000.

- (11) Open doors 542 AB or 642AB allowing access to rod and bellcrank assembly at wing RIB 22.

### C. Remove

- (1) Remove cotters and unscrew nuts (4) ; remove washers (5) and bolts (2). Disconnect rods (1) and (3) from crank (6).
- (2) Remove cotter and unscrew nut (9) ; remove washer (8) and bolt (11) . Remove crank (6), retain shim washer (7).

### D. Install

- (1) Install bellcrank assembly (6) on its support (10).
- (2) Install shim washer (7) between lower part of crank and support. Adjust washer if necessary.
- (3) Install bolt (11), washer (8) and tighten nut (9). Torque to between 1.4 and 1.6 m.daN (123.85 and 141.55 lbf.in.). Safety with cotter.
- (4) Connect rods (1) and (3) to crank : Install bolts (2), washers (5) and nuts (4). Tighten nuts and safety with cotters.

NOTE : Rigging pins must be inserted and removed freely on crank. If required, adjust length of rod at RIB 19. Tighten and safety rod ends with lock-wire (Ref. 20-21-13).

EFFECTIVITY: ALL

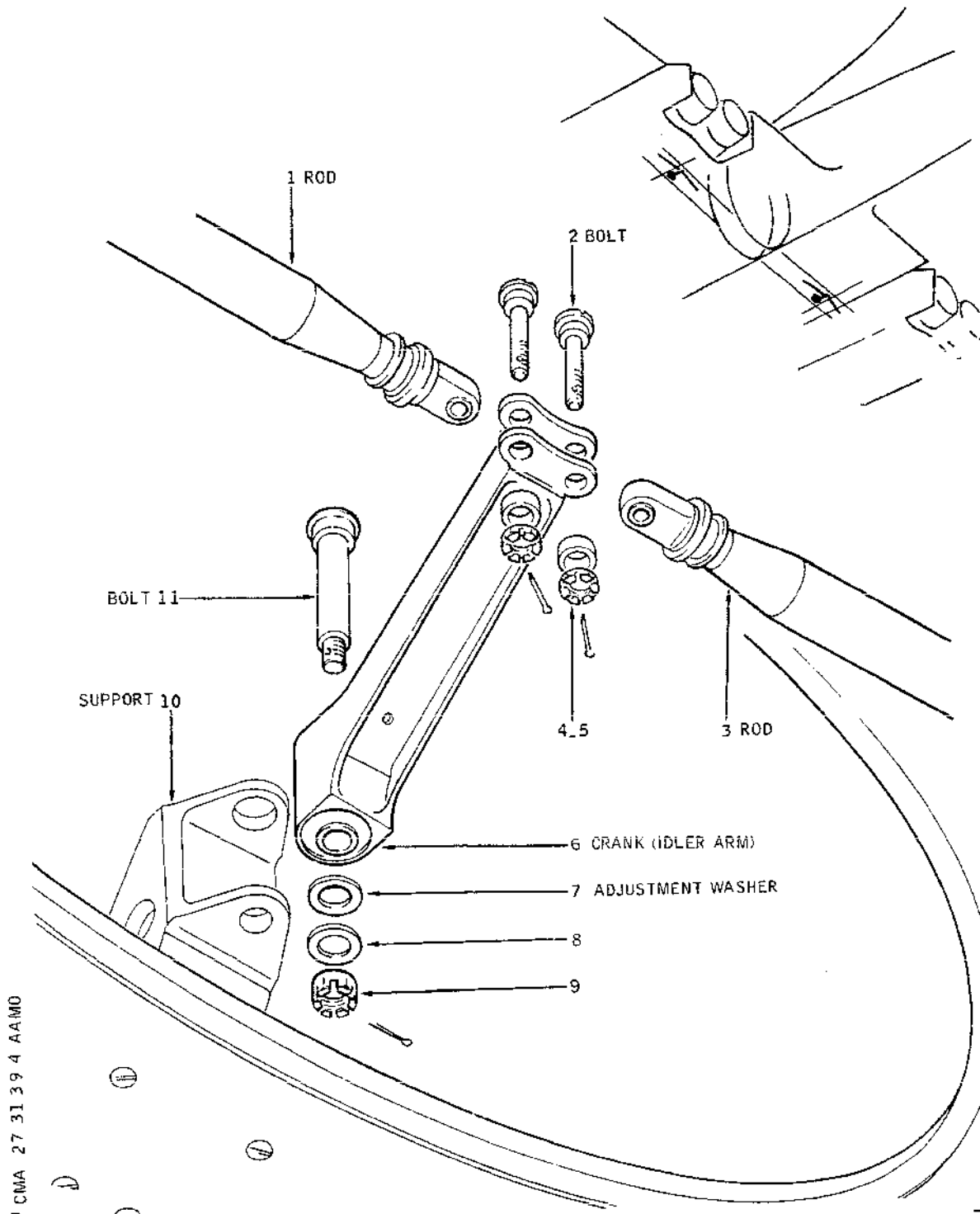
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Control Rod and Idler Arm at Wing rib 22  
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- (5) Connect PFCU actuating rods to PFCU input levers. PFCU at RIB 9 and 3 ; Torque to between 0.31 and 0.37 m.daN (27.425 and 32.733 lbf.in.). Safety with cotter.
- (6) Remove warning notices.
- (7) Remove safety clip and tag and set circuit breaker M 626 panel 15-210, Map Ref. 22.
- (8) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).
- (9) Check that rigging pin D921310000 on mixing unit and rigging pin D921337000 on rod and bellcrank assembly at RIB9 can be easily inserted or removed. Remove the rigging pins D921337000, D921310000, D925252001 and D925252003
- (10) Shut down pressurization of hydraulic systems. (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in electrical mode).

### E. Tests

- (1) Carry out operational tests (Ref. 27-31-00, Adjustment/ Test).
- (2) Check that clearance between support and crank (idler arm) is within the following limits:  
Nominal clearance : 0.1181 in. (3 mm)  
Minimum clearance : 0.0787 in. (2 mm)
- (3) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### F. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Install PFCU fairings 552JB, 553JB or 652JB and 653JB.
- (3) Install floor panels 241HF.
- (4) Close access doors and panels, 151DB, 121FB, 542AB or 642AB.
- (5) Remove access platforms.

EFFECTIVITY: ALL

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### CONTROL ROD AND BELLCRANK AT WING RIB19 - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The rod and bellcrank assembly, at wing RIB 19, transmits movements of the elevon control linkage.

#### 2. Control Rod and Bellcrank at Wing Rib 19

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins - Synchro Pack	D925252000
Rigging Pin - Mixing Unit Servo Control	D921310000
Rigging Pin - Torque Tube at RIBS 3 and 9	D921337000
Access Platforms 3.084 m (10 ft. 1 in.) 2.70 m (8 ft. 9 in.)	
Circuit Breaker Safety Clips	

##### B. Prepare

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- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).
- (3) Check that trim controls are set to zero.
- (4) Remove access panel 121FB and immobilize pitch and roll resolvers with rigging pins D925252003 and D925252001.
- (5) Open floor panel 241HF and immobilize mixing unit with rigging pin D921310000.

WARNING : WHEN INSERTING AND REMOVING PINS TAKE ALL PRECAUTIONS IN ORDER TO AVOID INTRODUCING INADVERTENTLY TOOLS OR MISCELLANEOUS ITEMS IN MIXING UNIT.

- (6) The following steps are carried out on RH or LH wing, according to the rod and bellcrank to be removed.
  - (a) Remove PFCU fairings 552JB, 553JB for LH wing or 652JB, 653JB for RH wing.
  - (b) Disconnect PFCU actuating rods, RIBS 9 and 3, from PFCU input levers.
- (7) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in electrical mode).
- (8) Open door 151DB and depressurize Blue, Green and Yellow hydraulic systems.

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (9) Trip, safety and tag the following circuit breaker :

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22
(10) Immobilize rod and bellcrank assembly at RIB 9 with rigging pin D921337000.			
(11) Open doors 535DT or 635DT, allowing access to rod and bellcrank assembly at wing RIB 9.			
<u>NOTE</u> : During Removal/Installation procedure, in order to remove or insert rod attachment bolts, it is necessary to press plunger on head of bolt to release the locking system balls.			

### C. Remove

- (1) Remove cotter and unscrew nut (10) ; remove washer (9) and bolt (8). Disconnect rod (11) from crank (5).
- (2) Remove cotter and unscrew nut (1) ; remove washer (2) and bolt (3). Disconnect rod (4) from crank (5).
- (3) Remove cotter and unscrew nut (6) ; remove washer (7). Disconnect crank (5) from support-post (12).

### D. Preparation of Replacement Component

Not applicable.

### E. Install

- (1) Install crank (5) on support-post (12). Install washer (7) and tighten nut (6). Torque to between 1.5 and 1.8 m.daN (132.70 and 159.24 lbf.in.). Safety with cotter.
- (2) Install end of rod (4) in fork end of crank (5). Install bolt (3), washer (2) and nut (1). Tighten and safety nut with cotter pin.
- (3) Install end of rod (11) in fork end of crank (5). Adjust lenght of rod, if necessary. Install bolt (8), washer (9) and nut (10). Tighten and safety nut with cotter pin.

EFFECTIVITY: ALL

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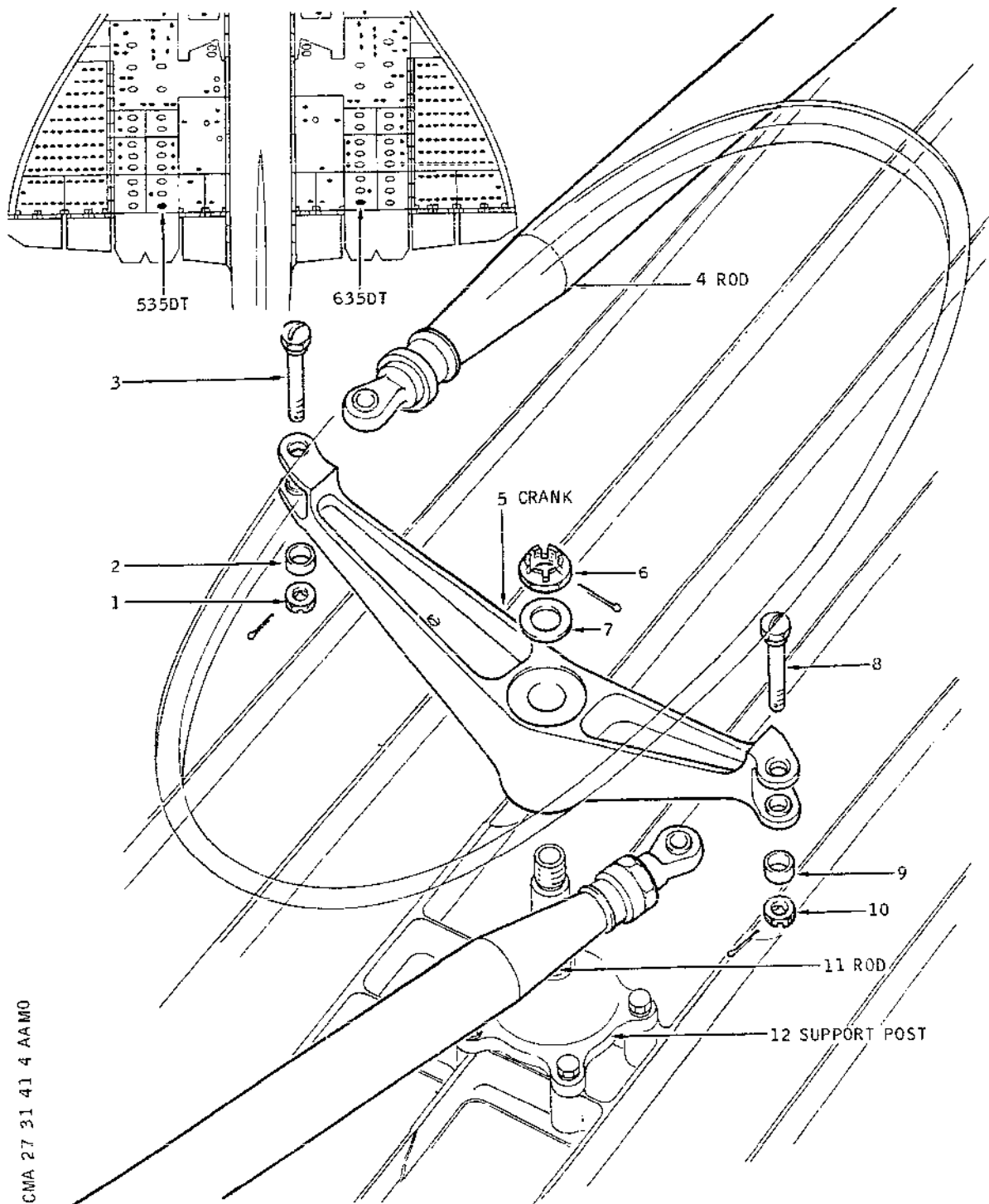
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Control Rod and Bellcrank at wing RIB 19  
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- (4) Connect PFCU actuating rods to input levers. Torque to between 0.31 and 0.37 m.daN (27.425 and 32.733 lbf.in.) Safety with cotter.
- (5) Remove warning notices.
- (6) Remove safety clip and tag and reset circuit breaker M 626 on panel 15-216, Map Ref. F22.
- (7) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).
- (8) Check that rigging pins on mixing unit and rod and bellcrank assembly at RIB 9, can be easily removed and inserted. If not, adjust length of rod (11). Remove rigging pins D921337000, D921310000, D925252003 and D925252001.
- (9) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in electrical mode).

### F. Tests

- (1) Carry out operational tests (Ref. 27-31-00, Adjustment/Test).
- (2) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Install floor panel 291HF.
- (3) Close access doors and panels 535DT, 635DT, 151DB and 121FB.
- (4) Install the PFCU fairings 552JB, 553JB for LH wing. 652JB, 653JB for RH wing.
- (5) Remove access platforms.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### CONTROL ROD AND BELLCRANK AT WING RIB15 - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The rod and bellcrank assembly at wing RIB15 transmits movements of the elevon control linkage.

#### 2. Control Rod and Bellcrank at Wing RIB15

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pin - Synchro Pack	D925252000
Rigging Pin - Mixing Unit Servo Control	D921310000
Rigging Pin - Torque Tube at RIBS3 and 9	D921337000
Access Platforms 3.08m (10 ft. 1 in.) 2.70m (8 ft. 9 in.)	
Circuit Breaker Safety Clips	

##### B. Prepare

EFFECTIVITY: ALL

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- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).
- (3) Check that trim controls are in zero position.
- (4) Remove panel 121FB, immobilize Roll resolvers with rigging pin D925252001 and Pitch resolvers with rigging pin D925252003.
- (5) Open floor panel 241HF and immobilize mixing unit with rigging pin D921310000.

WARNING : WHEN INSERTING AND REMOVING PINS TAKE ALL NECESSARY PRECAUTIONS IN ORDER TO AVOID INTRODUCING INADVERTENTLY TOOLS OR MISCELLANEOUS ITEMS IN MIXING UNIT.

- (6) The following operations are carried out on RH or LH wing according to the rod and bellcrank assembly to be removed.
  - (a) Remove PFCU fairings : 552JB, 553JB for LH wing or 652JB, 653JB for RH wing.
  - (b) Disconnect actuating rods from input levers of PFCUs at RIBS3 and 9.

NOTE : During Removal/Installation procedure, for removing or inserting attachment bolts it is necessary to press plunger located on head of bolt in order to free the retaining balls.

- (7) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in electrical mode).
- (8) Open door 151DB and depressurize Blue, Green and Yellow hydraulic systems.

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

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IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (9) Trip, safety and tag the following circuit breaker.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

- (10) Immobilize rod and bellcrank control assembly at RIB9 with rigging pin D921337000.
- (11) Open doors 536CT or 636CT, access to rod and bellcrank assemblies at wing RIB15.

### C. Remove

- (1) Remove cotter and unscrew nuts (6) ; remove washers (7) and bolts (9). Disconnect rods (5) and (8) from crank (3).
- (2) Remove cotter and unscrew nut (1), remove washer (2). Remove crank assembly (3) complete with its support post (4).

### D. Preparation of Replacement Component

### E. Install

- (1) Position crank assembly (3) on its support post (4). Install washer (2), tighten nut (1). Torque to between 1.5 and 1.8 m.daN (132.7 and 159.24 lbf.in.) Safety with cotter.
- (2) Position rods (5) and (8) to crank (3) ; adjust the length of rod (8) if necessary. Install bolts (9), washers (7) and nuts (6). Safety with cotters.
- (3) Connect PFCU actuating rods to input levers. Torque to between 0.31 and 0.37 m.daN (27.425 and 32.733 lbf.in.) Safety with cotter.
- (4) Remove warning notices.
- (5) Remove safety clip and tag and set circuit breaker

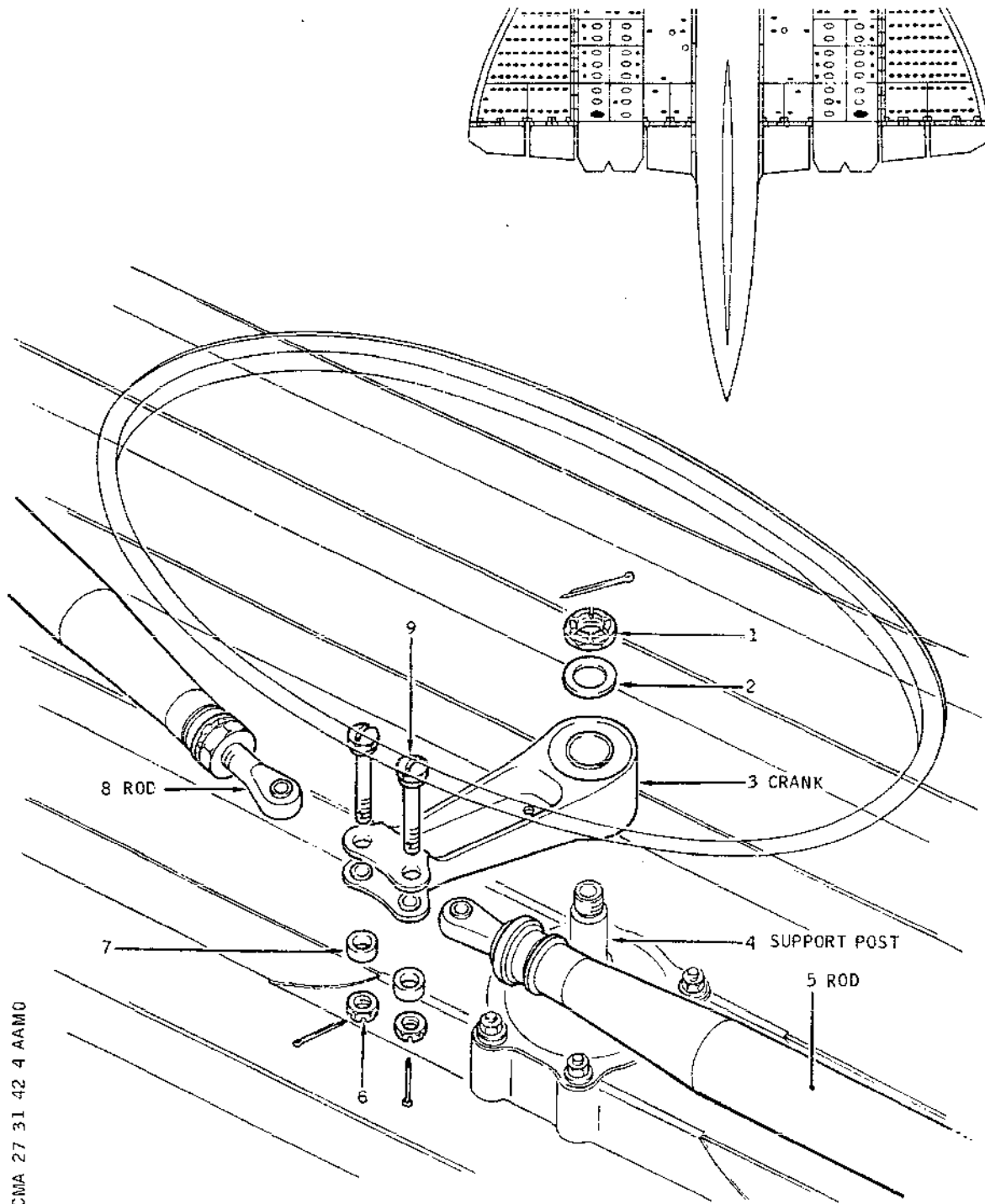
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Control Rod and Bellcrank at Wing RIB15.  
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M626, panel 15-216, Map Ref. F22

- (6) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).
- (7) Check that rigging pins (D921310000) and (D921337000) on mixing unit and rod and bellcrank assembly at RIB9 can be easily inserted or removed.  
Remove rigging pins D921337000, D921310000, D925252003 and D925252001.
- (8) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in electrical mode).

### F. Tests

- (1) Carry out an operational test (Ref. 27-31-00, Adjustment/Test).
- (2) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Install floor panel 241HF.
- (3) Close access doors and panels 121FB, 151DB.
- (4) Install PFCU fairings 552JB, 553JB or 652JB and 653JB.
- (5) Remove access platforms.

EFFECTIVITY: ALL

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### CONTROL ROD AND BELLCRANK AT WING RIB11 - REMOVAL/INSTALLATION

**WARNING :** MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The rod and bellcrank assembly at wing RIB 11 transmits movements of the elevon control linkage.

#### 2. Control Rod and Bellcrank at Wing RIB 11

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pin - Synchro Pack	D925252000
Rigging Pin - Mixing Unit Servo-Control	D921310000
Rigging Pin - Torque Tube at RIBS 3 and 9	D921337000
Access Platforms 3.08 m (10 ft. 1 in.) 2.70 m (8 ft. 9 in.)	
Circuit Breaker Safety Clips	

EFFECTIVITY: ALL

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### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).
- (3) Check that trim controls are set to zero.
- (4) Open access panel 121FB and immobilize pitch and roll resolvers with rigging pins D925252003 and D925252001.
- (5) Open floor panel 241HF and immobilize mixing unit with rigging pin D921310000.

WARNING : WHEN INSERTING AND REMOVING PINS, TAKE ALL NECESSARY PRECAUTIONS IN ORDER TO AVOID INTRODUCING INADVERTENTLY TOOLS OR MISCELLANEOUS ITEMS IN MIXING UNIT.

- (6) The following operations are carried out on RH or LH wing according to the rod and bellcrank assembly to be removed.
  - (a) Remove PFCU fairings : 552JB, 553JB for LH wing or 652JB, 653JB for RH wing.
  - (b) Disconnect PFCU actuating rods at RIBS 9 and 3 from PFCU input levers.
- (7) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in electrical mode).
- (8) Open door 151DB and depressurize Blue, Green and Yellow hydraulic systems.

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED. DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

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(9) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22
(10) Immobilize rod and bellcrank assembly at RIB 9 with rigging pin D921337000.			
(11) Open doors 543AB or 643AB, access to rod and bellcrank assembly at wing RIB 11.			

NOTE : During Removal/Installation procedure, in order  
to remove or install rod attachment bolts it  
is necessary to press plunger on head of bolt  
to free the locking system balls.

### C. Remove

- (1) Remove cotter and unscrew nuts (11) ; remove washer (10) and bolt (9). Disconnect rod (8) from crank (5).
- (2) Remove cotter and unscrew nut (1) ; remove washer (2) and bolt (4). Disconnect rod (3) from crank (5).
- (3) Remove cotter and unscrew nut (7) ; retain washer (6). Remove crank (5).

### D. Preparation of Replacement Component

### E. Install

- (1) Install crank assembly (5) on its support post (12)
- (2) Install washer (6), tighten nut (7) and safety with cotter.
- (3) Connect rod (3) to crank (5) ; adjust the length of the rod if necessary. Install bolt (4), washer (2) and tighten nut (1).  
Torque to between 0.31 and 0.37 m.daN (28 and 33 lbf.in.) for LH side  
0.52 and 0.58 m.daN (45 and 52 lbf.in.) for RH side.  
Safety with cotter.
- (4) Position rod (8) to crank (5), adjust the length of the

EFFECTIVITY: ALL

**27-31-43**

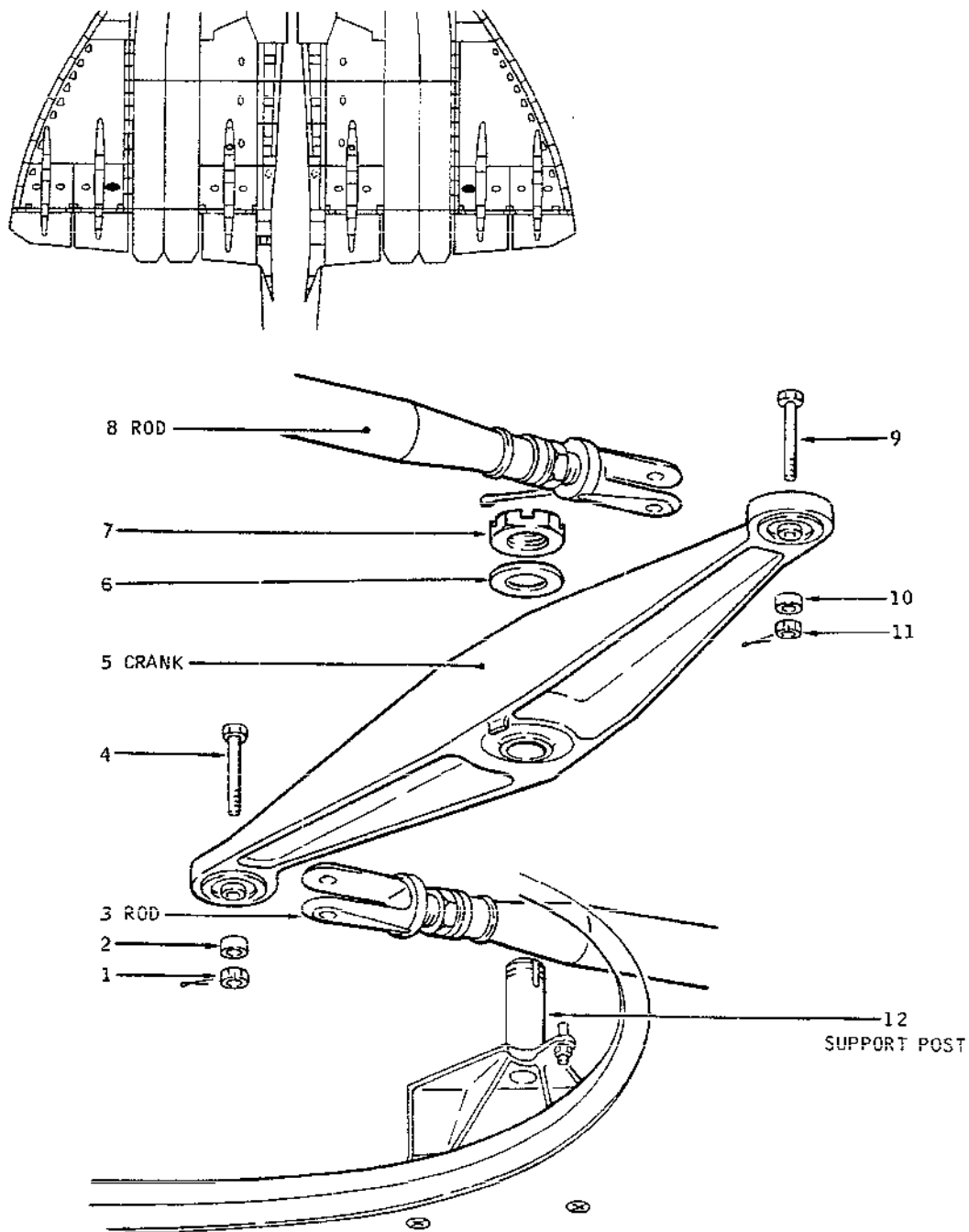
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# Concorde

## MAINTENANCE MANUAL



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Control Rod and Bellcrank at Wing RIB 11  
Figure 401

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

rod if necessary. Install bolt (9), washer (10) and tighten nut (11). Torque to between 0.31 and 0.37 m.daN (28 and 33 lbf.in.). Safety with cotter.

- (5) Connect PFCU actuating rods to input levers. Torque to between 0.31 and 0.37 m.daN (28 and 33 lbf.in.). To connect rods to input levers it is necessary to support elevons in appropriate position. Safety with cotter.
- (6) Remove warning notices.
- (7) Remove safety clip and tag and reset circuit breaker M626 on panel 15-216, Map. Ref. F22.
- (8) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).
- (9) Check that rigging pins on mixing unit and rod and bellcrank assembly at RIB 9 can be easily removed and inserted.  
Remove rigging pins D921310000, D921337000, D925252001 and D925252003.
- (10) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in electrical mode).

### F. Tests

- (1) Carry out operational tests (Ref. 27-31-00, Adjustment/Test).
- (2) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Install floor panels 241HF.
- (3) Close access doors and panels 121FB, 151DB, 543AB and 643AB.
- (4) Instal fairing 552JB, 553JB or 652JB, 653JB.
- (5) Remove access platforms.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### CONTROL ROD AND BELLCRANK AT WING RIB9 - REMOVAL/INSTALLATION

WARNING: MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE: DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED: DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The rod and bellcrank assembly, at RIB9, transmits movements of the elevon control linkage.

#### 2. Control Rod and Bellcrank at Wing Rib9

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pin - Mixing Unit Servo Control	D921310000
Rigging Pin - Torque Tube at RIBS3 and 9	D921337000
Rigging pin - Synchro Pack	D925252000
Lockwire Dia. 0.041 in (1 mm) Corrosion Resistant Steel	-
Access Platforms 10 ft 1 in (3.073 m) 8 ft 9 in (2.667 m)	-
Circuit Breaker Safety Clips	-

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).
- (3) Check that trim controls are set to zero. Remove access panel 121FB and immobilize roll and pitch resolvers with rigging pins D925252001 and D925252003.
- (4) Open floor panel 241HF, and immobilize mixing unit with rigging pin D921310000.

WARNING: WHEN INSERTING AND REMOVING PINS TAKE ALL NECESSARY PRECAUTIONS IN ORDER TO AVOID INTRODUCING INADVERTENTLY TOOLS OR MISCELLANEOUS ITEMS IN MIXING UNIT.

NOTE: The following operations are carried out on RH or LH wing, according to the rod and bellcrank assembly to be removed.

- (5) Remove PFCU fairings: 552JB, 553JB for LH wing or 652JB, 653JB for RH wing.
- (6) Disconnect actuating rods of PFCUs at RIBS3 and 9, at the level of the PFCU input levers.

NOTE: During Removal/Installation procedure, for removing or inserting rod attachment bolts, it is necessary to press the plunger located on head of bolt in order to free the locking system balls.

- (7) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in electrical mode).
- (8) Open door 151DB and depressurize Blue, Yellow and Green hydraulic systems.

WARNING: DISPLAY WARNING NOTICES ON ENGINES 1, 2

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## MAINTENANCE MANUAL

AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

(9) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

(10) Immobilize rod and bellcrank control assembly, RIB3, with rigging pin D921337000.

(11) Open doors 543AB or 643AB, access to rod and bellcrank assemblies at RIB9.

### C. Remove

(1) Remove cotter and unscrew nuts (1) ; remove washers (2) and bolts (3). Disconnect rods (5) from upper crank (4).

(2) Remove cotter and unscrew nut (12) ; remove washer (13) and bolt (14).  
Disconnect rod (15) from lower crank (11).

(3) Remove cotter and unscrew nut (8) ; remove washer (9).  
Remove taper pin (10).

(4) Remove lower crank (11).

(5) Unscrew and unscrew bolts (6) attaching lower support (16) : remove washers (7).

(6) Support torque tube (18) and remove lower support (16). Retain adjustment washer (17).

(7) Remove torque tube (18)/upper crank (4) assembly by

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

pulling them downwards.

### D. Install

- (1) Position the torque tube (18)/upper crank (4) assembly and engage the end of the torque tube in the bearing of the upper support.
- (2) Install adjustment washer.
- (3) Position lower support (16) and install washers (7) and bolts (6). Tighten bolts and safety with lockwire (Ref. 20-21-13).
- (4) Position lower crank (11) and insert taper pin (10).

NOTE: The smooth part of the smaller end of the taper pin must not project more than 1.5 mm (0.058 in.), under any circumstances.

Install washer (9) and nut (8). Torque to between 0.40 and 0.58 m.daN (40.68 and 51.30 lbf.in.). Safety with cotter pin.

- (5) Check the longitudinal play between lower support (16) and torque tube (18). The play must not exceed 0.10 mm (0.004 in.).

NOTE: Should the play exceed tolerance stated, it will be necessary to strip and install new adjustment washer (17), ground to a dimension which will take-up/correct excessive play.

- (6) Insert rigging pin D921337000 in torque tube (18).
- (7) Connect rods (5) to crank, ensuring correct placing of rods as per scrap view of Fig. 401. Install bolts (3), washer (2) and nuts (1). Torque to between 0.31 and 0.37 m.daN (27.4 and 32.7 lbf.in.). Safety with cotter.
- (8) Connect rod (15) to crank : install bolt (14), washer (13) and nut (12). Torque to between 0.31 and 0.37 m.daN (27.4 and 32.7 lbf.in.). Safety with cotter.

NOTE: Rigging pins must be inserted and removed freely on crank. If required, adjust length of rods between RIB15 and RIB19 and between RIB6 and RIB9 until attachment bolts can be inserted easily.

- (9) Connect PFCU actuating rods to PFCU input levers. PFCU at ribs 9 and 3 : Torque to between 0.31 and 0.37 m.daN (27.425 and 32.733 lbf.in.). Safety with cotter.
- (10) Remove warning notices.

EFFECTIVITY: ALL

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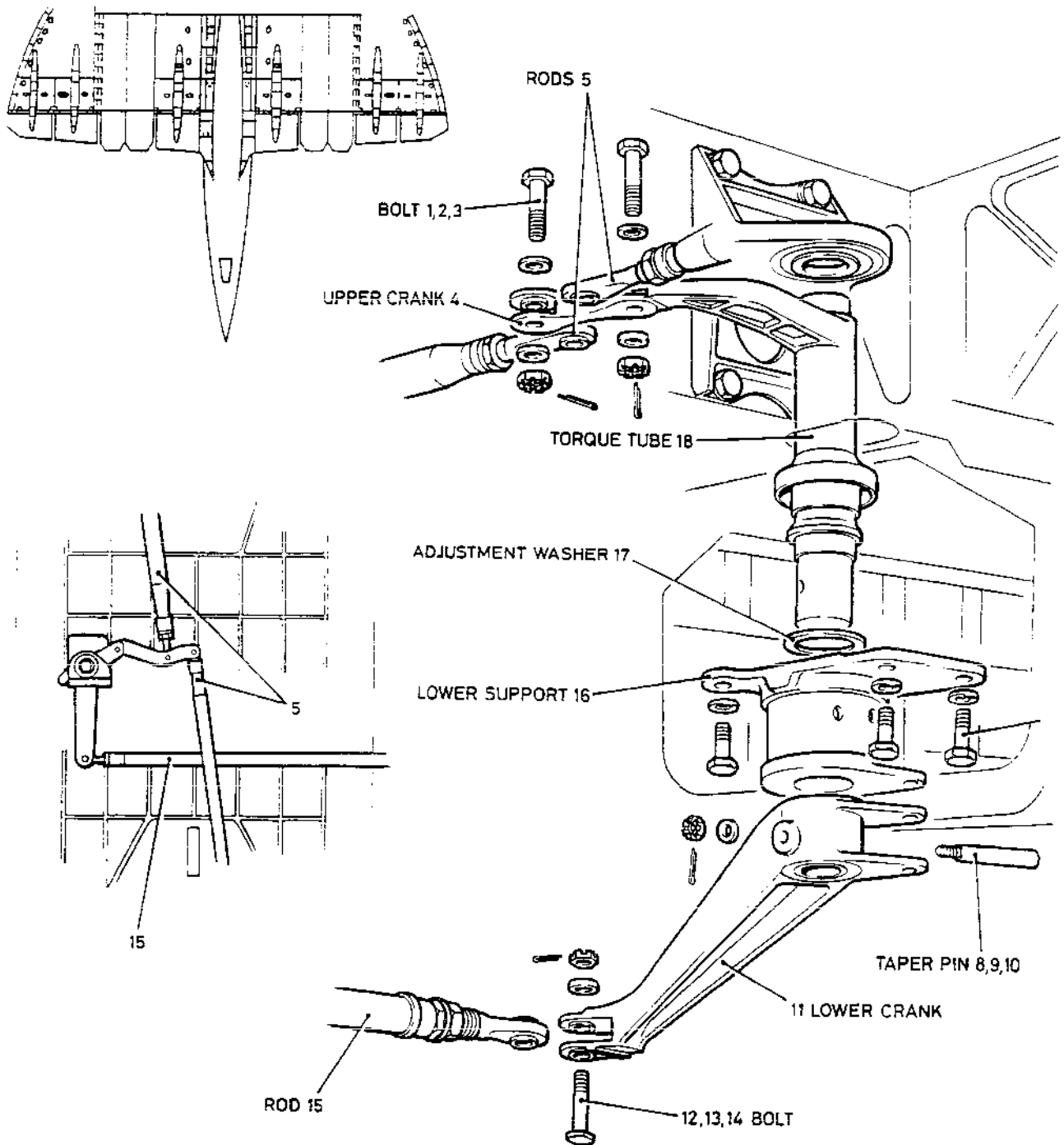
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## MAINTENANCE MANUAL



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Control Rod and Bellcrank at Wing RIB9  
Figure 401

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (11) Set circuit breaker M626 panel 15-216, Map. Ref. F22.
- (12) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).
- (13) Check that rigging pin D921310000 on mixing unit and pin D921337000 on rod and bellcrank assembly at RIB3, can be removed and inserted easily. Remove rigging pins ; D921310000 from mixing unit ; D921337000, D921337000 from rod and bellcrank at RIB3 and 9, D925252001 and D925252003 from resolvers.
- (14) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in electrical mode).

### E. Tests

- (1) Carry out operational tests (Ref. 27-31-00, Adjustment/Test).

During operational test check that clearances between RIB9 and upper crank (4) throughout full travel are within the following limits.

- (a) LH rod and bellcrank assembly
  - Nominal clearance 0.3937 in. (10 mm)
  - Minimum clearance 0.1181 in. (3mm)
- (b) RH rod and bellcrank assembly
  - Nominal clearance 0.3937 in. (10 mm)
  - Minimum clearance 0.1378 in. (3.5 mm)

- (2) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### F. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Install floor panel 211HF.
- (3) Close access doors and panels 121FB.
- (4) Install fairings 552JB, 553JB for LH wing or 652JB, 653JB for RH wing.
- (5) Remove access platform.

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

### CONTROL ROD AND BELLCRANK AT WING RIB6 - REMOVAL/INSTALLATION

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The rod and bellcrank assembly at wing RIB 6, transmits movements of the elevon control linkage.

#### 2. Control Rod and Bellcrank at Wing RIB 6

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pin - Mixing Unit Servo Control	D921310000
Rigging Pin - Torque Tube at RIBS 3 and 9	D921337000
Rigging Pins - Synchro Pack	D925252000
Circuit Breaker Safety Clips	
Access Platforms 3.084 m (10 ft.1 in.) 2.70 m (8 ft.9 in.)	

##### B. Prepare

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).
- (3) Make certain that trim controls are in zero position. Remove access panel 121FB and immobilize pitch and roll resolvers with rigging pins D925252001 and D925252003.
- (4) Open floor panel 241HF and immobilize mixing unit with rigging pin D921310000.

WARNING : WHEN INSERTING AND REMOVING PINS TAKE ALL NECESSARY PRECAUTIONS IN ORDER TO AVOID INTRODUCING INADVERTENTLY TOOLS OR MISCELLANEOUS ITEMS IN MIXING UNIT.

NOTE : The following operations are carried out on RH or LH wing, according to the rod and bellcrank assembly to be removed.

- (5) Remove PFCU fairings : 552JB, 553JB for LH wing or 652JB, 653JB for RH wing.
- (6) Disconnect the PFCU (at RIBS 3 and 9) actuating rods, at the level of the PFCU input levers.

NOTE : For removing or inserting rod attachment bolts it is necessary to press plunger located on head of bolt in order to free the locking system balls.

- (7) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in electrical mode).
- (8) Open door 151DB and depressurize Blue, Green and Yellow hydraulic systems.

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNec-

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

TED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (9) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

- (10) Immobilize rod and bellcrank control assemblies at RIBS 3 and 9 with equipment D921337000.

- (11) Open doors 543BB or 643BB, allowing access to rod and bellcrank assemblies at RIB 6.

### C. Remove Control Rod and Bellcrank - LH Side (Ref. Fig. 401 )

- (1) Remove cotter pin, unscrew nut (13), remove washer (12), bolt (11), disconnect rod (10) from bellcrank (14).
- (2) Remove cotter pin, unscrew nut (1), remove washer (2), bolt (4), disconnect rod (3) from bellcrank (14).
- (3) Remove screw (7) at wing upper surface, remove door (9), retain O-ring (8).
- (4) Remove cotter pin, nut (16), remove washer (15), remove bolt (6) through the upper door (9). Disconnect bellcrank (14) from support (5).

### D. Preparation of Replacement Component

### E. Install Control Rod and Bellcrank - LH Side

- (1) Install crank (14) on support (5). Install bolt (6) through upper door. Install washer (15), nut (16). Tighten and safety with cotter pin. Torque to between 1.6 and 1.78 m.daN (141.552 and 158.1 lbf.in.).
- (2) Replace O-ring (8) on door (9).
- (3) Install door (9), tighten screws (7).
- (4) Position rod (3) on bellcrank (14). Install bolt (4)

EFFECTIVITY: ALL

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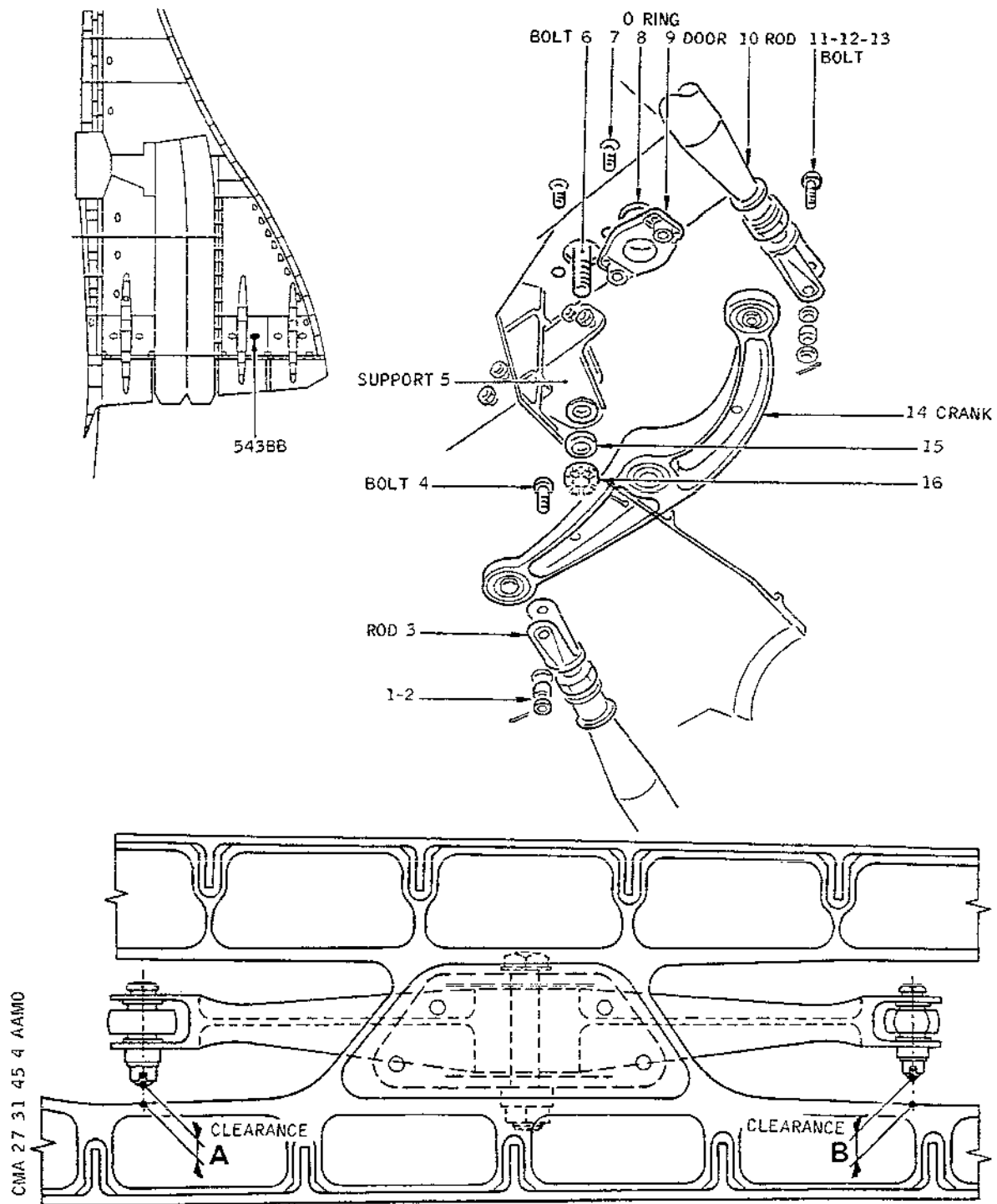
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## MAINTENANCE MANUAL



Control Rod and Bellcrank at Rib (6) (LH Side)  
Figure 401

EFFECTIVITY: ALL

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washer (2), nut (1). Tighten and insert cotter pin. Torque to between 0.52 and 0.58 m.daN (46 and 51.3 lbf.in.).

- (5) Connect rod (10) to bellcrank (14). Adjust length of rod if necessary. Install bolt (11), washer (12), nut (13). Tighten and insert cotter pin. Torque to between 0.31 and 0.37 m.daN (27 and 32.5 lbf.in.).
- (6) Connect PFCU actuating rods to PFCU input levers. PFCU at RIB 9 and 3 ; torque to between : 0.31 and 0.37 m.daN (27.425 and 32.733 lbf.in.). Safety with cotter.
- (7) Remove warning notices.
- (8) Set circuit breaker M626, panel 15-216, Map Ref. F22.
- (9) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).
- (10) Check that pin D921310000 on mixing unit and pins D921337000 on rod and bellcrank assemblies at RIB 3 and 9 can be easily inserted or removed. Remove rigging pins, D921337000 from rod and bellcrank assemblies at RIBS 3 and 9, D921310000 from mixing unit and D925252001, D925252003 from resolvers.
- (11) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in electrical mode).

### F. Remove Control Rod and Bellcrank - RH Side (Ref. Fig. 402 )

- (1) Remove cotter pin, nut (1), remove washer (2). Remove bolt (4). Disconnect rod (3).
- (2) Remove cotter pin, nut (10), remove washer (9). Remove bolt (7). Disconnect rod (8).
- (3) Cut and remove lockwire, nut (6). Remove washer (5). Remove bellcrank assembly (11).

### G. Install Control Rod and Bellcrank - RH Side

- (1) Install crank (11) on to its support post (12). Install washer, tighten nut and safety with cotter.
- (2) Install rod (3) on bellcrank.

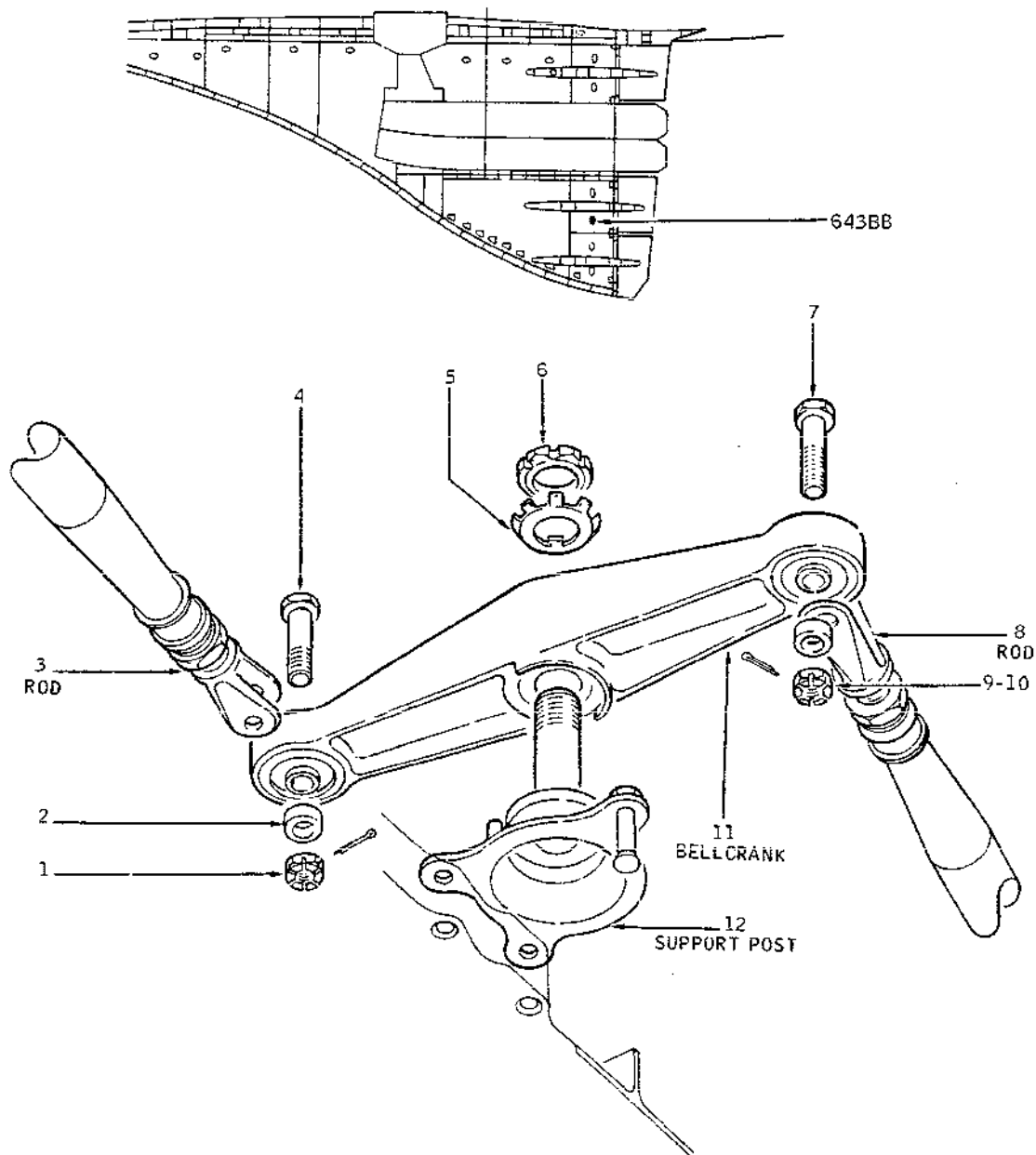
EFFECTIVITY: ALL

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## MAINTENANCE MANUAL



Control and Bellcrank at Wing RIB 6  
Figure 402

EFFECTIVITY: ALL

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Install bolt (4), washer (2), nut (1). Tighten and insert cotter.

Torque to between 0.31 and 0.37 m.daN (27 and 32.5 lbf.in.).

- (3) Position rod (8) on to bellcrank, adjust length if necessary. Install bolt (7), washer (9), nut (10). Tighten and safety with cotter.  
Torque to between 0.52 and 0.58 m.daN (46 and 51.3 lbf.in.).
- (4) Connect PFCU actuating rods to PFCU input levers ; PFCU at RIBS 9 and 3 : Torque to between 0.31 and 0.37 m.daN (27.425 and 32.733 lbf.in.).  
Safety with cotter.
- (5) Remove warning notices.
- (6) Set circuit breaker M626, panel 15-216, Map Ref. 22.
- (7) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).
- (8) Check that rigging pin D921310000 on mixing unit and rigging pins D921337000 on rod and bellcrank assemblies at RIBS 3 and 9 can be easily inserted and removed. Remove rigging pins, D921337000 from rod and bellcrank assemblies at RIBS 3 and 9, D921310000 from mixing unit and D925252001 and D925252003 from resolvers.
- (9) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in electrical mode).

### H. Test

- (1) Carry out an operational test (Ref. 27-31-00, Adjustment/Test).
- (2) Clearances (Ref. Fig. 401 )

During operational test, check that clearances between bellcrank (LH side only) and RIB 6 cut-outs are within the following limits :

Clearance A : Nominal 10 mm (0.3937 in.)  
Minimum 7.5 mm (0.2953 in.)  
Clearance B : Nominal 10 mm (0.3937 in.)  
Minimum 8 mm (0.3150 in.)

- (3) Before closing access doors and panels, carry out a double inspection of work performed and area affected

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## MAINTENANCE MANUAL

as per instructions detailed in 05-55-11.

### I. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access doors and panels, 121FB, 151DB, 543BB and 643BB, and floor panel 241HF.
- (3) Install PFCU fairings 552JB, 553JB or 652JB, 653JB
- (4) Remove access platforms.

EFFECTIVITY: ALL

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**END OF THIS  
SECTION**

**NEXT**

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## MAINTENANCE MANUAL

### CONTROL ROD AND BELLCRANK AT WING RIB3 - REMOVAL/INSTALLATION

**WARNING :** MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The rod and bellcrank assembly, at wing RIB3, transmits movements of the elevon control linkage.

#### 2. Control Rod and Bellcrank at Wing Rib 3

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins - Mixing Unit Servo Control	D921310000
Rigging Pin - Torque Tube at RIBS 3 and 9	D921337000
Rigging Pins - Synchro Pack	D925252000
Access Platforms 3.084 m (10 ft. 1 in.) 2.70 m (8 ft. 9 in.)	
Circuit Breaker Safety Clips	

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).
- (3) Check that trim controls are set to zero. Remove panel 121FB and immobilize pitch and roll resolvers with rigging pins D925252001 and D925252003.
- (4) Open floor panel 241HF and immobilize mixing unit with rigging pin D921310000.

WARNING : WHEN INSERTING AND REMOVING PINS TAKE ALL NECESSARY PRECAUTIONS IN ORDER TO AVOID INTRODUCING INADVERTENTLY TOOLS OR MISCELLANEOUS ITEMS IN MIXING UNIT.

NOTE : The following operations are carried out on RH or LH wing, according to the rod and bellcrank assembly to be removed.

- (5) Remove PFCU fairings : 552JB, 553JB for LH wing, 652JB, 653JB for RH wing.
- (6) Disconnect PFCU actuating rods at RIB3 and 9 at the level of the PFCU input levers.

NOTE : During Removal/Installation procedure ; for removing or inserting rod attachment bolts it is necessary to press the plunger located on head of bolt in order to free the locking system balls.

- (7) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in electrical mode).
- (8) Open door 151DB and depressurize Blue, Green and Yellow hydraulic systems.

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (9) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

- (10) Immobilize rod and bellcrank assembly at RIB9 with rigging pin D921337000.

- (11) Open doors 544CB or 644CB, allowing access to rod and bellcrank assemblies at RIB3.

### C. Remove

- (1) Remove cotter and unscrew nut (5) ; remove washer (4) and bolt (1). Disconnect rod (3) from upper crank (2).
- (2) Remove cotter and unscrew nut (13) ; remove washer (12) and bolt (11). Disconnect rod (14) from lower crank (9).
- (3) Remove cotter and unscrew nut (8) ; remove washer (7). Remove taper pin (10) and disconnect lower crank (9) from torque tube (18).
- (4) Unsafety and unscrew bolts (15) ; remove washers (16) and support (6). Remove torque tube (18) by pulling it downwards. Recover adjustment washer (17).

### D. Install

- (1) Install torque tube (18) in the bearing of upper support (19).
- (2) Install adjustment washer (17) on base of torque tube.
- (3) Install torque tube (18) in support (6). Install washers (16) and bolts (15). Tighten bolts and safety with lockwire.

NOTE: The longitudinal play between the lower support and the torque tube must not exceed 0.05 mm

EFFECTIVITY: ALL

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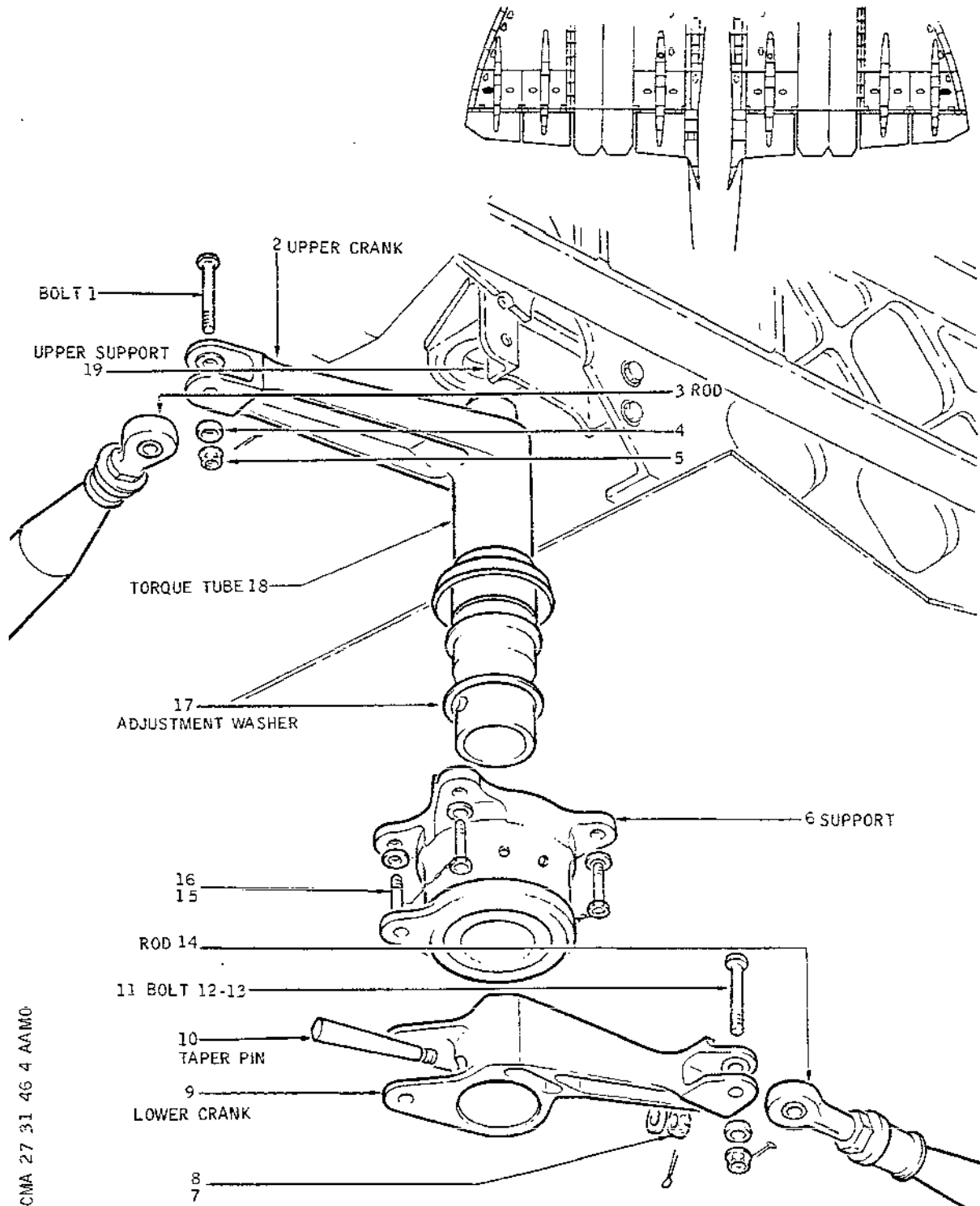
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# Concorde

## MAINTENANCE MANUAL



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Control Rod and Bellcrank at RIB 3  
Figure 401

EFFECTIVITY: ALL

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(0.0019 in.).

- (4) Install lower crank (9) on torque tube (18) : insert taper pin (10), install washer (7) and tighten nut (8).

Torque to between 0.46 and 0.56 m.daN (40.68 and 51.30 lbf.in.).

Safety with cotter.

NOTE : The smooth part of the smaller end of the taper pin must not project more than 1.5 mm (0.058 in.), under any circumstances.

- (5) Open out and ream rigging hole to a 8 mm dia. plus 0.15, 0.10 (0.3150 in. plus 0.0059, 0.0039). Insert rigging pin D921337000 in torque tube at RIB3.

- (6) Connect rod (3) to upper crank (2) ; install bolt (1), washer (4) and tighten nut (5). Torque to between 0.31 and 0.37 m.daN (27.40 and 32.7 lbf.in.). Safety with cotter. If necessary, adjust length of rod between RIB6 and RIB9 so that bolt attaching rod (3) to upper crank (2) can be inserted easily. Tighten and safety rod ends.

- (7) Connect rod (14) to lower crank (9) ; install bolt (11), washer (12) and tighten nut (13). Torque to between 0.31 and 0.37 m.daN (27.40 and 32.7 lbf.in.). Safety with cotter.

- (8) Connect PFCU actuating rods to PFCU input levers ; PFCU at ribs 3 and 9 ; torque to between 0.31 and 0.37 m.daN (27.40 and 32.7 lbf.in.). Safety with cotter.

- (9) Remove warning notices.

- (10) Set circuit breaker M626 panel 15-216, Map. Ref. F22.

- (11) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).

- (12) Check that rigging pin D921310000 on mixing unit and rigging pins D921337000 on rod and bellcrank assemblies at RIBS9 and 3 can be easily inserted and removed. Remove rigging pins ; D921337000 from rod and bellcrank at RIBS9 and 3, D921310000 from mixing unit and D925252001, D925252003 from resolvers.

- (13) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing. Procedure to set Flight Con-

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## MAINTENANCE MANUAL

trols in electrical mode).

### E. Tests

- (1) Carry out operational tests (Ref. 27-31-00, Adjustment/Test).
- (2) Check that clearance between RIB3 structure and upper crank throughout full travel is within the following limits :

Nominal clearance	10mm (0.3937 in.)
Minimum clearance	6mm (0.2362 in.)
- (3) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### F. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Install floor panel 241HF.
- (3) Install PFCU fairings 552JB, 553JB or 652JB, 653JB.
- (4) Close access doors and panels 121FB, 151DB, 544CB or 644CB.
- (5) Remove access platforms.

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## MAINTENANCE MANUAL

### BULKHEAD PRESSURE SEAL CONNECTION - REMOVAL/INSTALLATION

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

Removal/Installation of all bulkhead pressure seal connections being identical, only removal/installation of RH bulkhead pressure seal connections shall be dealt with.

#### 2. Bulkhead Pressure Seal Connections

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pin - Mixing Unit Servo Control	D921310000
Rigging Pin - Torque Tube at RIB24	D921311000
Rigging Pin - Torque Tube at RIBS3 and 9	D921337000
Access Platforms 3.22 m (10 ft 7 in.) 4.06 m (13 ft 7 in.)	
Lockwire Dia. 0.8 mm (0.032 in.) Corrosion Resistant Steel	

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### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).
- (3) Check that Pitch, roll and yaw trim controls are at zero.
- (4) Open door 121FB, immobilize resolvers using rigging pins D925252001 and D925252003.
- (5) Open floor panel 241HF and immobilize mixing unit using rigging pin D921310000.  
Install floor panel, but do not attach.

WARNING : WHEN INSERTING AND REMOVING PINS TAKE ALL NECESSARY PRECAUTIONS IN ORDER TO AVOID INTRODUCING INADVERTENTLY TOOLS OR MISCELLANEOUS ITEMS IN MIXING UNIT.

- (6) Open access door 641AB or 541AB.
- (7) On concerned wing remove the following fairings :  
RH wing : 651JB, 652JB, 653JB.  
LH wing : 551JB, 552JB, 553JB.

On the 3PFCUs, disconnect actuating rods from PFCU input levers.

- (8) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in electrical mode.)
- (9) Open access door 151DB, and depressurize the Blue Green and Yellow hydraulic systems.

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 and 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

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(10) Trip, safety and tag the following circuit breaker.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

(11) Access to bulkhead pressure seal connections :

(a) In hydraulics compartment, door 151DB

(b) In rear cabin :

- For RH bulkhead pressure seal connections, open floor panel 242LF.
- For LH bulkhead pressure seal connections, open floor panel 241LF.

NOTE : During Removal/Installation procedure, in order to install or remove attachment bolts, it is necessary to press plunger on head of bolt to release the locking system balls.

C. Remove Bulkhead Pressure Seal Connection, Inner Elevon Control (Ref. Fig. 401 )

- (1) Disconnect rods of bulkhead pressure seal connection at the level of rod and bellcrank assembly at RIB 26.
- (2) Remove cotter pin, loosen nut (14), retain washer (15), disengage bolt (17) and disconnect rod (16).
- (3) Remove cotter pin, loosen nut (3), retain washer (2), drive out taper pin (19), note position of crank (1) and remove it.
- (4) Cut lockwire and loosen nut (4).
- (5) Remove cotter pin, loosen nut (6), retain washer (5), disengage bolt (8), disconnect rod (7).
- (6) Remove cotter pin, loosen nut (12), retain washer (11), drive out pin (9), note position of crank (10) and drive it out.
- (7) Cut lockwire, loosen nut (13).

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- (8) Drive out to the upwards direction the body of bulkhead pressure seal connection (18).

### D. Preparation of Replacement Component

### E. Install Bulkhead Pressure Seal Connection, Control of Inner Elevons

- (1) Install the body of bulkhead pressure seal connection (18). Tighten nuts (4 and 13).  
Torque to between : 3.5 and 4 m.daN (309.64 and 353.88 lbf.in.).  
Wirelock.

- (2) Install crank (10) in its initial position, install taper pin (9), washer (11), tighten nut (12).  
Torque to between : 0.46 and 0.58 m.daN (40 and 52 lbf.in.).  
Insert cotter pin.

NOTE : Clearance between crank and pressure seal body must not be less than 1 mm (0.0394 in.).

- (3) Connect rod (7), insert bolt (8), washer (5), tighten nut (6), safety with cotter pin.

- (4) Install crank (1) in its initial position, install taper pin (19), washer (2), tighten nut (3).  
Torque to between 0.46 and 0.58 m.daN (40 and 52 lbf.in.).  
safety with cotter pin.

NOTE : The smooth part of the smaller end of the taper pins (9 and 19) must not project more than 1.5 mm (0.06 in) maximum under any circumstances

- (5) Connect rod (16), insert bolt (17), washer (15), tighten nut (14), safety with cotter pin.

- (6) Connect rods from bulkhead pressure seal connection to rod and bellcrank assembly at RIB 26. Check that rigging pin D921311000 can be easily inserted and removed in rod and bellcrank assembly at RIB 24. Remove rigging pin. If required, adjust length of adjustable rod between rod and bellcrank assemblies at RIBS 26 and 24.

- (7) Connect actuating rods to input levers of the 3 PFCUs.  
PFCU at RIB 24 torque to between 0.25 and 0.30 mdaN (23 and 26.541 lbf.in)  
PFCU at RIBS 3 and 9 torque to between 0.31 and

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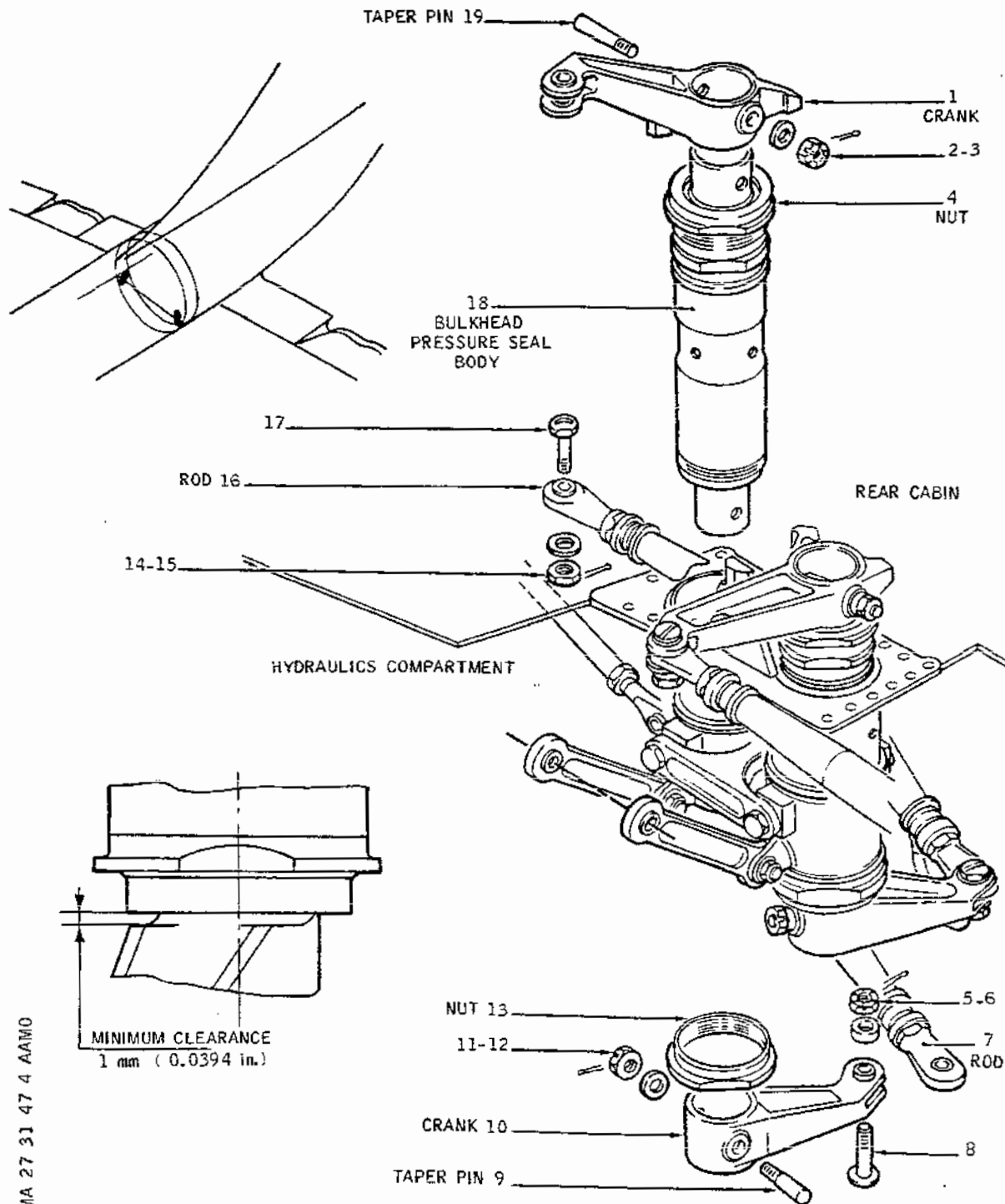
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## MAINTENANCE MANUAL



Bulkhead Pressure Seal Connection -  
Inner Elevons  
Figure 401

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0.37 m.daN (27.425 and 32.733 lbf.in.).  
Safety with cotter pin.

- (8) Remove warning notices.
  - (9) Set circuit breaker M626.
  - (10) Set flight Controls in electrical mode  
(Ref. 27-00-00, Servicing).
  - (11) Remove rigging pin D921310000 from mixing unit.
  - (12) Remove rigging pins D925252001 and D925252003 from  
resolvers.
  - (13) Shut down pressurization of hydraulic systems  
(Ref. 27-00-00, Servicing. Procedure to set Flight  
Controls in electrical mode).
- F. Remove Bulkhead Pressure Seal Connection, Middle and Outer  
Elevons (Ref. Fig. 402 )
- (1) Disconnect rods of bulkhead pressure seal connection  
at the level of rod and bellcrank assembly at RIB 26.
  - (2) Remove cotter pin, loosen nut (15), retain washer (16),  
drive out bolt (18), disconnect rod (17).
  - (3) Remove cotter pin, loosen nut (3), retain washer (2),  
drive out taper pin (19), note crank (1) position and  
drive it out.
  - (4) Cut lockwire, loosen nut (4).
  - (5) Remove cotter pin, loosen nut (8), retain washer (7),  
disengage bolt (5), disconnect rod (6).
  - (6) Remove cotter pin, loosen nut (12), retain washer (11),  
drive out taper pin (9), note the position of crank  
(10) and drive it out.
  - (7) Cut lockwire and loosen nut (13).
  - (8) Drive out to the upwards direction the body of the  
bulkhead pressure seal connection (14).
- G. Preparation of Replacement Component
- H. Install Bulkhead Pressure Seal Connection, Control of Outer  
and Middle Elevons

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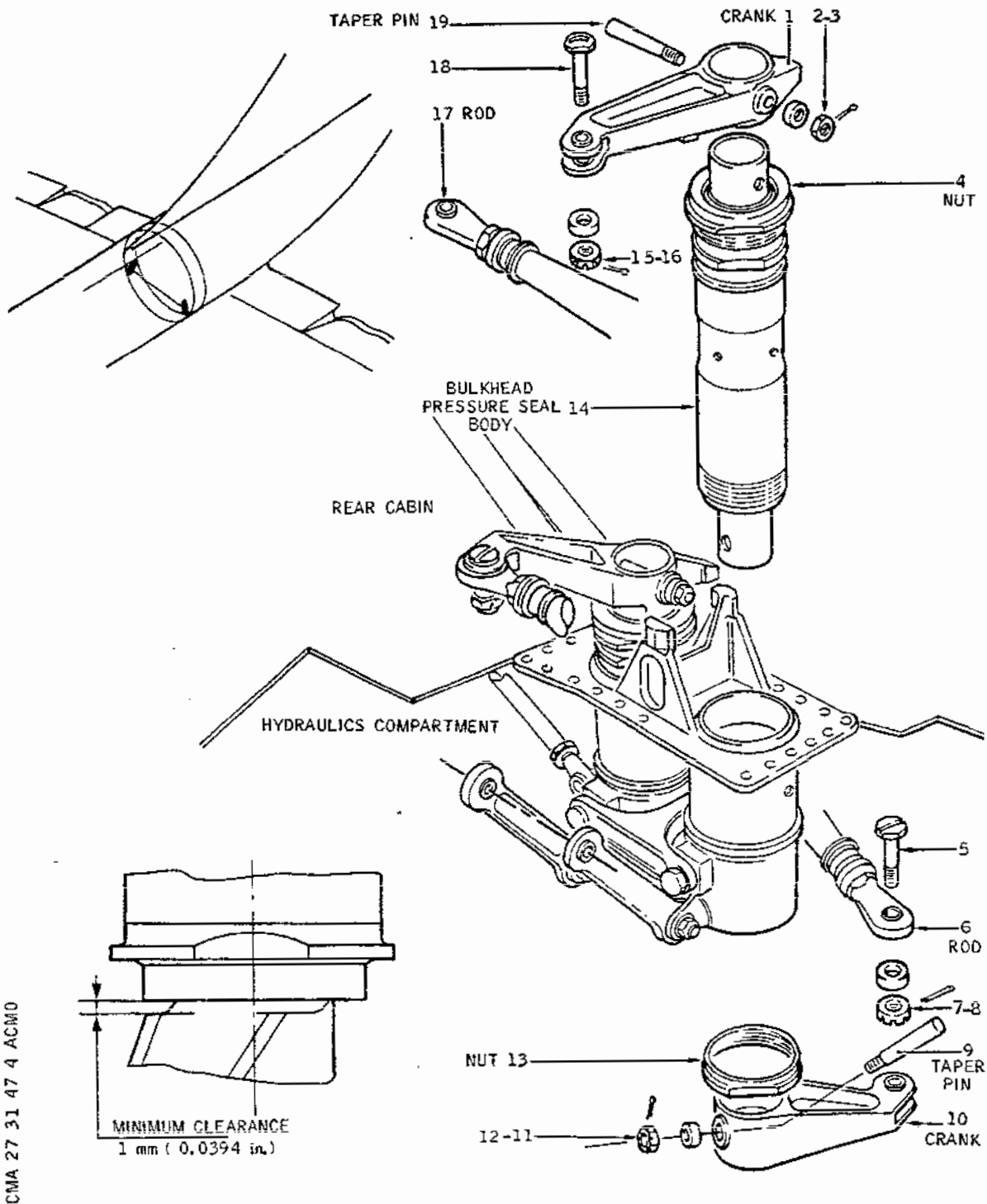
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## MAINTENANCE MANUAL



Bulkhead Pressure Seal Connection -  
Outer and Middle Elevons  
Figure 402

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- (1) Install the body of bulkhead pressure seal connection (14), tighten nuts (4 and 13).  
Torque to between 3.5 and 4 m.daN (309.64 and 353.88 lbf.in.).  
Wirelock.

- (2) Install crank (10) in its initial position, taper pin (9), washer (11), tighten nut (12).  
Torque to between 0.46 and 0.58 m.daN (40 and 52 lbf.in.).  
Safety with cotter pin.

NOTE : Clearance between crank (10) and pressure seal body must not be less than 1 mm (0.0394 in.).

- (3) Connect rod (6) to crank (10), insert bolt (5), washer (7), tighten nut (8), safety with cotter pin.

- (4) Install crank (1) in its initial position, install taper pin (19), washer (2), tighten nut (3).  
Torque to between 0.46 and 0.58 m.daN (40 and 52 lbf.in.).  
Safety with cotter pin.

NOTE : The smooth part of the smaller end of the taper pins (9 and 19) must not project more than 1.5 mm (0.06 in) maximum under any circumstances

- (5) Connect rod (17) to crank (1), insert bolt (18), washer (16), tighten nut (15), safety with cotter pin.

- (6) Connect rods from bulkhead pressure seal connections to rod and bellcrank assembly at RIB 26.  
Check that rigging pin D921337000 can be easily inserted, and removed, in rod and bellcrank assembly at RIB 9. Remove rigging pin.  
If required, adjust length of adjustable rod between rod and bellcrank assemblies at RIBS 19 and 15.

- (7) Connect actuating rods to input levers of the 3 PFCUs.  
PFCU at RIB 24. Torque to between 0.25 and 0.30 m.daN (23 and 26.541 lbf.in.).  
PFCU at RIBS 3 and 9. Torque to between 0.31 and 0.37 m.daN (27.425 and 32.733 lbf.in.).  
Safety with cotter pin.

- (8) Remove warning notices.

- (9) Set circuit breaker M626.

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- (10) Set Flight Controls in electrical mode  
(Ref. 27-00-00, Servicing).
- (11) Remove pin D921310000 from mixing unit.
- (12) Remove pins D925252001 and D925252003 from resolvers.
- (13) Shut down pressurization of hydraulic systems  
(Ref. 27-00-00, Servicing. Procedure to set Flight Controls in electrical mode).

### I. Test

- (1) Carry out operational tests (Ref. 27-31-00, Adjustment/Test and 27-11-00, Adjustment/Test).
- (2) Check that clearances are within the following limits :
  - (a) between pressure seal lower crank at RIB26 and hydraulic line (Green system suction on LH side, Blue system suction on RH side)  
Nominal clearance : 0.3937 in. (10 mm)  
Minimum clearance : 0.2756 in. (7 mm)
  - (b) between crank and head of taper pin ;  
LH side  
Nominal clearance : 0.1181 in. (3 mm)  
Minimum clearance : 0.1063 in. (2.7 mm)  
RH side  
Nominal clearance : 0.1181 in. (3 mm)  
Minimum clearance : 0.0315 in. (0.8 mm)
- (3) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### J. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Install floor panels 241HF, 242LF or 241LF.
- (3) Close access panels and doors 121FB, 641AB, 541AB, 151DB.
- (4) Install fairings.
- (5) Remove access platforms.

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## MAINTENANCE MANUAL

### ELEVONS 5 AND 6 - REMOVAL/INSTALLATION

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

Removal/Installation procedures are identical for LH and RH inner elevons 5 and 6.  
Therefore only the operations for the RH elevon 5 are dealt with.

#### 2. Elevon 5

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platforms 3 m. 25 (10 ft. 8 in.)	
Tool Kit - Fitting and Extraction of Elevon Pins	D920265000
Spanners - Set - Elevon Removal/Installation	D921599000
Sling - Elevons	D930130000
Trolley - Elevon Handling	E920006000

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DESCRIPTION	PART NO.
Rigging Pins - Synchro Pack	D925252000
Rigging Pin - Torque Tube at RIB24	D921311000
Test Set - Zero Setting, Resolver	TE3016000
Zeroing Equipment - Elevons	D921354000
Protractor - Elevon and Rudder	TE2012000
Jig - Neutral Setting - Elevons at RIB24	E920001000
General Lubricants (Ref. 20-30-00, No.51)	
Lockwire (Dia. 0.032 in. (0.8 mm) Corrosion Resistant Steel	
Special Materials (Ref. 20-30-00 No.123)	

### B. Prepare

- (1) Open door 151DB, depressurize Blue, Green and Yellow hydraulic systems.

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY ALSO A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZATION SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (2) Remove elevon contour strips.

642CB, DB, EB, FB, DT, ET, FT for elevon 5-RH  
641CB, DB, EB, FB, DT, ET, FT for elevon 6-RH  
542CB, DB, EB, FB, DT, ET, FT for elevon 5-LH

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541CB, DB, EB, FB, DT, ET, FT for elevon 6-LH.

- (3) Remove doors giving access to elevon hinges.

642BB,CT - 641CT - 692AT,AB - 691BB,BT	for elevon 5-RH
641BB, BT, CT - 691AB, BB, AT, BT	for elevon 6-RH
541BB,CT, BT - 591AB, BB, AT, BT	for elevon 6-LH
542BB,CT - 541CT - 592AB,AT - 591BB,BT	for elevon 5-LH

- (4) Remove PFCU fairings.

651KB and 651JB for elevons 5 and 6-RH  
551KB and 551JB for elevons 5 and 6-LH

- (5) Remove the elevon fairings (Ref. 57-30-30, Removal/Installation).

- (6) Check that roll and pitch trim controls are set to zero.

### C. Remove

NOTE: The elevons being coupled, it is necessary to hold elevons in horizontal position in order to carry out an elevon removal/installation.

- (1) Remove cotter and unscrew nut (23), remove washer (22) and bolt (21). Disengage shackle (25) from its attachment (26).

- (2) Disconnect the ground bonding leads.

- (3) Remove control rod (16).

#### (a) On elevon

- Remove cotter and unscrew nut (20), remove washer (33), remove bolt (13), tab-washer (19) and cup washer (14).
- Unscrew castle nut (18), remove peel washer (17) and hollow shouldered bolt (15). Carefully disengage rod (16).

#### (b) On PFCU

Remove cotter pin, nut (31), peel washer (30), and withdraw eccentric bush (29) using extractor D921225000.

Remove control rod (16) and thrust washer (28).

- (4) Remove cotters and nuts (6), remove bolts (1) and

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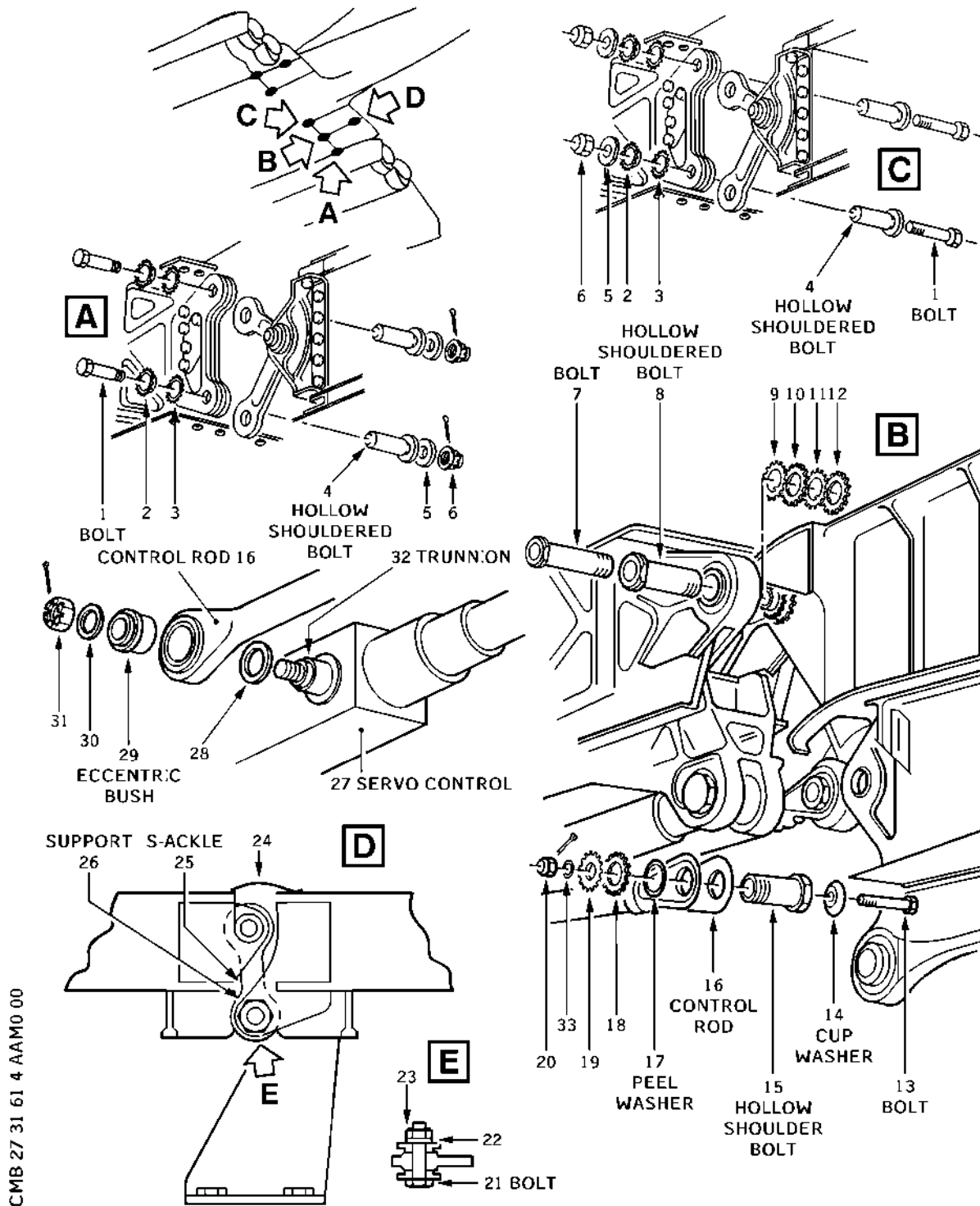
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Elevons 5 and 6  
Figure 401

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washers (5).

- (5) Bend back tabs of tabwasher (3) and unscrew castle nut (2).
- (6) Bend back the tabs of tabwasher (11), unscrew castle nut (12) and remove bolt (7) and tabwasher (11).
- (7) Bend back the tabs of tabwasher (9) and unscrew castle nut (10).
- (8) Install equipment D930130000.
- (9) Support the elevon and remove hollow shouldered bolts (4) and (8). Remove the elevon taking care not to damage slot seal (24).
- (10) Install elevon on handling equipment E920006000. Remove equipment D930130000.
- (11) Visually inspect the forward face of the D nose of the existing elevon to check for any skin scoring due to wing to elevon seal bolts. If bolts are found causing a foul, check the bolt for correct part number (Ref. IPC 57-38-20, Pages 2 and 3). The bolts should be Pt. No. BAS9082-3-2 and no bolt should extend beyond the minimum 2-3 threads required for it to be in safety.

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### D. Remove Hinge Support (Fig. 401A)

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- (1) Remove cotter pin (10) and unscrew nut (9), remove washer (8) and bolt (7).

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- (2) Remove nut (6) and key washer (5) from shaft (4).

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- (3) Remove shaft (4) and carefully disengage hinge support (3) from hinge assembly (2) on the elevon assembly (1).

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### E. Install Hinge Support (Fig. 401A)

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R

- (1) Engage hinge support (3) with the hinge assembly (2) on the elevon assembly (1) and insert shaft (4).

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- (2) Install key washer (5) and nut (6) on shaft (4) and tighten nut (6).

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- (3) Torque nut (6) to between 55.3 to 62.69 lbf ft (7.5 to 8.5 mdaN).

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- (4) Install bolt (7), washer (8) and tighten nut (9).

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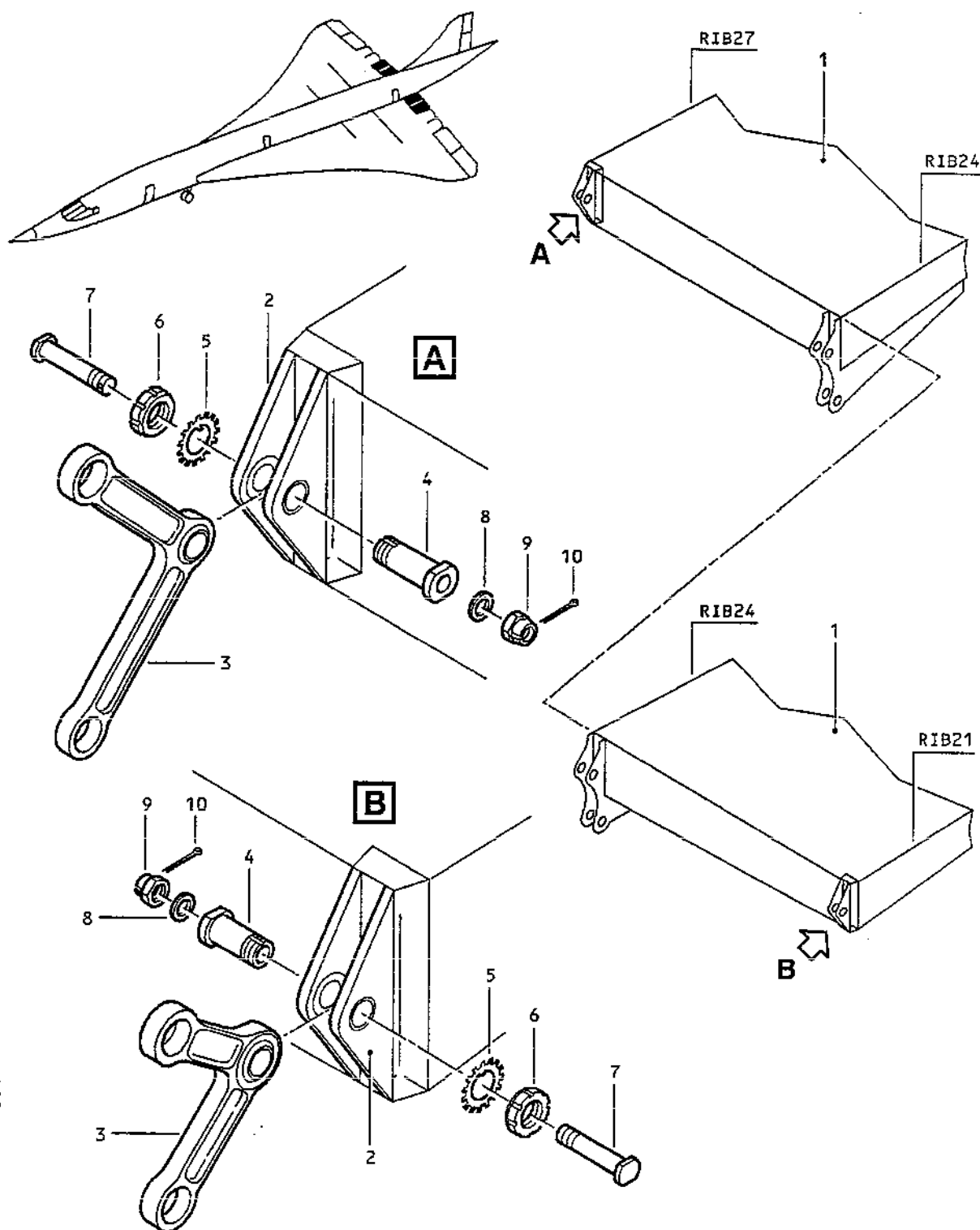
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Elevons 5 and 6 Hinge Supports  
Figure 401A

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(5) Torque-tighten nut (9) to between 26.55 and 32.45 lbf ft (3.6 and 4.4 mdaN).

(6) Safety with cotter pin.

### F. Preparation of Replacement Component

RB NOTE: Prior to installation of the elevon ensure that the  
RB following Concorde AMS tasks have been completed  
RB satisfactorily:

RB Pre Mod. 55G006 Elevons

RB Part 3 Tasks: 0555004H (LH) or 0655004H (RH)

RB Post Mod. 55G006 Elevons

RB Part 3 Tasks: 0555005H (LH) or 0655005H (RH).

(1) Install equipment D930130000.

(2) Check that nut (31) run down torque is at least 20 lbf in (0.226 mdaN). If load is less than this value it is necessary to install a new nut or to recondition existing nut as follows:

- Remove the four locking inserts.

- Install new inserts (Ref. 20-30-00, No.123) dia. 0.157 to 0.158 in (3.988 to 4.013 mm) length 0.25 to 0.26 in (6.35 to 6.604 mm).

- Run reamer down nut. Reamer dia. 0.885 to 0.895 in (22.479 to 22.733 mm).

NOTE: Only inserts are to be reamed, do not ream nut thread.

### G. Install

(1) Offer up the elevon and pin the hinges using the appropriate hollow bolts (4) and (8).

(2) Install a new tabwasher (9) and tighten nut (10). Torque-tighten nut (10) to 108.421 lbf ft (14.7 mdaN). Bend tabwasher tabs to safety.

NOTE: Castellated nut must be installed with chamfer towards fitting.

B In the following procedure (3) and (4), if possible  
B re-use the tabwashers that were fitted. When  
B re-using tabwashers, break off the used tab and dress  
B the jagged edge. When re-torquing the nut, if the  
B remaining tabs fail to line up with the slots in the  
B nut, consider using a tabwasher from another  
B location. If this does not work then renew the  
B tabwasher. It is acceptable for the tabwasher to be  
B re-used four (4) times.  
B Do not use any tab more than once.

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- (3) Install bolt (7), tabwasher (11) and tighten nut (12). Torque nut (12) to 87.032 lbf ft (11.80 mdaN). Bend tabwasher to safety.

NOTE: Castellated nut must be installed with chamfer towards fitting.

- (4) Install tabwasher (3) and tighten nuts (2). Torque nuts (2) to 36.140 lbf ft (4.90 mdaN). Bend tabwasher tabs to safety.
- (5) Install bolts (1), washers (5) and tighten nuts (6). Torque nuts (6) to 18.07 lbf ft (2.45 mdaN). Safety with cotter pin.
- (6) Remove equipment D930130000.
- (7) Make certain that elevon deflection is at least 22° 16' each side of zero.
- (8) Offer up shackle (25) to attachment (26). Install bolt (21), washer (22) and tighten nut (23). Torque nut (23) to 14.75 lbf ft (2 mdaN). Safety with cotter pin.
- (9) Install control rod (16):
- (a) If only one elevon (5 or 6) is removed/installed, installation of control rod (16) shall be carried out as per instructions detailed in paragraph (10) following.
  - (b) If both elevons (5 and 6) are removed/installed, installation of control rods (16) shall be carried out as per instructions detailed in paragraph (11) following.
- (10) Install control rod (16), (only one elevon (5 or 6) removed).

Install thrust washer (28) on PFCU (27) trunnion (32). Position control rod (16) and connect to PFCU and elevon.

- (a) Attach to PFCU:  
Position eccentric bush (29) on PFCU trunnion (32) so that bolt (15) attaching rod to elevon spherical bearing can be inserted easily. Install peel washer (30) and nut (31).  
Torque nut (31) to between 67.85 and 122.43 lbf ft (9.2 and 16.6 mdaN). Safety with cotter pin.

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NOTE : If necessary, adjust thickness of peel washer (30) to obtain required torque value with correct safetying.  
Prior to installation, smear bolts with product No.51.

- (b) Attach to elevon ;  
Connect control rod (16) to elevon spherical bearing with bolt (15), install peel washer (17), castle nut (18) and tighten.  
Torque to between 6 and 8 m.daN (44.25 to 59 lbf.ft.). Install cup washer (14), bolt (13), a new tab washer (19), washer (33), and tighten nut (20). Torque to between 0.7 and 0.8 m.daN (62 to 71 lbf.in.). Safety with cotter pin and bend tab washer tabs.

NOTE : If holes for safetying bolt are not aligned with slots in nut, it is necessary to correct thickness of peel washer (17).  
Prior to installation, lightly smear bolts with product No.51.

- (11) Install control rod (16), (both elevons (5 and 6) removed) ;

- (a) Install neutral setting pig E920001000 and position elevon so that it contacts equipment.  
Lock elevon in this position with zeroing equipment D921354000. After locking, make certain that elevon still contacts equipment E920001000.

- (b) Install protractor on elevon and set to zero.

- (c) Remove equipment E920001000.

- (d) LH rod ;

- (d1) Attach to PFCU ;  
Install thrust washer (28), control rod (16) and position eccentric bush (29) to zero (marks on body aligned with marks on bush).  
Install peel washer (30) and nut (31).  
Torque to between 9.2 and 16.6 m.daN (67.85 and 122.43 lbf.ft.).  
Safety with cotter pin.

NOTE : If necessary, adjust thickness of peel washer (30) to obtain required torque value with correct safetying.

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Prior to installation, smear bolts with product No.51.

- (d2) Attach to elevon ;  
Connect control rod (16) to elevon spherical bearing with bolt (15) ; install peel washer (17), castle nut (18) and tighten. Torque to between 6 and 8 m.daN (44.25 to 59 lbf.ft.) Install cup washer (14), bolt (13), a new tab washer (19), washer (33). Tighten nut (20). Torque to between 0.7 and 0.8 m.daN (62 and 71 lbf.in.). Safety with cotter pin and bend tab washer tabs.

NOTE : If holes for safetying bolt are not aligned with slots in nut, it is necessary to correct thickness of peel washer (17).  
Prior to installation lightly smear bolts with product No.51.

- (e) RH rod ;

- (e1) Attach to PFCU ;  
Install thrust washer (28), control rod (16) and position eccentric bush (29) on PFCU trunnion (32) so that bolt (15) attaching rod to elevon spherical bearing can be inserted easily.  
Install peel washer (30) and nut (31). Torque to between 9.2 and 16.6 m.daN (67.89 and 122.43 lbf.ft.).  
Safety with cotter pin.

NOTE : If necessary, adjust thickness of peel washer (30) to obtain required torque value.  
Prior to installation, smear bolts with product No.51.

- (e2) Attach to elevon ;  
Connect control rod (16) to elevon spherical bearing with bolt (15), install peel washer (17), castle nut (18) and tighten. Torque to between 6 and 8 m.daN (44.25 and 59 lbf.ft.).  
Install cup washer (14), bolt (13), a new tab washer (19), washer (33), tighten nut (20). Torque to between 0.7 and 0.8 m.daN (62 to 71 lbf.in.). Safety with cotter pin

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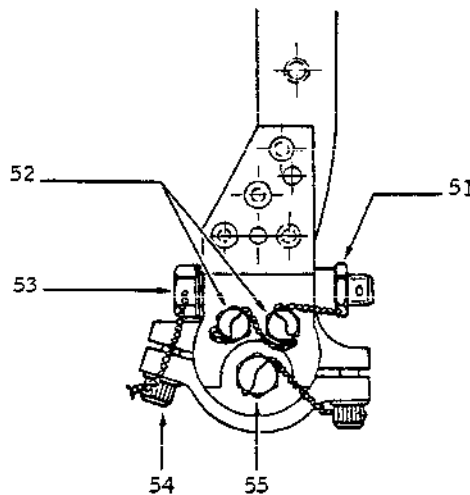
## MAINTENANCE MANUAL

and bend tab washer tabs.

NOTE : If holes for safetying bolt are not aligned with slots in nut, it is necessary to correct thickness of peel washer (17).

Prior to installation, lightly smear bolts with product No.51.

- (f) Check on protractor that elevon is at neutral.
- (g) Check resolver electrical zero.  
(Ref. Fig. 402 )



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- Resolver Electrical Zero Setting  
Figure 402

- (g1) Unsafety and disconnect PFCU electrical connectors. Connect test set TE3016000 cables to PFCU connectors. Supply test set with 28VDC.
- (g2) On test set, place POWER JACKS AND NOSE WHEEL STEERING selector switch in BLUE CT

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CONTROL ELEVONS position and check that resolvers are set to zero. If resolvers are not set to zero, carry out adjustment as follows ;

- Cut and remove lockwire from bolts (52), (54) and (55) and nut (51).
- Slightly loosen bolts (52), (54) and (55).
- Loosen nut (51) so that bolt (53) can be turned, but with slight resistance.
- Turn bolt (53) in appropriate direction until adjustment indicator pointer indicates 0 degrees plus or minus 2 minutes. At the same time, gradually increase test set sensitivity to maximum.
- Tighten nut (51).  
Torque to between 0.15 and 0.17 m.daN (13 and 15 lbf.in.)
- Check that electrical zero has not varied.
- Tighten bolts (52) and (54).  
Torque to between 0.07 and 0.09 m.daN (6 and 8 lbf.in.).
- Tighten bolt (55).  
Torque to between 0.259 and 0.282 m.daN (23 and 25 lbf. in.).
- Wirelock bolts (52), (54) and (55), nut (51) (Ref. 20-21-13).
- Disconnect test set and connect PFCU electrical connectors.
- Remove resolver feedback link bolt attachment plate.
- Remove zeroing equipment D921354000.
- Fully deflect elevon in both directions and check that in both PFCU stop positions, feedback link can be connected easily to structure.

**WARNING** : IN BOTH PFCU STOP POSITIONS, MAKE CERTAIN BEFORE CONNECTING FEEDBACK LINK TO STRUCTURE THAT THERE IS A CLEARANCE OF AT LEAST 1 mm (0.039 in.) BEFORE RESOLVERS ACHIEVE THEIR INTERNAL STOPS.

- Attach resolver feedback link bolt attachment plate to structure. Safety with lockwire (Ref. 20-21-13).
- Remove warning notices and set flight controls in mechanical mode

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(Ref. 27-00-00, Servicing).

- Immobilize pitch and roll resolvers (rigging pins D925252001 and D925252003).
- Immobilize bellcrank assembly at RIB24 with rigging pin D921311000.
- On protractor, check that elevon is at neutral. If required, adjust length of PFCU actuating rod to set elevon to neutral. Tighten and safety rod ends.
- Remove rigging pins D921311000, D925252003 and D925252001.
- Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
- Remove protractors.

(12) Connect bonding leads.

(13) Remove warning notices.

### R H. Tests

- (1) Carry out operational tests (Ref. 27-31-00 and 27-11-00, Adjustment/Test).
- (2) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### R J. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Install elevon contour strips

642CB, DB, EB, FB, DT, ET, FT	Elevon 5 - RH
641CB, DB, EB, FB, DT, ET, FT	Elevon 6 - RH
542CB, DB, EB, FB, DT, ET, FT	Elevon 5 - LH
541CB, DB, EB, FB, DT, ET, FT	Elevon 6 - LH
- (3) Install access doors on elevon hinges.

642BB, CT - 641CT - 692AT, AB - 691BB, BT	Elevon 5 - RH
641BB, BT, CT - 691AB, BB, AT, BT	Elevon 6 - RH
541BB, CT, BT - 591AB, BB, AT, BT	Elevon 6 - LH
542BB, CT - 541CT - 592AB, AT	Elevon 5 - LH
591BB, BB, BT	

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### ELEVONS 5 AND 6 - INSPECTION/CHECK

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN 24-00-00, SERVICING.

#### 1. General

The purpose of the following operations is to check play at PFCU control rod and elevon hinge points.

#### 2. Check of Elevon Hinge Swivel Joint Play

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins - Synchro Pack	D925252000
Access Platform 3.485 m (11 ft 5 in.)	
Collar Assembly - Elevon Hinge Swivel Joint Backlash	PCO 9099200
Attachment Press - Elevon Hinge Swivel Joint Backlash	PCO 9099300

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DESCRIPTION	PART NO.
Support Plate - Elevon Hinge Swivel Joint Backlash	PCO 9099400
Comparator Support	D921687000
Conventional Comparator	
Comparator with a Magnetic Base	
Warning Notices	

**B. Prepare**

- (1) Remove the following fairings (Ref. 57-30-30, Removal/Installation);  
LH inner elevon, 551MB and NB  
RH inner elevon, 651MB and NB
- (2) Disconnect elevons by removing connecting shackles.
- (3) Take the precautions described in the previous WARNING paragraph.
- (4) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).
- (5) Check that pitch and roll trim controls are at zero.
- (6) Remove access panel 121FB and immobilize pitch and roll resolvers with rigging pins D925252003 and D925252001.
- (7) Display a warning notice in Flight Compartment prohibiting operation of Flight Controls.

**C. Procedure for Checking Play of Elevon Hinge Swivel Joints**

- (1) Measuring displacement of an elevon trailing edge at the level of each PFCU enables the sum of play of the following hinge swivel joints to be checked  
"a" connection - control rod to PFCU  
"b" connection - control rod to elevon  
"c" Elevon hinge point

- (2) Maximum permissible play

The maximum permissible play at the elevon trailing

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edge is 12 mm (0.5 in).

(3) Measurement procedure (Ref. Fig. 601 )

- (a) Position a comparator on the trailing edge of one of both elevons (inner). Stylus resting on the other elevon in area shown on figure (Play Measurement - Principle).
- (b) Apply a load of 50 daN (112.385 lbf.) upwards to elevon and record displacement on comparator.

NOTE : Load support plate (steel plate covered by a neoprene coating) must be positioned as shown on figure (Play Measurement - Principle).  
Load 50 daN (112.385 lbf.) must be applied to elevon supporting the comparator stylus.

- (c) Repeat procedure detailed in paragraphs (a) and (b) above, on adjacent elevon.

- (4) In case elevon displacement exceeds permissible play 12 mm (0.5 in) record play of each hinge swivel joint (as per following paragraph).

D. Procedure for Checking Play of each Hinge Swivel Joint of an Elevon

- (1) Remove the following fairings (Ref. 57-30-30, Removal/Installation);  
LH inner PFCU, 551JB, LL, LR, KB  
RH inner PFCU, 651JB, LL, LR, KB  
(Ref. Fig. 602 )

(2) Measurement points and permissible play

- (a) Check play of each elevon hinge swivel joint at the 3 following points

"a" Connection - control rod to PFCU  
"b" Connection - control rod to elevon  
"c" Elevon hinge point

- (b) Limit play of each hinge swivel joint "a", "b" and "c" is 0.6 mm (0.0236 in.) with a total play for the three hinge swivel joints less than or equal to 1.4 mm (0.055 in.).

- (c) Equipment required

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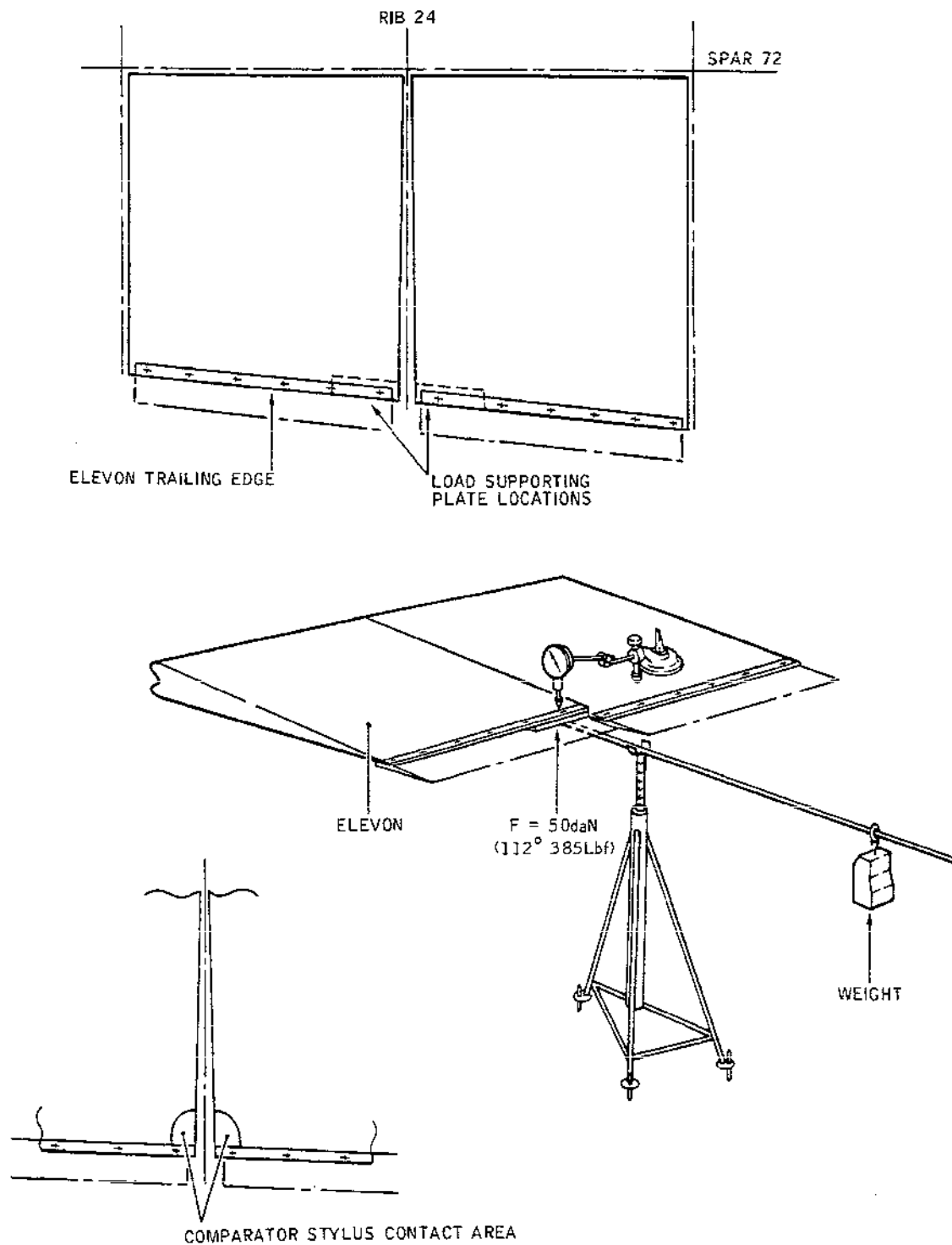
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Play Measurement - Principle  
Figure 601

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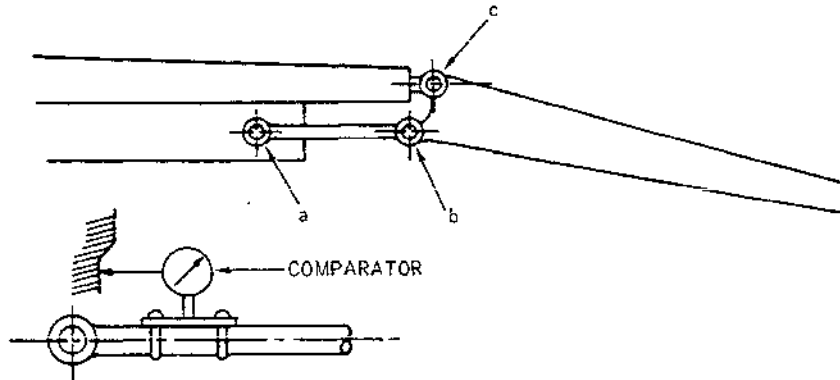
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Hinge Swivel Joints Check  
Figure 602

Point "a"-PCO 9099200 and conventional comparator  
Point "b"-PCO 9099300 and conventional comparator  
Point "c"-PCO 9099400 and comparator with a magnetic base

(3) Procedure for measuring play of hinge swivel joints

- (a) At each measurement point, position a comparator on one of the two components, stylus resting on the other.
- (b) As per figure (Play Measurement - Principle) apply a load of 50 daN (112.385 lbf.) upwards to elevon and record deflection on comparator.

NOTE : Load support plate (steel plate covered by a neoprene coating) must be positioned as shown on figure (play Measurement - Principle).  
Load 50 daN (112.385 lbf.) must be applied to elevon supporting the comparator stylus.

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- (c) Repeat procedure detailed in paragraphs (a) and (b) above, on adjacent elevon.
- (d) Replace components showing play out of tolerance (Ref. approved repairs).

### E. Close-Up

- (1) Remove rigging pins D925252001 and D925252003 from resolvers.
- (2) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in electrical mode).
- (3) Install access panel 121FB.
- (4) Install elevon connecting shackle.
- (5) Install fairings (Ref. 57-30-30, Removal/installation).
- (6) Remove warning notice.
- (7) Remove access platform.

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### ELEVONS 5 AND 6 - APPROVED REPAIRS

#### 1. General

- A. The following procedure deals with replacement of bushes and (or) attaching bolts worn to maximum limits.
- B. As it is not intended to remove attachment fittings, repairs shall be carried out in situ.

The tools referred to in Equipment and Materials paragraph shall be used to proceed with :

- Removal of bush to be discarded
- Accurate centering before fitting is reamed
- Correct positioning of parts to be assembled.

As reaming is not always possible through use of only one reamer, a set of reamers with progressive diameters shall be used to achieve work.

- C. The job is to be performed on elevons 5 and 6 of RH and LH wings.
- D. Make certain that electrical looms located in adjacent area do not interfere with job accomplishment and do not present any danger for repair personnel.

If there is evidence of risks, observe the electrical safety precautions described in chapter 24-00-00, Servicing.

#### 2. Approved repairs on elevons 5 and 6

- A. Equipment and Materials

---

DESCRIPTION

PART NO.

---

To be issued later

- B. Prepare

Proceed with removal of elevons 5 and 6 as per 27-31-61, Removal/installation.

- C. Oversize reaming of shackle ID

(1) Procedure : to be issued later

(2) Tolerance tables

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(Ref. Fig. 801 )

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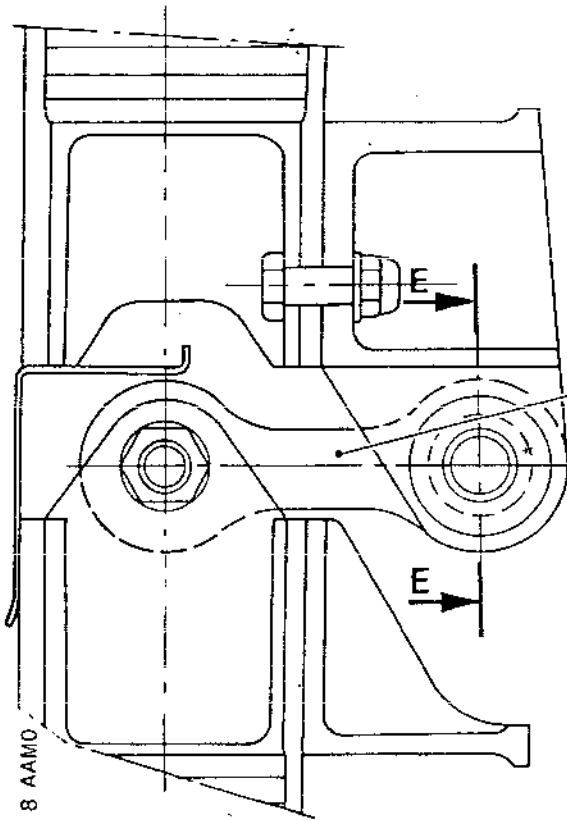
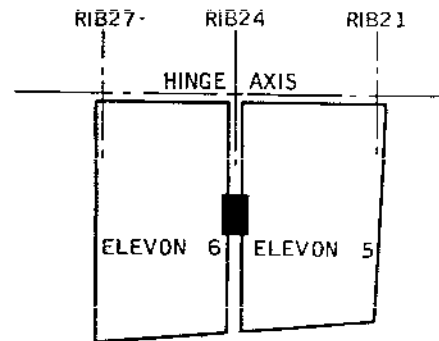
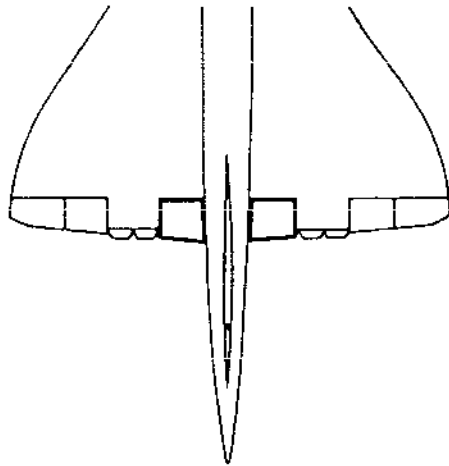
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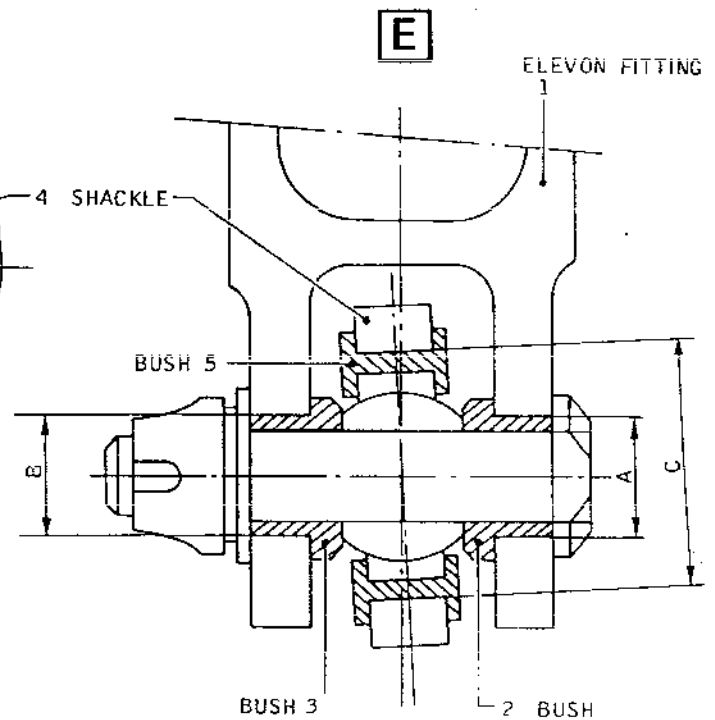


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Shackle between Elevons 5 and 6  
(Ref. Charts 1, 2 and 3)

Figure 801

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## MAINTENANCE MANUAL

OVERSIZE REAMING OF DIMENSION a					
PART 1			PART 3		
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
a THEORETICAL	12.5	H7 +0.018 +0.000	a THEORETICAL	12.5	k6 +0.012 +0.001
a 1st STAGE	12.7	H7 +0.018 +0.000	a 1st STAGE	12.7	k6 +0.012 +0.001
a 2nd STAGE	12.9	H7 +0.018 +0.000	a 2nd STAGE	12.9	k6 +0.012 +0.001
a 3rd STAGE	13.1	H7 +0.018 +0.000	a 3rd STAGE	13.1	k6 +0.012 +0.001
a 4th STAGE	13.3	H7 +0.018 +0.000	a 4th STAGE	13.3	k6 +0.012 +0.001

OVERSIZE REAMING OF DIMENSION a					
PART 1			PART 3		
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
a THEORETICAL	0.492	H7 +0.0007 +0.000	a THEORETICAL	0.492	k6 +0.0005 +0.0001
a 1st STAGE	0.500	H7 +0.0007 +0.000	a 1st STAGE	0.500	k6 +0.0005 +0.0001
a 2nd STAGE	0.507	H7 +0.0007 +0.000	a 2nd STAGE	0.507	k6 +0.0005 +0.0001
a 3rd STAGE	0.515	H7 +0.0007 +0.000	a 3rd STAGE	0.515	k6 +0.0005 +0.0001
a 4th STAGE	0.523	H7 +0.0007 +0.000	a 4th STAGE	0.523	k6 +0.0005 +0.0005

Table 1

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## MAINTENANCE MANUAL

OVERSIZE REAMING OF DIMENSION b					
PART 1			PART 2		
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
b THEORETICAL	12.5	H7 +0.018 +0.000	b THEORETICAL	12.5	h6 -0.000 -0.011
b 1st STAGE	12.7	H7 +0.018 +0.000	b 1st STAGE	12.7	h6 -0.000 -0.011
b 2nd STAGE	12.9	H7 +0.018 +0.000	b 2nd STAGE	12.9	h6 -0.000 -0.011
b 3rd STAGE	13.1	H7 +0.018 +0.000	b 3rd STAGE	13.1	h6 -0.000 -0.011
b 4th STAGE	13.3	H7 +0.018 +0.000	b 4th STAGE	13.3	h6 -0.000 -0.011

OVERSIZE REAMING OF DIMENSION b					
PART 1			PART 2		
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
b THEORETICAL	0.492	H7 +0.0007 +0.0000	b THEORETICAL	0.492	h6 -0.000 -0.0004
b 1st STAGE	0.500	H7 +0.0007 +0.000	b 1st STAGE	0.500	h6 -0.000 -0.0004
b 2nd STAGE	0.507	H7 +0.0007 +0.000	b 2nd STAGE	0.507	h6 -0.000 -0.0004
b 3rd STAGE	0.515	H7 +0.0007 +0.000	b 3rd STAGE	0.515	h6 -0.000 -0.0004
b 4th STAGE	0.523	H7 +0.0007 +0.000	b 4th STAGE	0.523	h6 -0.000 -0.0004

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Table 2

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## MAINTENANCE MANUAL

OVERSIZE REAMING OF DIMENSION c					
PART 4			PART 5		
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
c THEORETICAL	23.1	H7 +0.021 +0.000	c THEORETICAL	23.1	h6 -0.000 -0.013
c 1st STAGE	23.3	H7 +0.021 +0.000	c 1st STAGE	23.3	h6 -0.000 -0.013
c 2nd STAGE	23.5	H7 +0.021 +0.000	c 2nd STAGE	23.5	h6 -0.000 -0.013
c 3rd STAGE	23.7	H7 +0.021 +0.000	c 3rd STAGE	23.7	h6 -0.000 -0.013
c 4th STAGE	23.9	H7 +0.021 +0.000	c 4th STAGE	23.9	h6 -0.000 -0.013

OVERSIZE REAMING OF DIMENSION c					
PART 4			PART 5		
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
c THEORETICAL	0.909	H7 +0.0008 +0.000	c THEORETICAL	0.909	h6 -0.000 -0.0005
c 1st STAGE	0.917	H7 +0.0008 +0.000	c 1st STAGE	0.917	h6 -0.000 -0.0005
c 2nd STAGE	0.925	H7 +0.0008 +0.000	c 2nd STAGE	0.925	h6 -0.000 -0.0005
c 3rd STAGE	0.933	H7 +0.0008 +0.000	c 3rd STAGE	0.933	h6 -0.000 -0.0005
c 4th STAGE	0.940	H7 +0.0008 +0.000	c 4th STAGE	0.940	h6 -0.000 -0.0005

CMA 27 31 61 8 AGMO

Table 3

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## MAINTENANCE MANUAL

- D. Oversize reaming on elevon control hinge fitting ID
  - (1) Procedure : to be issued later
  - (2) Tolerance tables  
(Ref. Fig. 802 )
- E. Oversize reaming on elevon hinge fitting ID's at RIB27 and RIB21
  - (1) Procedure : to be issued later
  - (2) Tolerance tables  
(Ref. Fig. 803, 804 and 805)  
(Ref. Fig. 806 )

EFFECTIVITY: ALL

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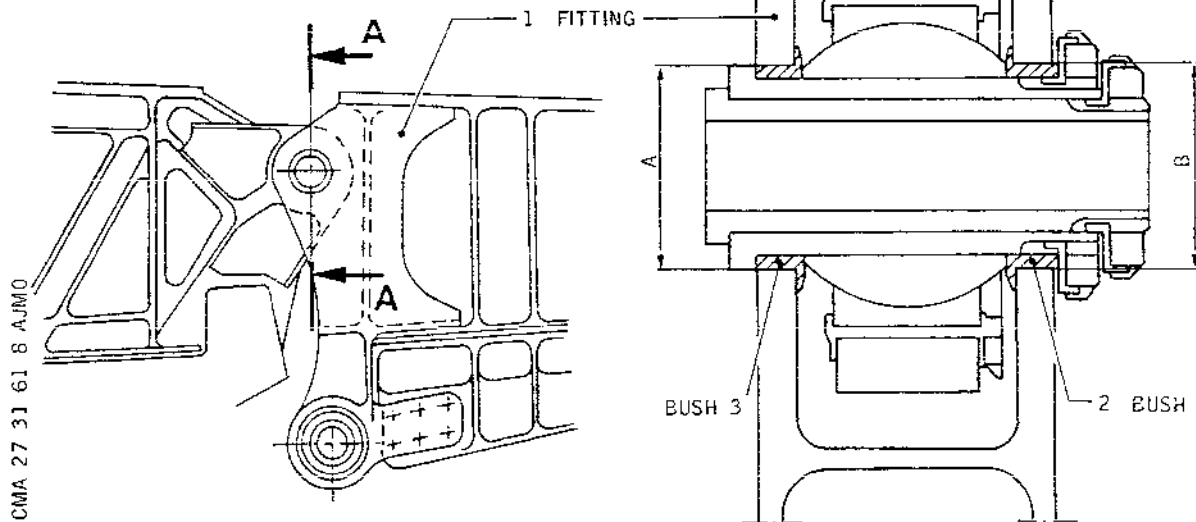
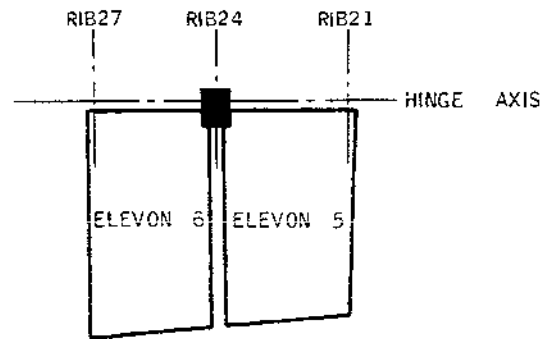
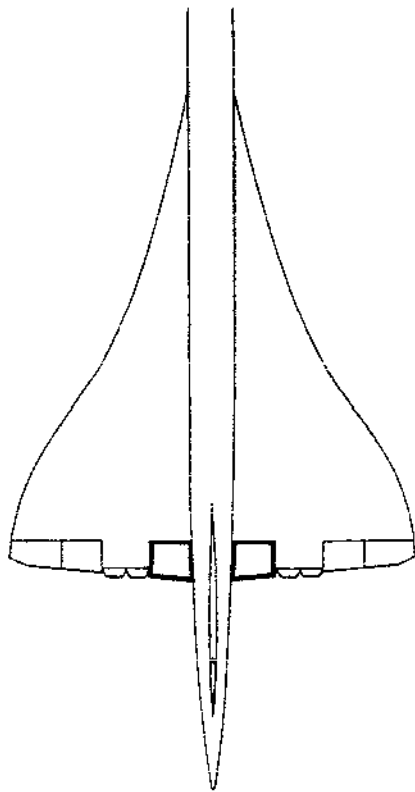
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## MAINTENANCE MANUAL



Elevon Control Hinge (Ref. Table 4)  
Figure 802

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# Concorde

## MAINTENANCE MANUAL

OVERSIZE REAMING OF DIMENSION a AND b					
PART 1			PARTS 2 AND 3		
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
a AND b THEORETICAL	43	H6 +0.016 +0.000	a AND b THEORETICAL	43	h6 -0.0003 -0.010
a-b 1st STAGE	43.2	H6 +0.016 +0.000	a-b 1st STAGE	43.2	h6 -0.003 -0.010
a-b 2nd STAGE	43.4	H6 +0.016 +0.000	a-b 2nd STAGE	43.4	h6 -0.003 -0.010
a-b 3rd STAGE	43.6	H6 +0.016 +0.000	a-b 3rd STAGE	43.6	h6 -0.003 -0.010
a-b 4th STAGE	43.8	H6 +0.016 +0.000	a-b 4th STAGE	43.8	h6 -0.003 -0.010

OVERSIZE REAMING OF DIMENSION a AND b					
PART 1			PARTS 2 AND 3		
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
a AND b THEORETICAL	1.692	H6 +0.0006 +0.000	a-b THEORETICAL	1.692	h6 -0.0001 -0.0004
a-b 1st STAGE	1.700	H6 +0.0006 +0.000	a-b 1st STAGE	1.700	h6 -0.0001 -0.0004
a-b 2nd STAGE	1.708	H6 +0.0006 +0.000	a-b 3rd STAGE	1.708	h6 -0.0001 -0.0004
a-b 3rd STAGE	1.716	H6 +0.0006 +0.000	a-b 2nd STAGE	1.716	h6 -0.0001 -0.0004
a-b 4th STAGE	1.724	H6 +0.0006 +0.000	a-b 4th STAGE	1.724	h6 -0.0001 -0.0004

CMA 27 31 61 8 ALMO

Table 4

EFFECTIVITY: ALL

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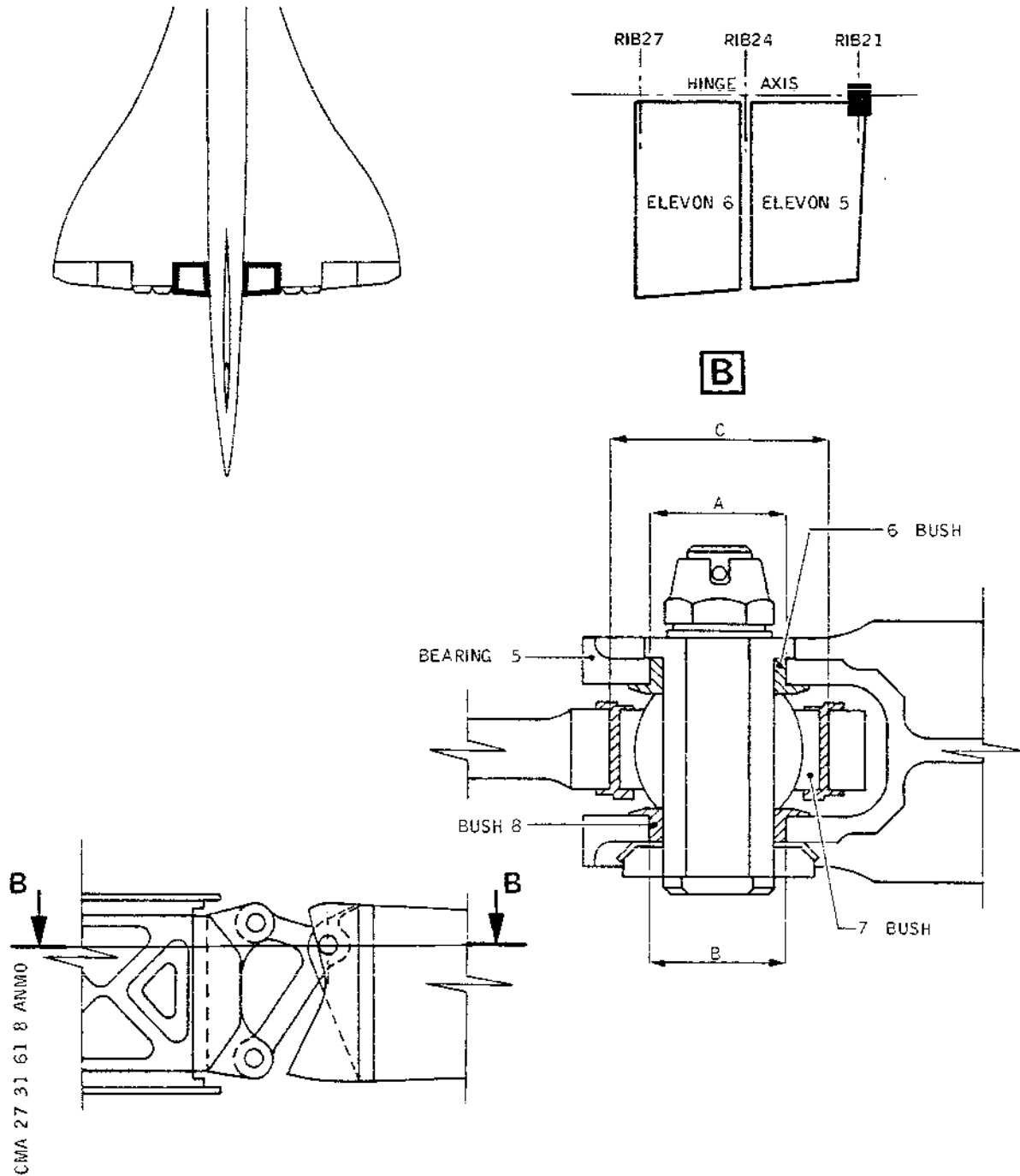
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## MAINTENANCE MANUAL



Hinge Bearing at RIB21 (Ref. Tables 5 and 8)  
Figure 803

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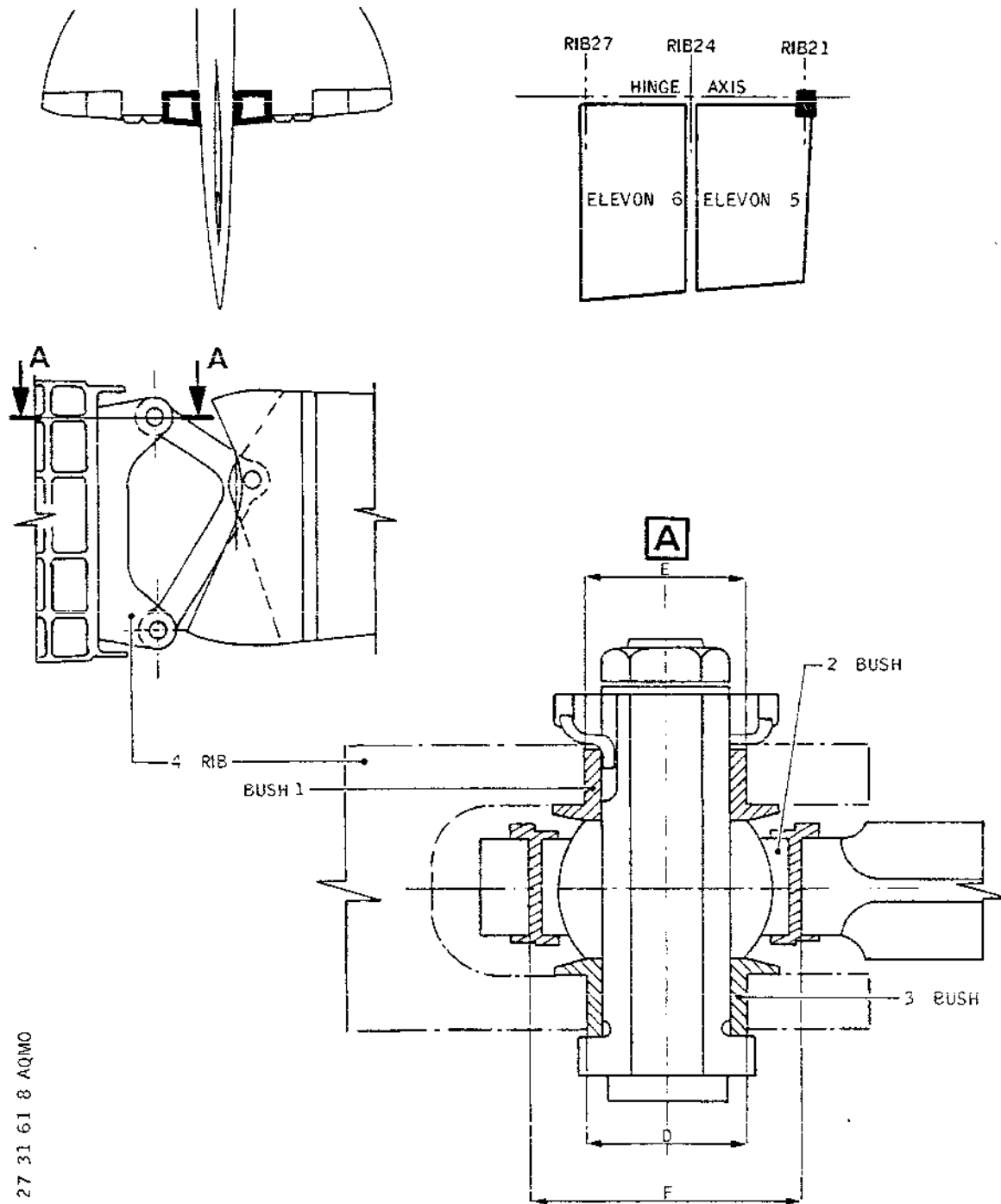
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## MAINTENANCE MANUAL



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Hinge at RIB21 (Ref. Tables 6 and 7)  
Figure 804

EFFECTIVITY: ALL

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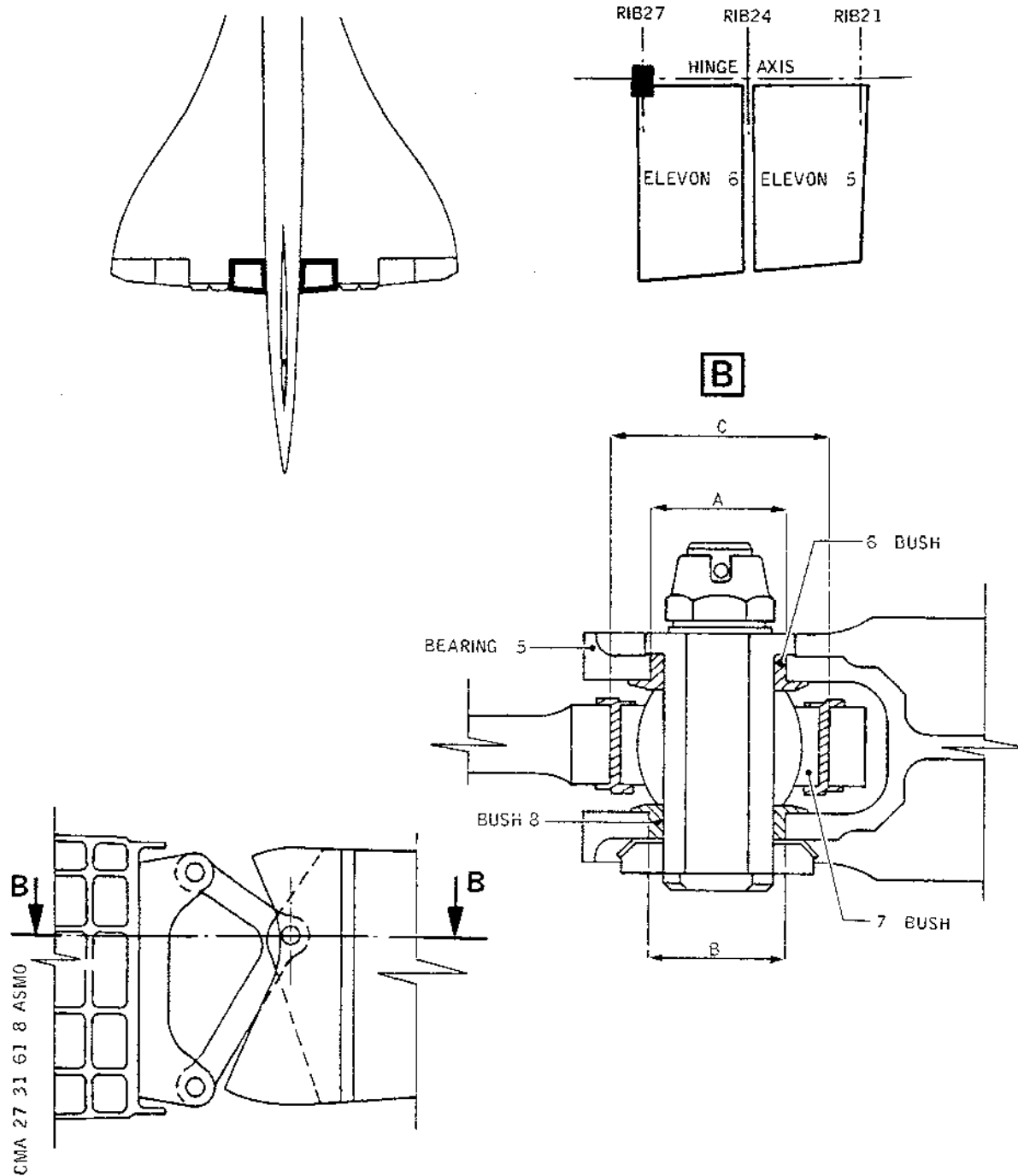
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# Concorde

## MAINTENANCE MANUAL



Hinge Bearing at RIB27 (Ref. Tables 5 and 8)  
Figure 805

EFFECTIVITY: ALL

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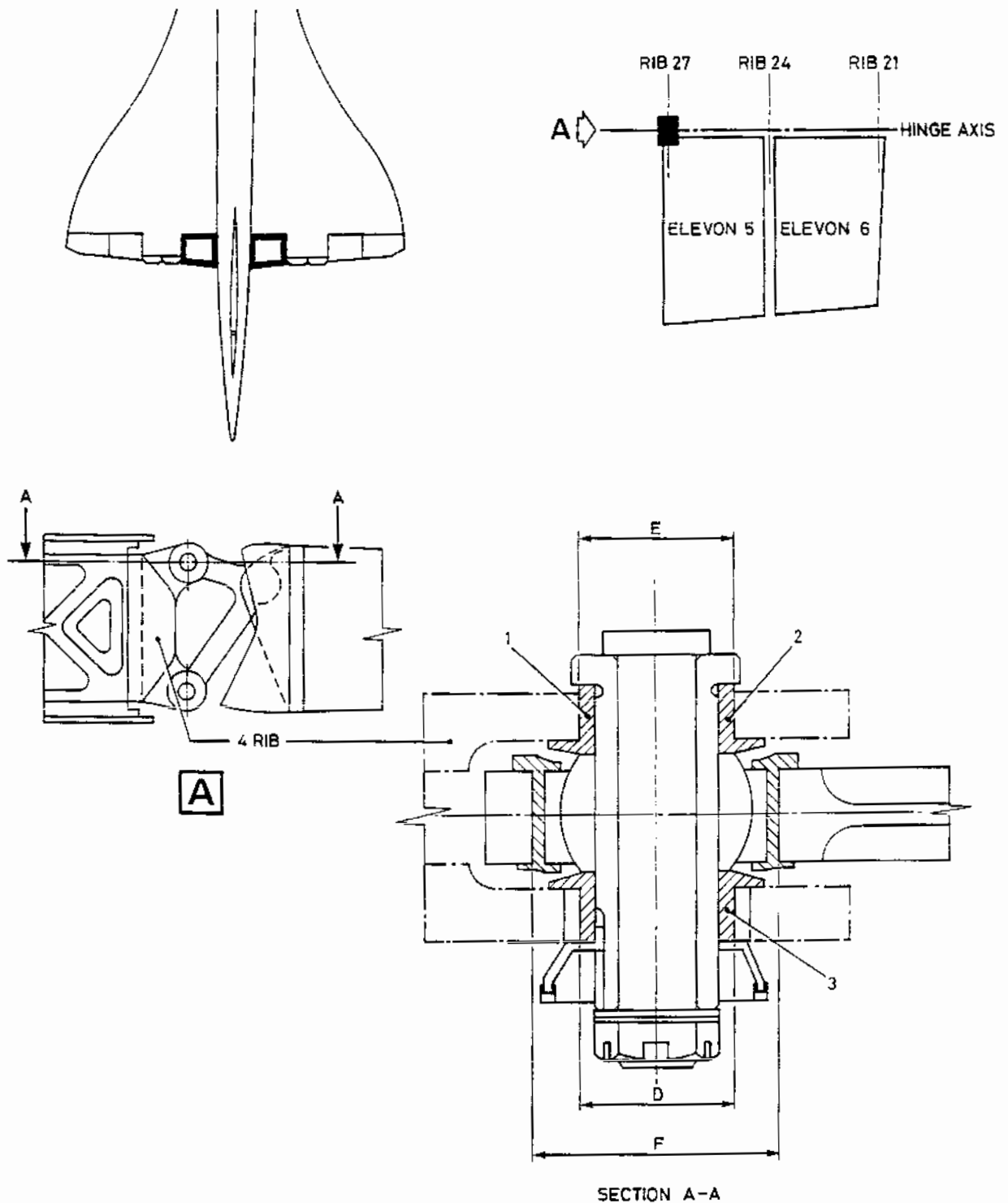
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## MAINTENANCE MANUAL



Hinge at RIB 27 (Ref. Tables 6 and 7)  
Figure 806

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## MAINTENANCE MANUAL

OVERSIZE REAMING OF DIMENSION a AND b					
PART 5			PARTS 6 AND 8		
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
a-b THEORETICAL	27	H7 10.000 +0.021	a-b THEORETICAL	27	h6 -0.000 -0.013
a-b 1st STAGE	27.2	H7 +0.000 +0.021	a-b 1st STAGE	27.2	h6 -0.000 -0.013
a-b 2nd STAGE	27.4	H7 +0.000 +0.021	a-b 2nd STAGE	27.4	h6 -0.000 -0.013
a-b 3rd STAGE	27.6	H7 +0.000 +0.021	a-b 3rd STAGE	27.6	h6 -0.000 -0.013
a-b 4th STAGE	27.8	H7 +0.000 +0.021	a-b 4th STAGE	27.8	h6 -0.000 -0.013

OVERSIZE REAMING OF DIMENSION a AND b					
PART 5			PARTS 6 AND 8		
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
a-b THEORETICAL	1.063	H7 +0.000 +0.0008	a-b THEORETICAL	1.063	h6 -0.000 -0.0005
a-b 1st STAGE	1.070	H7 +0.000 +0.0008	a-b 1st STAGE	1.070	h6 -0.000 -0.0005
a-b 2nd STAGE	1.078	H7 +0.000 +0.0008	a-b 2nd STAGE	1.078	h6 -0.000 -0.0005
a-b 3rd STAGE	1.086	H7 +0.000 +0.0008	a-b 3rd STAGE	1.086	h6 -0.000 -0.0005
a-b 4th STAGE	1.094	H7 +0.000 +0.0008	a-b 4th STAGE	1.094	h6 -0.000 -0.0005

Table 5

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# Concorde

## MAINTENANCE MANUAL

OVERSIZE REAMING OF DIMENSION e AND d					
PART 4			PARTS 1 AND 3		
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
e-d THEORETICAL	20	H7 +0.000 +0.021	e-d THEORETICAL	20	k6 +0.015 -0.002
e-d 1st STAGE	20.2	H7 +0.000 +0.021	e-d 1st STAGE	20.2	k6 +0.015 +0.002
e-d 2nd STAGE	20.4	H7 +0.000 +0.021	e-d 2nd STAGE	20.4	k6 +0.015 +0.002
e-d 3rd STAGE	20.6	H7 +0.000 +0.021	e-d 3rd STAGE	20.6	k6 +0.015 +0.002
e-d 4th STAGE	20.8	H7 +0.000 +0.021	e-d 4th STAGE	20.8	k6 -0.015 +0.002

OVERSIZE REAMING OF DIMENSION e AND d					
PART 4			PARTS 1 AND 3		
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
e-d THEORETICAL	0.787	H7 +0.000 +0.0008	e-d THEORETICAL	0.787	k6 +0.0006 +0.0001
e-d 1st STAGE	0.795	H7 +0.000 +0.0008	e-d 1st STAGE	0.795	k6 +0.0006 +0.0001
e-d 2nd STAGE	0.803	H7 +0.000 +0.0008	e-d 2nd STAGE	0.803	k6 +0.0006 +0.0001
e-d 3rd STAGE	0.811	H7 +0.000 +0.0008	e-d 3rd STAGE	0.811	k6 +0.0006 +0.0001
e-d 4th STAGE	0.818	H7 +0.000 +0.0008	e-d 4th STAGE	0.818	k6 +0.0006 +0.0001

CMA 27 31 61 8 AYM0

Table 6

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# Concorde

## MAINTENANCE MANUAL

OVERSIZE REAMING OF DIMENSION F					
PART 4			PART 2		
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
f THEORETICAL	33.1	H7 +0.000 +0.025	BAS 7084 - 008	33.1	h6 -0.000 -0.016
f 1st STAGE	33.3	H7 +0.000 +0.025	NAS 5114 - 02 - 008	33.3	h6 -0.000 -0.016
f 2nd STAGE	33.5	H7 +0.000 +0.025	NAS 5114 - 04 - 008	33.5	h6 -0.000 -0.016
f 3rd STAGE	33.7	H7 +0.000 +0.025	NAS 5114 - 06 - 008	33.7	h6 -0.000 -0.016
f 4th STAGE	33.9	H7 +0.000 +0.025	NAS 5114 - 08 - 008	33.9	h6 -0.000 -0.016

OVERSIZE REAMING OF DIMENSION f					
PART 4			PART 2		
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
f THEORETICAL	1.303	H7 +0.000 +0.001	BAS 7084 - 008	1.303	h6 -0.000 -0.0006
f 1st STAGE	1.311	H7 +0.000 +0.001	NAS 5114 - 02 008	1.311	h6 -0.000 -0.0006
f 2nd STAGE	1.318	H7 +0.000 +0.001	NAS 5114 - 04 - 008	1.318	h6 -0.000 -0.0006
f 3rd STAGE	1.326	H7 +0.000 +0.001	NAS 5114 - 06 - 008	1.326	h6 -0.000 -0.0006
f 4th STAGE	1.334	H7 +0.000 +0.001	NAS 5114 - 08 - 008	1.334	h6 -0.000 -0.0006

CMA 27 31 61 8 BAMO

Table 7

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# Concorde

## MAINTENANCE MANUAL

OVERSIZE REAMING OF DIMENSION c					
PART 4			PART 5		
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
c THEORETICAL	43.6	H7 +0.000 +0.025	BAS 7084 - 010	43.6	h6 -0.000 -0.016
c 1st STAGE	43.8	H7 +0.000 +0.025	NAS 5114 - 02 - 010	43.8	h6 -0.000 -0.016
c 2nd STAGE	44	H7 +0.000 +0.025	NAS 5114 - 04 - 010	44	h6 -0.000 -0.016
c 3rd STAGE	44.2	H7 +0.000 +0.025	NAS 5114 - 06 - 010	44.2	h6 -0.000 -0.016
c 4th STAGE	44.4	H7 +0.000 +0.025	NAS 5114 - 08 - 010	44.4	h6 -0.000 -0.016

OVERSIZE REAMING OF DIMENSION c					
PART 4			PART 5		
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
c THEORETICAL	1.716	H7 +0.000 +0.001	BAS 7084 - 010	1.716	h6 -0.000 -0.0006
c 1st STAGE	1.724	H7 +0.000 +0.001	NAS 5114 - 02 - 010	1.724	h6 -0.000 -0.0006
c 2nd STAGE	1.732	H7 +0.000 +0.001	NAS 5114 - 04 - 010	1.732	h6 -0.000 -0.0006
c 3rd STAGE	1.740	H7 +0.000 +0.001	NAS 5114 - 06 - 010	1.740	h6 -0.000 -0.0006
c 4th STAGE	1.748	H7 +0.000 +0.001	NAS 5114 - 08 - 010	1.748	h6 -0.000 -0.0006

CMA 27 31 61 8 BCMO

Table 8

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## MAINTENANCE MANUAL

F. Oversize reaming on elevon control fitting ID

(1) Procedure : to be issued later

(2) Tolerance table  
(Ref. Fig. 807 )

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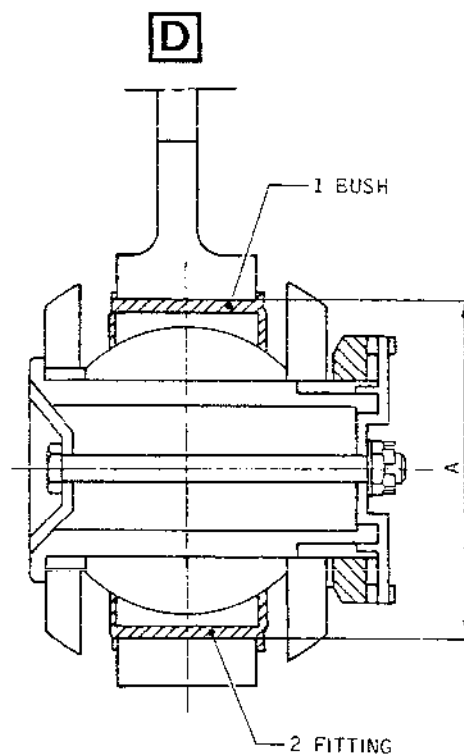
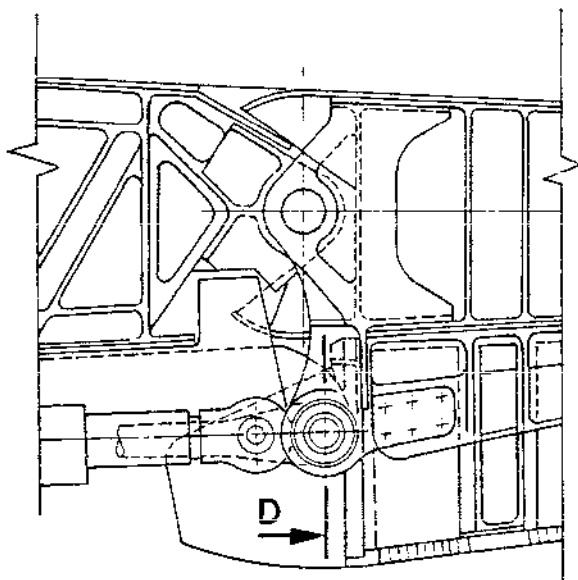
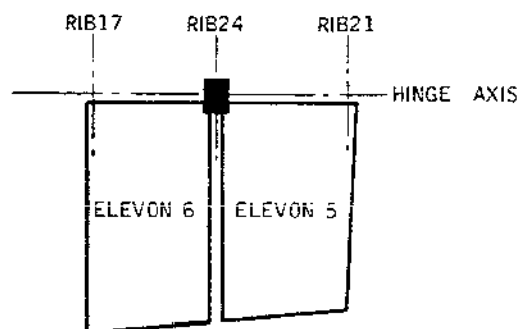
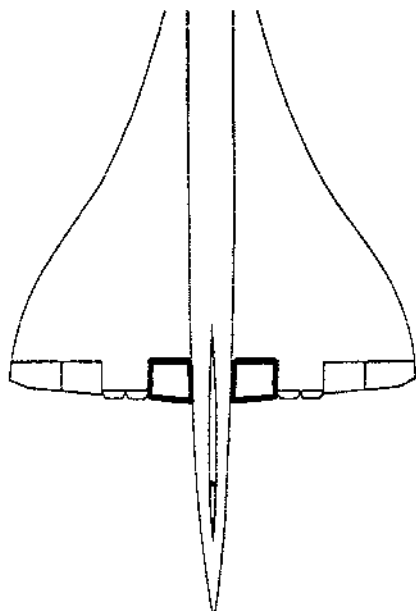
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# Concorde

## MAINTENANCE MANUAL



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Elevon Control Fitting (Ref. Table 9)  
Figure 807

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# Concorde

## MAINTENANCE MANUAL

OVERSIZE REAMING OF DIMENSION a					
PART 1			PART 2		
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
a THEORETICAL	71.7	K6 +0.004 -0.015	BAS 7084 - 032	71.7	h6 -0.000 -0.019
a 1st STAGE	71.9	K6 +0.004 -0.015	NSA 5114 - 02 - 032	71.9	h6 -0.000 -0.019
a 2nd STAGE	72.1	K6 +0.004 -0.015	NSA 5114 - 04 - 032	72.1	h6 -0.000 -0.019
a 3rd STAGE	72.3	K6 +0.004 -0.015	NSA 5114 - 06 - 032	72.3	h6 -0.000 -0.019
a 4th STAGE	72.5	K6 +0.004 -0.015	NSA 5114 - 08 - 032	72.5	h6 -0.000 -0.019

OVERSIZE REAMING OF DIMENSION a					
PART 1			PART 2		
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
a THEORETICAL	2.822	K6 +0.0002 -0.0006	BAS 7084 - 032	2.822	h6 -0.000 -0.0007
a 1st STAGE	2.830	K6 +0.0002 -0.0006	NSA 5114 - 02 - 032	2.830	h6 -0.000 -0.0007
a 2nd STAGE	2.838	K6 +0.0002 -0.0006	NSA 5114 - 04 - 032	2.838	h6 -0.000 -0.0007
a 3rd STAGE	2.846	K6 +0.0002 -0.0006	NSA 5114 - 06 - 032	2.846	h6 -0.000 -0.0007
a 4th STAGE	2.854	K6 +0.0002 -0.0006	NSA 5114 - 08 - 032	2.854	h6 -0.000 -0.0007

CMA 27 31 61 8 BGMQ

Table 9

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## MAINTENANCE MANUAL

### ELEVONS 1, 2 AND 3, 4 - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

Removal/Installation procedures are identical for elevons 1, 2, 3 and 4.

Therefore only the operations for elevon 1 are dealt with.

#### 2. Elevon 1

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Tool Kit - Fitting and Extraction of Elevon Pins	D920265000
Trolley - Elevon Handling	E920006000
Spanners - Set - Elevon Removal/Installation	D921599000
Sling - Elevons	D930130000
Access Platform 3.25 m (10 ft. 8 in.)	
Rigging Pins - Synchro Pack	D925252000

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# Concorde

## MAINTENANCE MANUAL

DESCRIPTION	PART NO.
Rigging Pins - Torque Tubes at RIBS 3 and 9	D921337000
Test Set - Zero Setting, Resolver	TE3016000
Zeroing Equipment - Elevons	D921354000
Protractor - Elevon and Rudder	TE2012000
Jig - Neutral Setting - Elevons at RIB 3	D921303000
Jig - Neutral Setting - Elevons at RIB 9	D921304000
General Lubricants (Ref. 20-30-00, No.051)	
Lockwire (Dia. 0.032 in (0.8 mm) Corrosion Resistant Steel	
Special Materials (Ref. 20-30-00, No.123)	

### B. Prepare

- (1) Open doors 151DB and 121FB, depressurize the Green, Blue and Yellow hydraulic systems.

**WARNING :** DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY ALSO A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZATION SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT, PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (2) Remove elevon contour strips :

544-KB, JB, HB, GB, WT, VT, UT, TT  
544-FB, EB, ST, RT

For elevon 1 - LH  
For elevon 2 - LH

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## MAINTENANCE MANUAL

543-GB, HB, RT, ST	For elevon 3 - LH
543-EB, FB, QT, PT	For elevon 4 - LH
644-KB, JB, HB, GB, WT, VT, UT, TT	For elevon 1 - RH
644-FB, EB, ST, RT	For elevon 2 - RH
643-BG, HB, RT, ST	For elevon 3 - RH
643-EB, FB, QT, PT	For elevon 4 - RH

(3) Remove door giving access to elevon hinges:

544-DB, QT, PT - 596-AB, AT - 595-BB, BT	For elevon 1 - LH
544-PT - 543-NT, DB - 595-AB, BB, BT, AT	For elevon 2 - LH
543-DB, NT, MT - 594-AB, AT - 593-BB, BT	For elevon 3 - LH
543-CB, MT, LT - 593-AB, BB, AT, BT	For elevon 4 - LH

644-DB, QT, PT - 696-AB, AT - 695-BB, BT	For elevon 1 - RH
644-PT - 643-NT, DB - 695-AB, BB, BT, AT	For elevon 2 - RH
643-DB, NT, MT - 694-AB, AT - 693-BB, BT	For elevon 3 - RH
643-CB, MT, LT - 693-AB, BB, AT, BT	For elevon 4 - RH

(4) Remove PFCU fairings.

553JB, 553-KB for elevons 1 and 2 - LH	
552JB, 552-KB for elevons 3 and 4 - LH	
653JB, 653-KB for elevons 1 and 2 - RH	
652JB, 652-KB for elevons 3 and 4 - RH	

(5) Remove elevon fairings (Ref. 57-30-30, Removal/Installation).

(6) Check that pitch and roll trim controls are set to zero.

C. Remove  
(Ref. Fig. 401)

NOTE: The elevons being coupled, it is necessary to hold elevons in horizontal position in order to carry out an elevon removal/installation.

(1) Remove cotter and unscrew nut (22), remove washer (21) and bolt (20). Disengage shackle (24) from support (23).

(2) Disconnect the ground bonding leads.

EFFECTIVITY: ALL

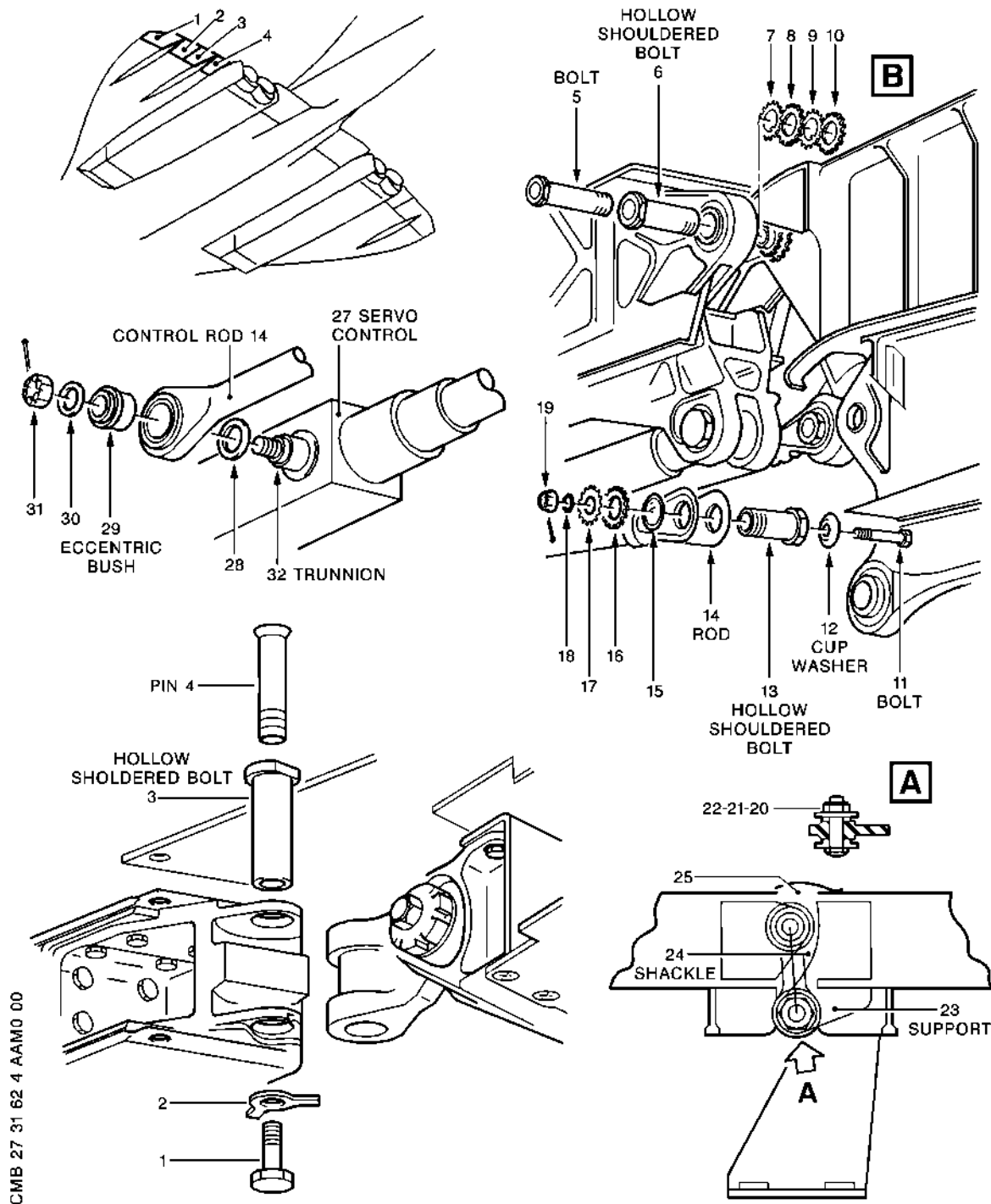
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## MAINTENANCE MANUAL

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Outer and Middle Elevons  
Figure 401

EFFECTIVITY: ALL

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# *Concorde*

## MAINTENANCE MANUAL

(3) Remove control rod (14).

(a) On elevon

- Remove cotter and unscrew nut (19), remove washer (18), bolt (11), tabwasher (17) and cup washer (12)
- Unscrew castle nut (16), remove washer (15) and shouldered bolt (13). Carefully disengage rod (14).

(b) On PFCU

- Remove cotter pin, nut (31), peel washer (30) and withdraw eccentric bush (29) using extractor D921225000
- Remove control rod (14) and thrust washer (28).

(4) Bend back the tabs of tabwasher (2), unscrew bolt (1) and remove pin (4).

(5) Bend back the tabs of tabwasher (9), unscrew nut (10) and remove bolt (5).

(6) Bend back the tabs of tabwasher (7) and unscrew nut (8).

(7) Install equipment D930130000.

(8) Remove hollow shouldered bolts (3) and (6).  
Remove the elevon taking care not to damage slot seal (24).

(9) Install elevon on handling equipment E920006000.  
Remove equipment D930130000.

R D. Remove Shackle (Fig. 401A)

(1) Remove cotter pin (10) and unscrew nut (9), remove washer (8) and bolt (7).

(2) Remove nut (6) and key washer (5) from shaft (4).

(3) Remove shaft (4) and carefully disengage shackle (3) from hinge assembly (2) on the elevon assembly (1).

EFFECTIVITY: ALL

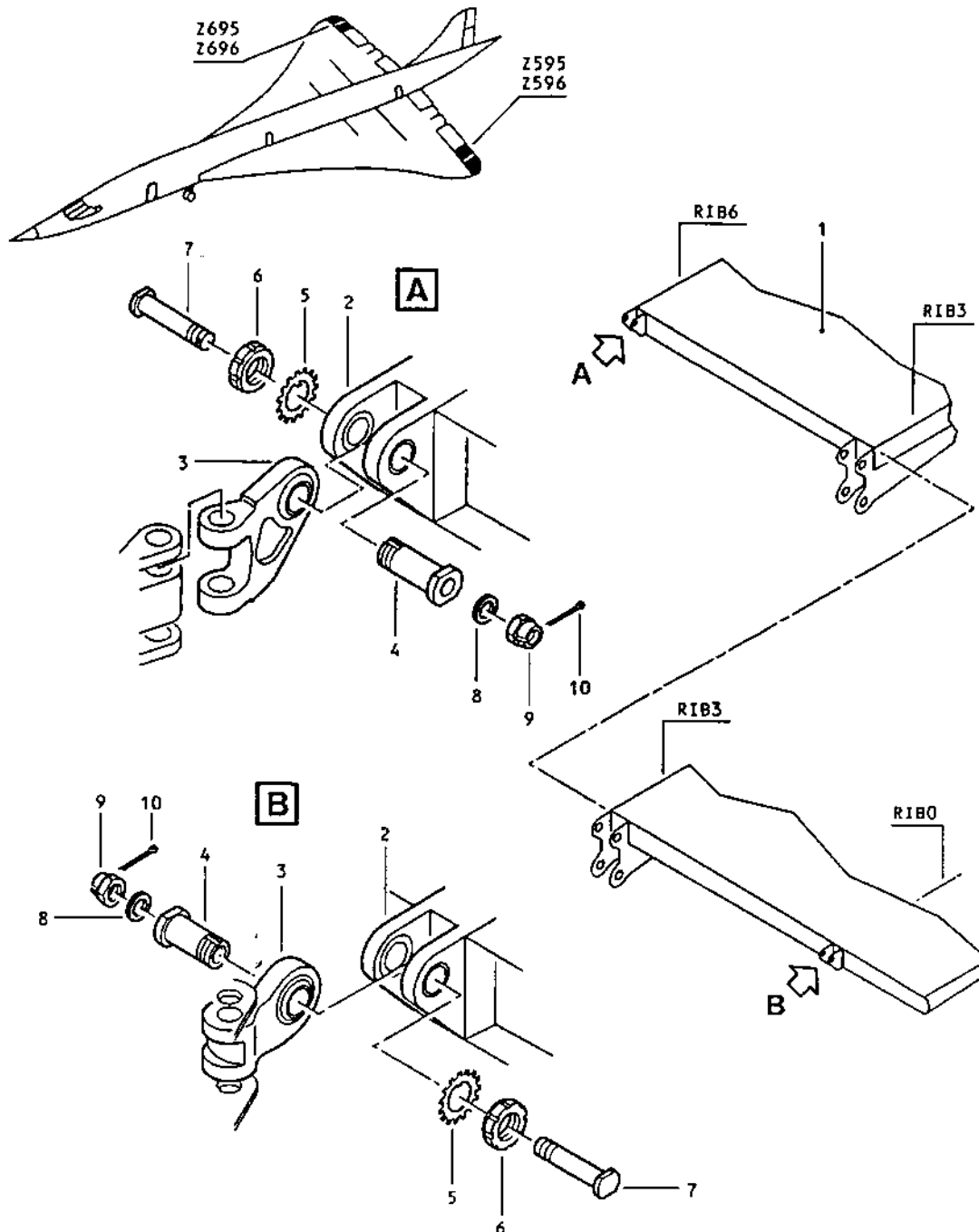
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# Concorde

## MAINTENANCE MANUAL



CMB 27 31 62 4 AAM0 00

Outer and Middle Elevon Shackles  
Figure 401A

EFFECTIVITY: ALL

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# *Concorde*

## MAINTENANCE MANUAL

### E. Install Shackle (Ref. Fig.401A)

- (1) Engage shackle (3) with the hinge assembly (2) on the elevon assembly (1) and insert shaft (4).
- (2) Install key washer (5) and nut (6) on shaft (4) and tighten nut (6).
- (3) Torque-tighten nut (6) to between 40.5 and 47.5 lbf ft (5.5 and 6.5 mdaN).
- (4) Install bolt (7), washer (8) and tighten nut (9).
- (5) Torque-tighten nut (9) to between 19.17 and 25.1 lbf ft (2.6 and 3.4 mdaN).
- (6) Safety with cotter pin (10).

### F. Preparation of Replacement Component

**NOTE:** Prior to installation of the elevon ensure that the following Concorde AMS tasks have been completed satisfactorily:

Pre Mod. 55G006 Elevons

Part 3 Tasks: 0555004H (LH) or 0655004H (RH)

Post Mod. 55G006 Elevons

Part 3 Tasks: 0555005H (LH) or 0655005H (RH).

- (1) Install equipment D930130000.
- (2) Check that nut (31) run down torque is at least 20 lbf in (0.226 mdaN).  
If load is less than this value, it is necessary to install a new nut or to recondition existing nut as follows:
  - Remove the four locking inserts.
  - Install new inserts (Ref. 20-30-00, No.123) dia. 0.157 to 0.158 in (3.988 to 4.013 mm) length 0.25 to 0.26 in (6.35 to 6.604 mm).
  - Run reamer down nut. Reamer dia. 0.885 to 0.895 in (22.479 to 22.733 mm).

**NOTE:** Only inserts are to be machined, do not ream nut thread.

### G. Install

- (1) Offer up the elevon and pin the hinges with hollow bolts (3) and (6).
- (2) Install a new tabwasher (7) and tighten nut (8).  
Torque-tighten nut (8) to 110.634 lbf ft (15 mdaN). Bend tabwasher tabs to safety.

**NOTE:** Castellated nut must be installed with chamfer towards fitting.

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NOTE: In the following procedures (3) and (4), if possible re-use the tabwashers that were fitted. When re-using tabwashers, break off the used tab and dress the jagged edge. When re-torquing the nut, if the remaining tabs fail to line up with the slots in the nut, consider using a tabwasher from another location. If this does not work then renew the tabwasher. It is acceptable for the tabwasher to be re-used four (4) times.

Do not use any tab more than once.

- (3) Install bolt (5), a new tabwasher (9) and tighten nut (10).  
Torque nut (10) to 88.507 lbf ft (12 mdaN). Bend tabwasher tabs to safety.

NOTE: Castellated nut must be installed with chamfer towards fitting.

- (4) Install pin (4), tabwasher (2) and bolt (1).  
Bend tabwasher tabs to safety. Torque bolt (1) to between 115.059 and 123.910 lbf in (1.3 and 1.4 mdaN).
- (5) Remove equipment D930130000.
- (6) Check that elevon deflection is at least : 29° nose up and 26° 30' nose down, from neutral, for outer and middle elevons.
- (7) Offer up shackle (24) to support (23). Install bolt (20) and washer (21) and tighten nut (22).  
Torque nut (22) to 14.751 lbf ft (2 mdaN).  
Safety with cotter.
- (8) Install control rod (14)
- (a) If only one elevon (1, 2, 3 or 4) is removed/installed, installation of control rod (14) shall be carried out as per instructions detailed in Paragraph (9) following.
- (b) In case of removal/installation of two elevons actuated by the same PFCU (elevons 1 and 2 or 3 and 4) control rod (14) installation shall be carried out as per instructions detailed in Paragraph (10) following.
- (9) Install control rod (14), (Only one elevon (1, 2, 3

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## MAINTENANCE MANUAL

or 4) removed).

- install thrust washer (28) on PFCU (27) trunnion (32).
- position control rod (14) and connect to PFCU and to elevon.

- (a) Attach to PFCU  
Position eccentric bush (29) on PFCU trunnion (32) so that bolt (13) attaching rod (14) to elevon spherical bearing can be inserted easily. Install peel washer (30) and nut (31). Torque to between 9.2 and 16.6 m.daN (67.85 and 122.43 lbf.ft).  
Safety with cotter pin.

NOTE : - If necessary, adjust thickness of peel washer (30) to obtain required torque value.  
- Prior to installation, smear bolts with product No.51.

- (b) Attach to elevon ;  
Connect control rod (14) to elevon spherical bearing with bolt (13), install peel washer (15), castle nut (16) and tighten. Torque to between 6 and 8 m.daN (44.25 to 59 lbf.ft).  
Install cup washer (12), bolt (11), a new tab washer (17), washer (18), nut (19). Torque to between 0.7 and 0.8 m.daN (62 and 71 lbf.in.)

NOTE : If holes for safetying bolt are not aligned with slots in nut, it is necessary to correct thickness of peel washer (15).  
Prior to installation, lightly smear bolts with product No.51.

- (10) Install control rod (14), (two elevons, actuated by the same PFCU, removed).

- (a) Install elevon neutral setting jig D921303000 for elevons 1 and 2, or D921304000 for elevons 3 and 4, as applicable. Position elevon so that it contacts equipment and lock in this position with zeroing equipment D921354000. After locking, make certain that elevon still contacts equipment D921304000 or D921303000.
- (b) Install protractor on elevon and set to zero.
- (c) Remove equipment D921303000 or D921304000

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(d) LH rod ;

(d1) Attach to PFCU ;

Install thrust washer (28), control rod (14), and position eccentric bush (29) to zero (marks on body aligned with marks on bush)

Install peel washer (30) and nut (31). Torque to between 9.2 and 16.6 m.daN (67.85 and 122.43 lbf.ft.).

Safety with cotter pin.

NOTE : If necessary, adjust thickness of peel washer (30) to obtain required torque value.

- Prior to installation, lightly smear bolts with product No.51.

(d2) Attach to elevon

Connect control rod (14) to elevon spherical bearing with bolt (13), install peel washer (15), castle nut (16) and tighten. Torque to between 6 and 8 m.daN (44.25 and 59 lbf.ft.). Install cup washer (12), bolt (11), a new tab washer (17), washer (18), nut (19). Torque to between 0.7 and 0.8 m.daN (62 to 71 lbf.in).

NOTE : If holes for safetying bolt are not aligned with slots in nut, it is necessary to correct thickness of peel washer (15).

- Prior to installation, lightly smear bolts with product No.51.

(e) RH rod

(e1) Attach to PFCU

Install thrust washer (28) control rod (14) and position eccentric bush (29) on PFCU trunnion (32) so that bolt (13) attaching control rod (14) to elevon spherical bearing can be inserted easily. Install peel washer (30) and nut (31). Torque to between 9.2 and 16.6 m.daN (67.85 and 122.43 lbf.ft.).

Safety with cotter pin.

NOTE : If necessary, adjust thickness of peel washer (30) to obtain required torque value.

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Prior to installation, smear bolts with product No.51.

### (e2) Attach to elevon

Connect control rod (14) to elevon spherical bearing with bolt (13) install peel washer (15), castle nut (16) and tighten. Torque to between 6 and 8 m.daN (44.25 and 59 lbf.ft). Install cup washer (12), bolt (11), a new tab washer (17), washer (18) nut (19). Torque to between 0.7 and 0.8 m.daN (62 and 71 lbf.in).

NOTE : If holes for safetying bolt are not aligned with slots in nut, it is necessary to correct thickness of peel washer (15).

- Prior to installation, lightly smear bolts with product No.51.

### (f) Check on protractor that elevons are at neutral.

### (g) Check resolver electrical zero. (Ref. Fig. 402 )

#### (g1) Unsafety and disconnect PFCU electrical connectors. Connect test set TE3016000 cables to PFCU connectors. Supply test set with 28VDC.

#### (g2) On test set, place POWER JACKS AND NOSE WHEEL STEERING selector switch in BLUE CT CONTROL ELEVONS position and check that resolvers are set to zero. If resolvers are not set to zero, carry out adjustment as follows.

- Cut and remove lockwire from bolts (52), (54) and (55) and nut (51).
- Slightly loosen bolts (52), (54) and (55).
- Loosen nut (51) so that bolt (53) can be turned, but with slight resistance.
- Turn bolt (53) in appropriate direction until adjustment indicator pointer indicates 0 degrees plus or minus 2 minutes. At the same time gradually increase test set sensitivity to maximum.

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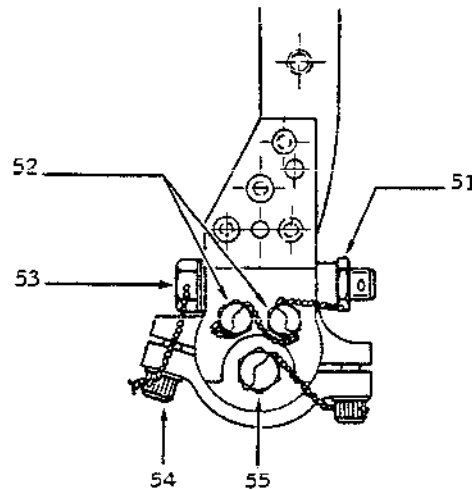
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Resolver Electrical Zero Setting  
Figure 402

- Tighten nut (51)  
Torque to between 0.15 and 0.17 m.daN (13 and 15 lbf. in).
- Make certain, that electrical zero has not varied.
- Tighten bolts (52) and (54).  
Torque to between 0.07 and 0.09 m.daN (6 and 8 lbf.in).
- Tighten bolt (55).  
Torque to between 0.259 and 0.282 m.daN (23 and 25 lbf. in.).
- Wirelock bolts (52), (54) and (55) and nut 51 (Ref. 20-21-13).
- Disconnect test set and connect aircraft electrical circuit connectors to PFCU

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- Disconnect PFCU feedback link bolt attachment plate
- Remove zeroing equipment D921354000
- Fully deflect elevon in both directions and check that in both PFCU stop positions, feedback link can be connected easily to structure

WARNING: IN BOTH PFCU STOP POSITIONS, MAKE CERTAIN BEFORE CONNECTING FEEDBACK LINK TO STRUCTURE THAT THERE IS A CLEARANCE OF AT LEAST 1 mm (0.039 in) BEFORE RESOLVERS ACHIEVE THEIR INTERNAL STOPS.

- Secure feedback link bolt attachment plate to structure. Wirelock (Ref. 20-21-13)
- Remove warning notices and set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing)
- Immobilize roll and pitch resolvers with rigging pins D925252001 and D925252003
- Immobilize bellcrank at RIB3 or RIB9 with rigging pin D921337000
- On protractor, check that elevon is at zero. If necessary, adjust length of PFCU control rod to set elevon to zero. Tighten and safety control rod ends
- Remove rigging pins D92133700, D925252003 and D925252001
- Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode.

- (11) Remove protractors.
- (12) Connect bonding leads.
- (13) Remove warning notices.

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### R H. Tests

- (1) Carry out operational tests (Ref. 27-11-00, 27-31-00, Adjustment/Test).
- (2) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### R J. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Install elevon contour strips

544KB, JB, HB, GB, WT, VT, UT, TT	Elevon 1 - LH
544FB, EB, ST, RT	Elevon 2 - LH
543GB, HB, RT, ST	Elevon 3 - LH
543EB, FB, QT, PT	Elevon 4 - LH
644KG, JB, HB, GB, WT, VT, UT, TT	Elevon 1 - RH
644FB, EB, ST, RT	Elevon 2 - RH
643GB, HB, RT, ST	Elevon 3 - RH
643EB, FB, QT, PT	Elevon 4 - RH
- (3) Install doors giving access to elevon hinges

544DB, QT, PT - 596AB, AT - 595BB, BT	Elevon 1 - LH
544PT - 543NT, DB - 595AB, BB, BT, AT	Elevon 2 - LH
543DB, NT, MT - 594AB, AT - 593BB, BT	Elevon 3 - LH
543CB, MT - 593AB, BB, AT, BT	Elevon 4 - LH
644DB, QT, PT - 696AB, AT - 695BB, BT	Elevon 1 - RH
644PT - 643NT, DB - 695AB, BB, BT, AT	Elevon 2 - RH
643DB, NT, MT - 694AB, AT - 693BB, BT	Elevon 3 - RH
643CB, MT, LT - 693AB, BB, AT, BT	Elevon 4 - RH
- (4) Install PFCU fairings

553JB, 553KB	Elevons 1 and 2 - LH
552JB, 552KB	Elevons 3 and 4 - LH
653JB, 653KB	Elevons 1 and 2 - RH
652JB, 652KB	Elevons 3 and 4 - RH
- (5) Install elevon fairings (57-30-30, Removal/Installation).
- (6) Close access door 151DB and 121FB.
- (7) Remove access platforms.

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### ELEVONS 1, 2 AND 3, 4 - INSPECTION/CHECK

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN 24-00-00, SERVICING.

#### 1. General

The purpose of the following operations is to check play at PFCU control rod and elevon hinge points.

#### 2. Check of Elevon Swivel Joint Play

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging pins - synchro pack	D925252000
Access platform 3.485 m (11 ft. 5 in.)	
Collar Assembly - Elevon Hinge Swivel Joint Backlash	PC09099200
Attachment Press - Elevon Hinge Swivel Joint Backlash	PC09099300

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DESCRIPTION	PART NO.
Support Plate - Elevon Hinge Swivel Joint Backlash	PC09099400
Compartment Support	D921687000
Conventional Comparator	
Comparator with a magnetic base	
Warning notices	

### B. Prepare

- (1) Remove the following fairings : (Ref. 57-30-30, Removal/Installation)
  - LH outer PFCU, fairings 553MB, NB
  - LH middle PFCU, fairings 552MB, NB
  - RH outer PFCU, fairings 653MB, NB
  - RH middle PFCU fairings 652MB, NB
- (2) Disconnect elevons by removing connecting shackles.
- (3) Take the precautions described in the previous WARNING paragraph.
- (4) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).
- (5) Check that pitch and roll trim controls are at zero.
- (6) Remove access panel 121FB and immobilize pitch and roll resolvers with rigging pins D925252003 and D925252001.
- (7) Display a warning notice in Flight Compartment prohibiting operation of Flight Controls.

### C. Procedure for Checking Play of Elevon Hinge Swivel Joints

- (1) Measuring displacement of an elevon trailing edge at the level of each PFCU enables the sum of play of the following hinge swivel joints to be checked.
  - "a" connection - control rod to PFCU.
  - "b" connection - control rod to elevon.
  - "c" elevon hinge point.

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- (2) Maximum permissible play.  
The maximum permissible play at the elevon trailing edge is 14 mm (0.55 in.).
- (3) Measurement procedure (Ref. Fig. 601 )
  - (a) Position a comparator on the trailing edge of one of both elevons (group of outer and middle elevons). Stylus resting on the other elevon in area shown on figure (Play Measurement - Principle).
  - (b) Apply a load of 50 daN (112.385 lbf.) upwards to elevon and record displacement on comparator.  
  
NOTE : Load support plate (steel plate covered by a neoprene coating) must be positioned as shown on figure (Play Measurement - Principle).  
Load (50 daN (112.387 lbf.)) must be applied to elevon supporting the comparator stylus.
  - (c) Repeat procedure detailed in paragraphs (a) and (b) above, on adjacent elevon.
- (4) In case elevon displacement exceeds permissible play 14 mm (0.55 in.) record play of each hinge swivel joint (as per following paragraph).

### D. Procedure for Checking Play of Each Hinge Swivel Joint of an Elevon

- (1) Remove the following fairings (Ref. 57-30-30, Removal/Installation)

LH outer PFCU 553JB, LL, LR, KB  
LH middle PFCU 552JB, LL, LR, KB  
RH outer PFCU 653JB, LL, LR, KB  
RH middle PFCU 652JB, LL, LR, KB

(Ref. Fig. 602 )

- (2) Measurement points and permissible play.
  - (a) Check elevon swivel joint at the 3 following points :  
  
"a" connection - control rod to PFCU  
"b" connection - control rod to elevon  
"c" elevon hinge point

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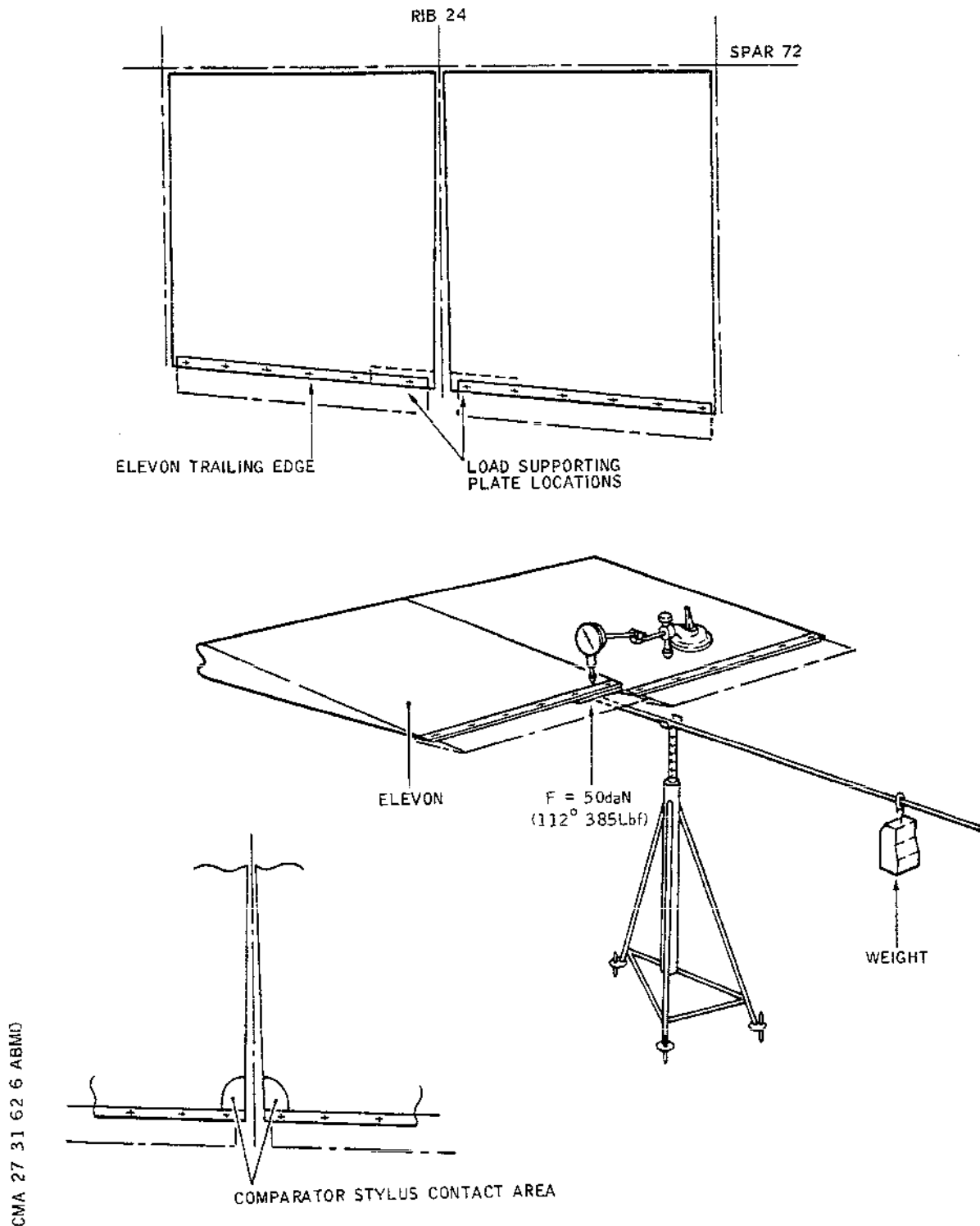
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Play Measurement Principle  
Figure 601

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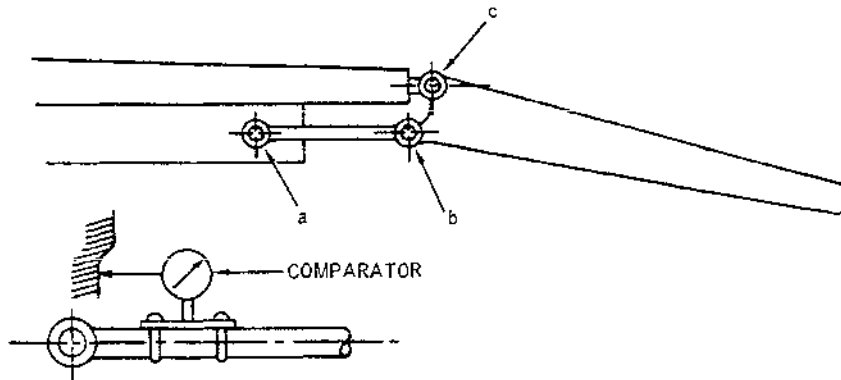
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Hinge Swivel Joints Check  
Figure 602

- (b) Limit play of each hinge swivel joint "a", "b" and "c" is 0.6 mm (0.0236 in.) with a total play for the three hinge swivel joints less than or equal to 1.4 mm (0.055 in.)

- (c) Equipment required

Point "a" - PC0 9099200 and conventional comparator

Point "b" - PC0 9099300 and conventional comparator

Point "c" - PC0 9099400 and comparator with a magnetic base.

- (3) Procedure for measuring play of hinge swivel joint.

- (a) At each measurement point, position a comparator on one of the two components, stylus resting on the other.

- (b) As per figure (Play Measurement - Principle) apply a load of 50 daN (112.385 lbf.) upwards to elevon

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and record deflection on comparator.

NOTE : Load support plate (steel plate covered by a neoprene coating) must be positioned as shown on figure (Play Measurement - Principle).  
Load (50 daN (112.387 lbf.)) must be applied to elevon supporting the comparator stylus.

- (c) Repeat procedure detailed in paragraphs (a) and (b), on each elevon.
- (d) Replace components showing play out of tolerance (Ref. approved repairs).

### E. Close-Up

- (1) Remove rigging pins D925252001 and D925252003 from resolvers.
- (2) Shut down pressurization of hydraulic systems.  
(Ref. 27-00-00, Servicing, procedure to set Flight Controls in electrical mode).
- (3) Install access panel 121FB.
- (4) Install elevon connecting shackle.
- (5) Install fairings (Ref. 57-30-30, Removal/Installation).
- (6) Remove warning notice.
- (7) Remove access platform.

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### ELEVON 1, 2 AND 3, 4 - APPROVED REPAIRS

#### 1. General

- A. The following procedure deals with replacement of bushes and (or) attaching bolts worn to maximum limits.
- B. As it is not intended to remove attachment fittings, repairs shall be carried out in situ.

The tools referred to in Equipment and Material paragraph shall be used to proceed with :

- Removal of bush to be discarded
- Accurate centering before fitting is reamed
- Correct positioning of parts to be assembled

As reaming is not always possible through use of only one reamer, a set of reamers with progressive diameters shall be used to achieve work.

- C. The job is to be performed on elevons 1, 2 and 3, 4 of RH and LH wings.
- D. Make certain that electrical looms located in adjacent area do not interfere with job accomplishment and do not present any danger for repair personnel.

If there is evidence of risks, observe the electrical safety precautions described in chapter 24-00-00, Servicing.

#### 2. Approved Repairs on elevons 1, 2 and 3, 4

- A. Equipment and Materials

DESCRIPTION	PART NO.
-------------	----------

To be issued later

- B. Prepare

Proceed with removal of elevons 1, 2 and 3, 4 as per 27-31-62, Removal/installation.

- C. Oversize reaming of shackle ID between elevon 1 and 2 or 3 and 4

(1) Procedure : to be issued later

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- (2) Tolerance tables  
(Ref. Fig. 801 )

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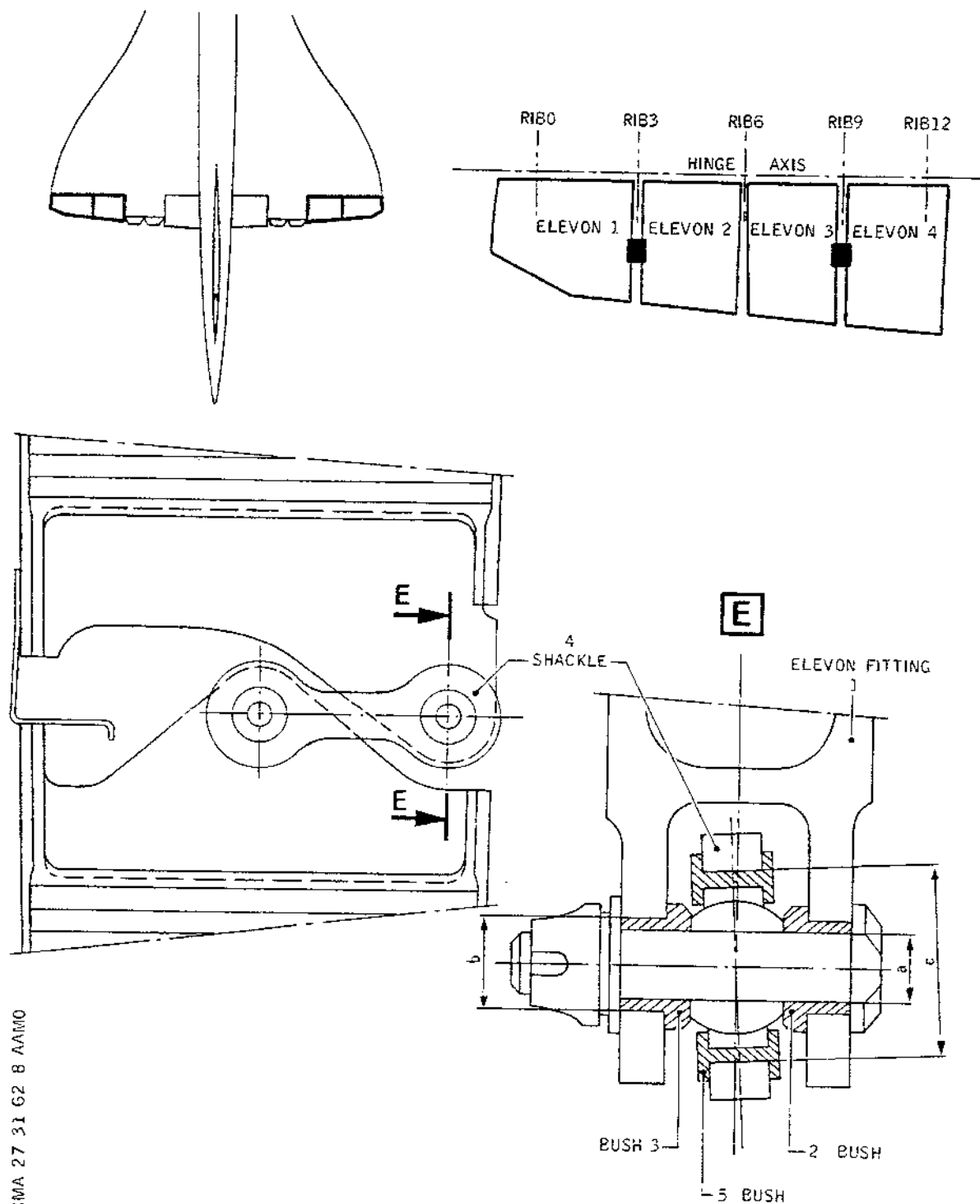
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Shackle Between Elevons 1 and 2  
(Ref. Tables 1, 2 and 3)  
Figure 801

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OVERSIZE REAMING OF DIMENSION a					
PART 1			PART 3		
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
a THEORETICAL	12.5	H7 +0.018 +0.000	a THEORETICAL	12.5	k6 +0.012 +0.001
a 1st STAGE	12.7	H7 +0.018 +0.000	a 1st STAGE	12.7	k6 +0.012 +0.001
a 2nd STAGE	12.9	H7 +0.018 +0.000	a 2nd STAGE	12.9	k6 +0.012 +0.001
a 3rd STAGE	13.1	H7 +0.018 +0.000	a 3rd STAGE	13.1	k6 +0.012 +0.001
a 4th STAGE	13.3	H7 +0.018 +0.000	a 4th STAGE	13.3	k6 +0.012 +0.001

OVERSIZE REAMING OF DIMENSION a					
PART 1			PART 3		
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
a THEORETICAL	0.492	H7 +0.0007 +0.000	a THEORETICAL	0.492	k6 +0.0003 +0.00004
a 1st STAGE	0.500	H7 +0.0007 +0.000	a 1st STAGE	0.500	k6 +0.0005 +0.00004
a 2nd STAGE	0.507	H7 +0.0007 +0.000	a 2nd STAGE	0.507	k6 +0.0005 +0.00004
a 3rd STAGE	0.515	H7 +0.0007 +0.000	a 3rd STAGE	0.515	k6 +0.0005 +0.00004
a 4th STAGE	0.523	H7 +0.0007 +0.000	a 4th STAGE	0.523	k6 +0.0005 +0.00004

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Table 1

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## MAINTENANCE MANUAL

OVERSIZE REAMING OF DIMENSION b					
PART 1			PART 2		
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
b THEORETICAL	12.5	H7 +0.018 +0.000	b THEORETICAL	12.5	h6 -0.000 -0.011
b 1st STAGE	12.7	H7 +0.018 +0.000	b 1st STAGE	12.7	h6 -0.000 -0.011
b 2nd STAGE	12.9	H7 +0.018 +0.000	b 2nd STAGE	12.9	h6 -0.000 -0.011
b 3rd STAGE	13.1	H7 +0.018 +0.000	b 3rd STAGE	13.1	h6 -0.000 -0.011
b 4th STAGE	13.3	H7 +0.018 +0.000	b 4th STAGE	13.3	h6 -0.000 -0.011

OVERSIZE REAMING OF DIMENSION b					
PART 1			PART 2		
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
b THEORETICAL	0.492	H7 +0.0007 +0.000	b THEORETICAL	0.492	h6 -0.000 -0.0004
b 1st STAGE	0.500	H7 +0.0007 +0.000	b 1st STAGE	0.500	h6 -0.000 -0.0004
b 2nd STAGE	0.507	H7 +0.0007 +0.000	b 2nd STAGE	0.507	h6 -0.000 -0.0004
b 3rd STAGE	0.515	H7 +0.0007 +0.000	b 3rd STAGE	0.515	h6 -0.000 -0.0004
b 4th STAGE	0.523	H7 +0.0007 +0.000	b 4th STAGE	0.523	h6 -0.000 -0.0004

CMA 27 31 62 8 ACM0

Table 2

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# Concorde

## MAINTENANCE MANUAL

OVERSIZE REAMING OF DIMENSION c					
PART 4			PART 5		
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
c THEORETICAL	23.1	H7 +0.021 +0.000	c THEORETICAL	23.1	h6 -0.000 -0.013
c 1st STAGE	23.3	H7 +0.021 +0.000	c 1st STAGE	23.3	h6 -0.000 -0.013
c 2nd STAGE	23.5	H7 +0.021 +0.000	c 2nd STAGE	23.5	h6 -0.000 -0.013
c 3rd STAGE	23.7	H7 +0.021 +0.000	c 3rd STAGE	23.7	h6 -0.000 -0.013
c 4th STAGE	23.9	H7 +0.021 +0.000	c 4th STAGE	23.9	h6 -0.000 -0.013

OVERSIZE REAMING OF DIMENSION c					
PART 4			PART 5		
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
c THEORETICAL	0.909	H7 +0.0008 +0.000	c THEORETICAL	0.909	h6 -0.000 -0.0005
c 1st STAGE	0.917	H7 +0.0008 +0.000	c 1st STAGE	0.917	h6 -0.000 -0.0005
c 2nd STAGE	0.925	H7 +0.0008 +0.000	c 2nd STAGE	0.925	h6 -0.000 -0.0005
c 3rd STAGE	0.933	H7 +0.0008 +0.000	c 3rd STAGE	0.933	h6 -0.000 -0.0005
c 4th STAGE	0.940	H7 +0.0008 +0.000	c 4th STAGE	0.940	h6 -0.000 -0.0005

CMA 27 31 62 8 AGMO

Table 3

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# *Concorde*

## MAINTENANCE MANUAL

- D. Oversize reaming on elevon control hinge fitting ID
  - (1) Procedure : to be issued later
  - (2) Tolerance tables  
(Ref. Fig. 802 )
- E. Oversize reaming on elevon hinge fitting ID at RIB0,  
RIB6, RIB12
  - (1) Procedure : to be issued later
  - (2) Tolerance tables  
(Ref. Fig. 803, 804 and 805)

EFFECTIVITY: ALL

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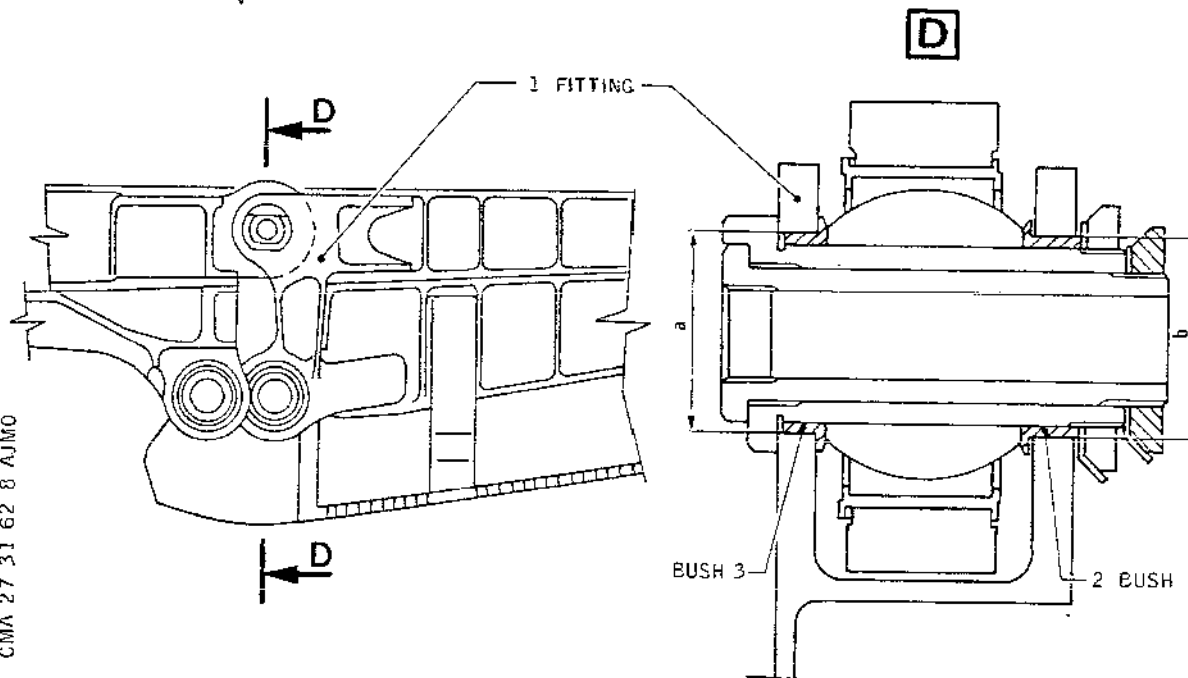
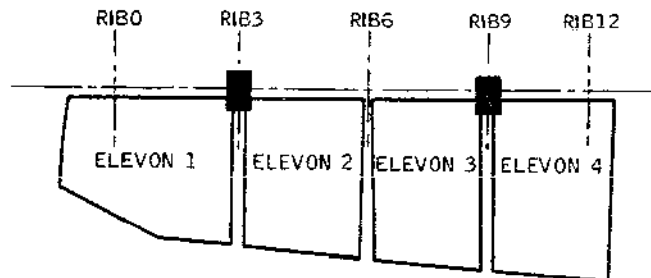
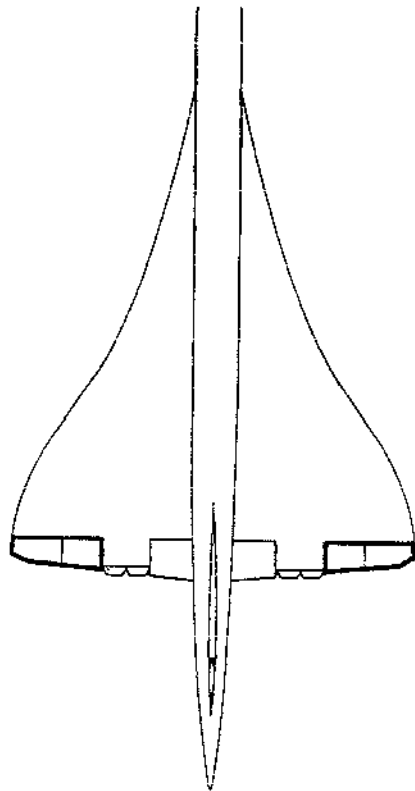
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## MAINTENANCE MANUAL



Elevon Control Hinge  
Figure 802

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# Concorde

## MAINTENANCE MANUAL

OVERSIZE REAMING OF DIMENSION a AND b					
PART 1			PARTS 2 AND 3		
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
a AND b THEORETICAL	43	H6 +0.016 +0.000	a AND b THEORETICAL	43	h6 -0.003 -0.010
a-b 1st STAGE	43.2	H6 +0.016 +0.000	a-b 1st STAGE	43.2	h6 -0.003 -0.010
a-b 2nd STAGE	43.4	H6 +0.016 +0.000	a-b 2nd STAGE	43.4	h6 -0.003 -0.010
a-b 3rd STAGE	43.6	H6 +0.016 +0.000	a-b 3rd STAGE	43.6	h6 -0.003 -0.010
a-b 4th STAGE	43.8	H6 +0.016 +0.000	a-b 4th STAGE	43.8	h6 -0.003 -0.010

OVERSIZE REAMING OF DIMENSION a AND b					
PART 1			PARTS 2 AND 3		
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
a AND b THEORETICAL	1.692	H6 +0.0006 +0.000	a AND b THEORETICAL	1.692	h6 -0.0001 -0.0004
a-b 1st STAGE	1.700	H6 +0.0006 +0.000	a-b 1st STAGE	1.700	h6 -0.0001 -0.0004
a-b 2nd STAGE	1.708	H6 +0.0006 +0.000	a-b 2nd STAGE	1.708	h6 -0.0001 -0.0004
a-b 3rd STAGE	1.716	H6 +0.0006 +0.000	a-b 3rd STAGE	1.716	h6 -0.0001 -0.0004
a-b 4th STAGE	1.724	H6 +0.0006 +0.000	a-b 4th STAGE	1.724	h6 -0.0001 -0.0004

CMA 27 31 62 8 ALMO

Table 4

EFFECTIVITY: ALL

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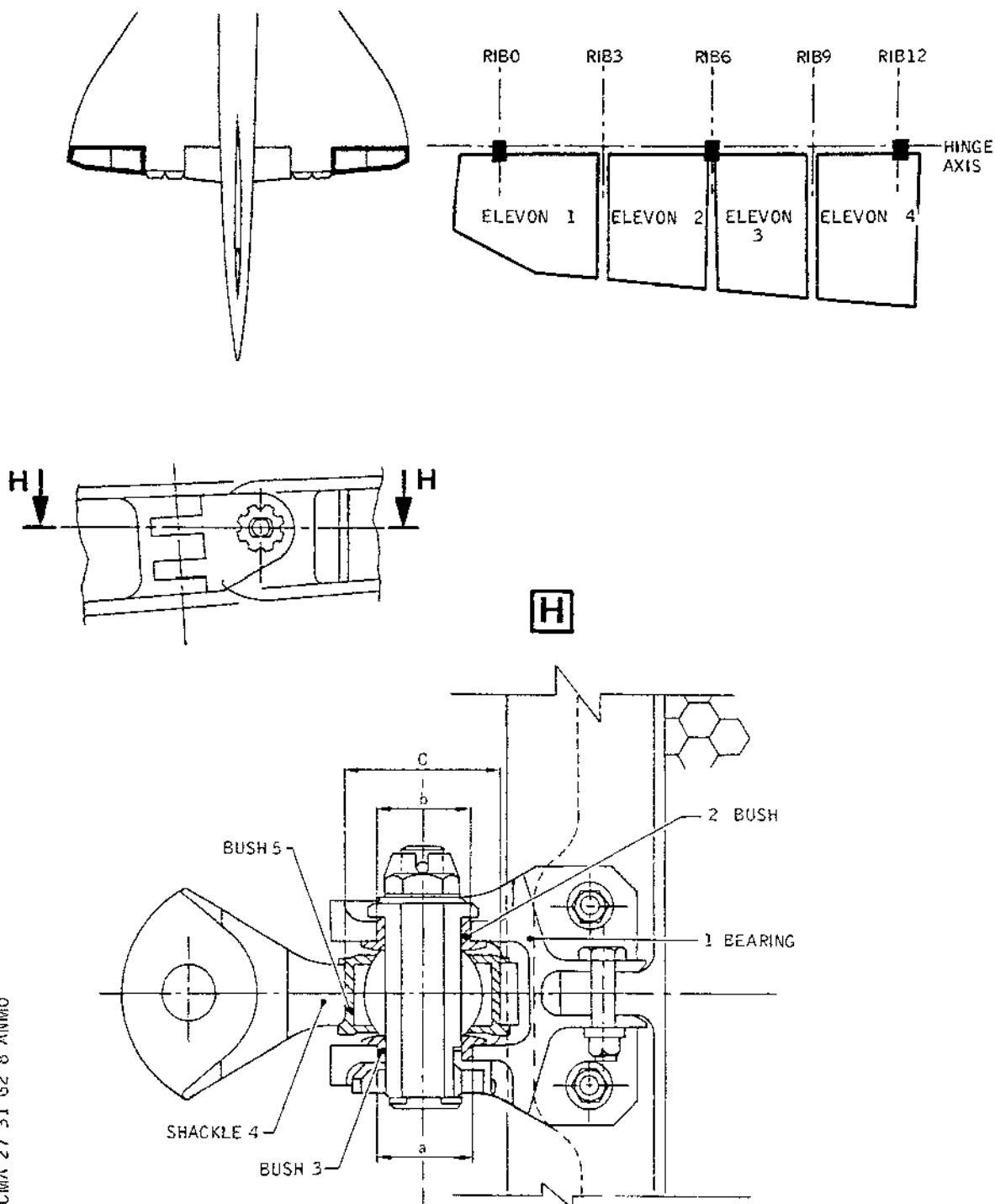
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## MAINTENANCE MANUAL



CMA 27 31 62 8 ANMO

Hinge Shackle RIB0, RIB6, RIB12  
(Ref. Tables 5 and 6)  
Figure 803

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## MAINTENANCE MANUAL

OVERSIZE REAMING OF DIMENSION a AND b					
PART 1			PARTS 2 AND 3		
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
a-b THEORETICAL	23	H7 +0.021 +0.000	a-b THEORETICAL	23	h6 -0.000 -0.013
a-b 1st STAGE	23.2	H7 +0.021 +0.000	a-b 1st STAGE	23.2	h6 -0.000 -0.013
a-b 2nd STAGE	23.4	H7 +0.021 +0.000	a-b 2nd STAGE	23.4	h6 -0.000 -0.013
a-b 3rd STAGE	23.6	H7 +0.021 +0.000	a-b 3rd STAGE	23.6	h6 -0.000 -0.013
a-b 4th STAGE	23.8	H7 +0.021 +0.000	a-b 4th STAGE	23.8	h6 -0.000 -0.013

OVERSIZE REAMING OF DIMENSION a AND b					
PART 1			PARTS 2 AND 3		
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
a-b THEORETICAL	0.905	H7 +0.0008 +0.000	a-b THEORETICAL	0.905	h6 -0.000 -0.0005
a-b 1st STAGE	0.913	H7 +0.0008 +0.000	a-b 1st STAGE	0.913	h6 -0.000 -0.0005
a-b 2nd STAGE	0.921	H7 +0.0008 +0.000	a-b 2nd STAGE	0.921	h6 -0.000 -0.0005
a-b 3rd STAGE	0.929	H7 +0.0008 +0.000	a-b 3rd STAGE	0.929	h6 -0.000 -0.0005
a-b 4th STAGE	0.937	H7 +0.0008 -0.000	a-b 4th STAGE	0.937	h6 -0.000 -0.0005

CMA 27 31 62 8 AQMO

Table 5

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# Concorde

## MAINTENANCE MANUAL

OVERSIZE REAMING OF DIMENSION c					
PART 1			PART 5		
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
c THEORETICAL	37	K6 +0.018 +0.002	BAS 7084 - 028	37	h6 +0.000 +0.016
c 1st STAGE	37.2	K6 +0.018 +0.002	NAS 5114 - 02 - 028	37.2	h6 +0.000 +0.016
c 2nd STAGE	37.4	K6 +0.018 +0.002	NAS 5114 - 04 - 028	37.4	h6 +0.000 +0.016
c 3rd STAGE	37.6	K6 +0.018 +0.002	NAS 5114 - 06 - 028	37.6	h6 +0.000 +0.016
c 4th STAGE	37.8	K6 +0.018 +0.002	NAS 5114 - 08 - 028	37.8	h6 +0.000 +0.016

OVERSIZE REAMING OF DIMENSION c					
PART 4			PART 5		
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
c THEORETICAL	1.456	K6 +0.0007 +0.0001	BAS 7084 - 028	1.456	h5 +0.000 +0.0006
c 1st STAGE	1.464	K6 +0.0007 +0.0001	NAS 5114 - 02 - 028	1.464	h5 +0.000 +0.0006
c 2nd STAGE	1.472	K6 +0.0007 +0.0001	NAS 5114 - 04 - 028	1.472	h5 +0.000 +0.0006
c 3rd STAGE	1.480	K6 +0.0007 +0.0001	NAS 5114 - 06 - 028	1.480	h5 +0.000 +0.0006
c 4th STAGE	1.488	K6 +0.0007 +0.0001	NAS 5114 - 08 - 028	1.488	h5 +0.000 +0.0006

CMA 27 31 62 8 ASMO

Table 6

EFFECTIVITY: ALL

BA

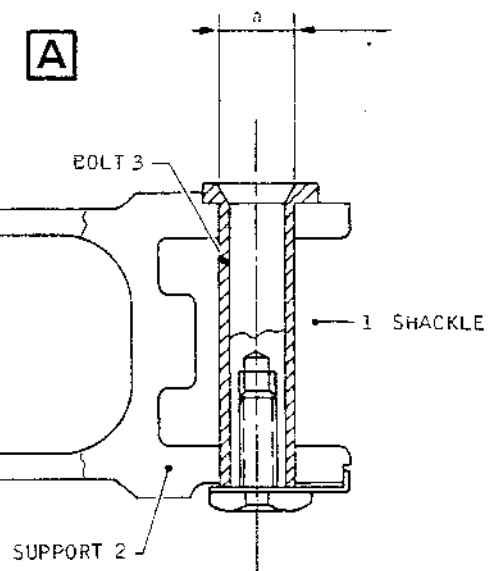
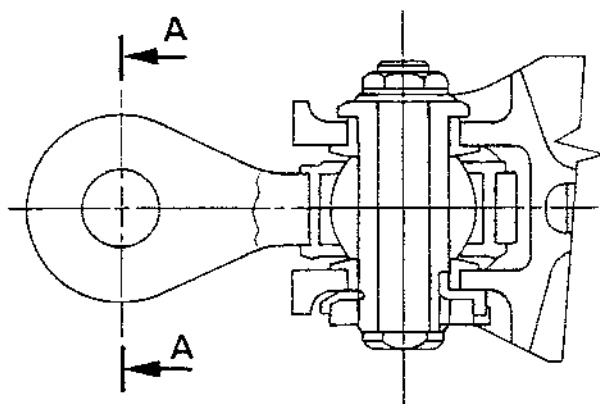
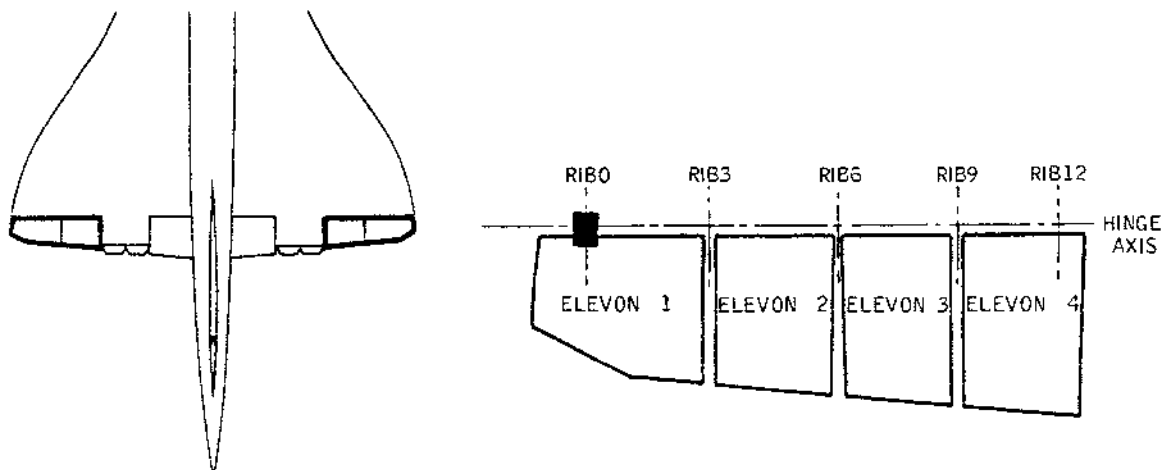
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## MAINTENANCE MANUAL



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Hinge Shackle RIB0 (Ref. Table 7)  
Figure 804

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## MAINTENANCE MANUAL

OVERSIZE REAMING OF DIMENSION a					
PARTS 1 AND 2			PART 3		
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
a THEORETICAL	16	H7 +0.000 +0.018	a THEORETICAL	16	g6 -0.006 -0.017
a 1st STAGE	16.2	H7 +0.000 +0.018	a STAGE	16.2	g6 -0.006 -0.017
a 2nd STAGE	16.4	H7 +0.000 +0.018	a 2nd STAGE	16.4	g6 -0.006 -0.017
a 3rd STAGE	16.6	H7 +0.000 +0.018	a 3rd STAGE	16.6	g6 -0.006 -0.017
a 4th STAGE	16.8	H7 +0.000 +0.018	a 4th STAGE	16.8	g6 -0.006 -0.017

OVERSIZE REAMING OF DIMENSION a					
PARTS 1 AND 2			PART 3		
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
a THEORETICAL	0.629	H7 +0.000 +0.0007	a THEORETICAL	0.629	g6 -0.0002 -0.0007
a 1st STAGE	0.637	H7 +0.000 +0.0007	a STAGE	0.637	g6 -0.0002 -0.0007
a 2nd STAGE	0.645	H7 +0.000 +0.0007	a 2nd STAGE	0.645	g6 -0.0002 -0.0007
a 3rd STAGE	0.653	H7 +0.000 +0.0007	a 3rd STAGE	0.653	g6 -0.0002 -0.0007
a 4th STAGE	0.661	H7 +0.000 +0.0007	a 4th STAGE	0.661	g6 -0.0002 -0.0007

CMA 27 31 62 8 AWMO

Table 7

EFFECTIVITY: ALL

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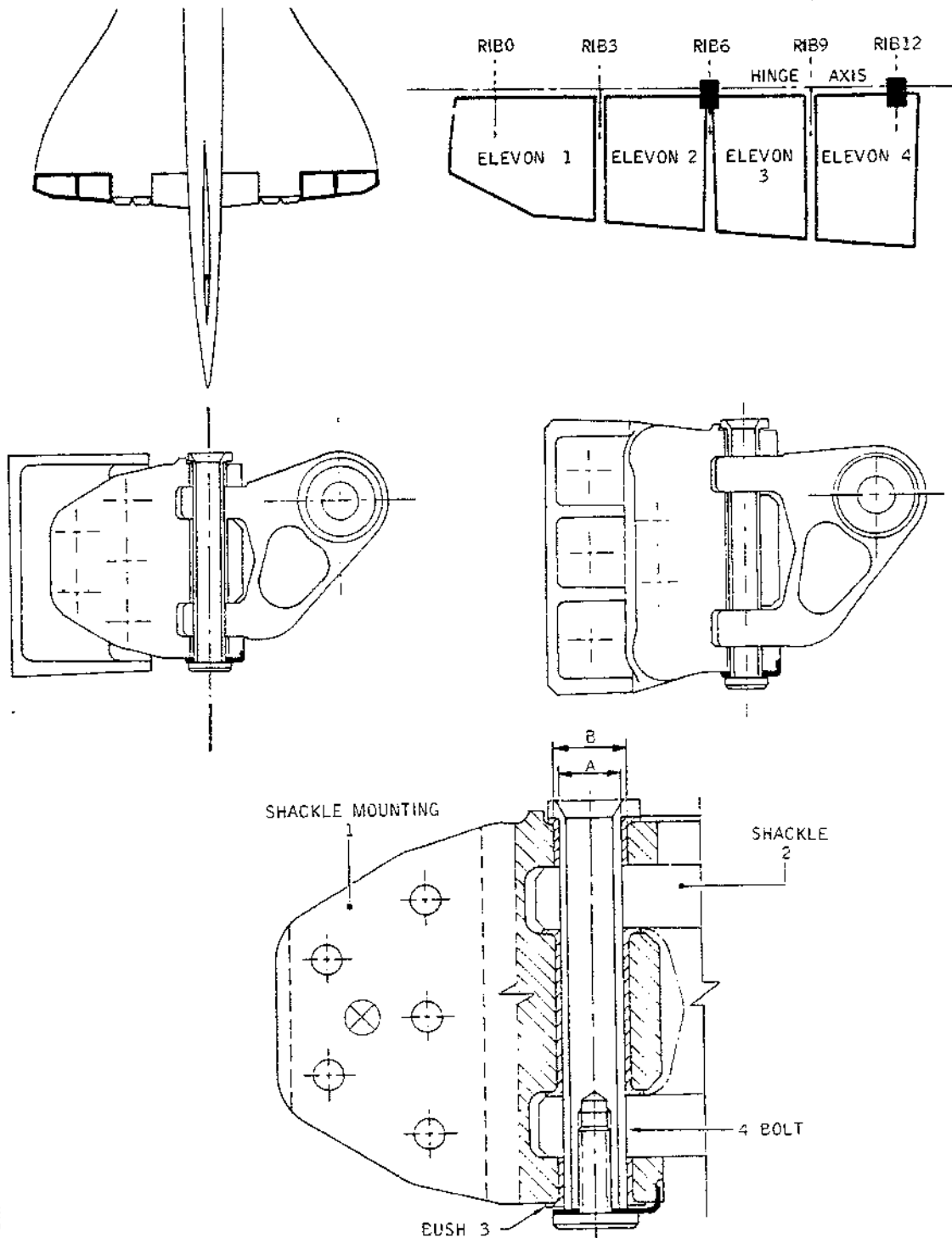
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## MAINTENANCE MANUAL



CMA 27 3J 62 8 AYM0

Hinge Shackle RIB6 and RIB12 (Ref. Table 8)  
Figure 805

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## MAINTENANCE MANUAL

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## MAINTENANCE MANUAL

OVERSIZE REAMING OF DIMENSION a						OVERSIZE REAMING OF DIMENSION b					
PART 4			PARTS 3 AND 2			PART 3			PARTS 1 AND 2		
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE		DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
a THEORETICAL	16	g6 -0.006 -0.017	a THEORETICAL	16	H7 +0.000 +0.018	b THEORETICAL	19	+0.055 +0.042	b THEORETICAL	19	H7 +0.000 +0.021
a THEORETICAL	16	g6 -0.006 -0.017	a THEORETICAL	16	H7 +0.000 +0.018	b THEORETICAL	19	+0.055 +0.042	b THEORETICAL	19	H7 +0.000 +0.021
a 1st STAGE	16.2	g6 -0.006 -0.017	a 1st STAGE	16.2	H7 +0.000 +0.018	b 1st STAGE	19.8	g6 -0.007 -0.020	b 1st STAGE	19.8	+0.000 +0.021
a 2nd STAGE	16.4	g6 -0.006 -0.017	a 2nd STAGE	16.4	H7 +0.000 +0.018						
a 3rd STAGE	16.6	g6 -0.006 -0.017	a 3rd STAGE	16.6	H7 +0.000 +0.018	b 1st STAGE	19.8	g6 -0.007 -0.020	b 1st STAGE	19.8	H7 +0.000 +0.021
a 4th STAGE	16.8	g6 -0.006 -0.017	a 4th STAGE	16.8	H7 +0.000 +0.018						

OVERSIZE REAMING OF DIMENSION a						OVERSIZE REAMING OF DIMENSION b					
PART 4			PARTS 3 AND 2			PART 3			PARTS 1 AND 2		
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE		DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
a THEORETICAL	0.629	g6 -0.0002 -0.0007	a THEORETICAL	0.629	H7 +0.000 +0.0007	b THEORETICAL	0.748	+0.0022 +0.0017	b THEORETICAL	0.748	H7 +0.000 +0.0008
a THEORETICAL	0.629	g6 -0.0002 -0.0007	a THEORETICAL	0.629	H7 +0.000 +0.0007	b THEORETICAL	0.748	+0.0022 +0.0017	b THEORETICAL	0.748	H7 +0.000 +0.0008
a 1st STAGE	0.637	g6 -0.0002 -0.0007	a 1st STAGE	0.637	H7 +0.000 +0.0007	b 1st STAGE	0.779	g6 -0.0003 -0.0008	b 1st STAGE	0.779	H7 +0.000 +0.0008
a 2nd STAGE	0.645	g6 -0.0002 -0.0007	a 2nd STAGE	0.647	H7 +0.000 +0.0007						
a 3rd STAGE	0.653	g6 -0.0002 -0.0007	a 3rd STAGE	0.653	H7 +0.000 +0.0007	b 1st STAGE	0.779	g6 -0.0003 -0.0008	b 1st STAGE	0.779	H7 +0.000 +0.0008
a 4th STAGE	0.661	g6 -0.0002 -0.0007	a 4th STAGE	0.661	H7 +0.000 +0.0007						

Table 8

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## MAINTENANCE MANUAL

F. Oversize reaming on elevon control fitting ID

(1) Procedure : to be issued later

(2) Tolerance tables  
(Ref. Fig. 806 )

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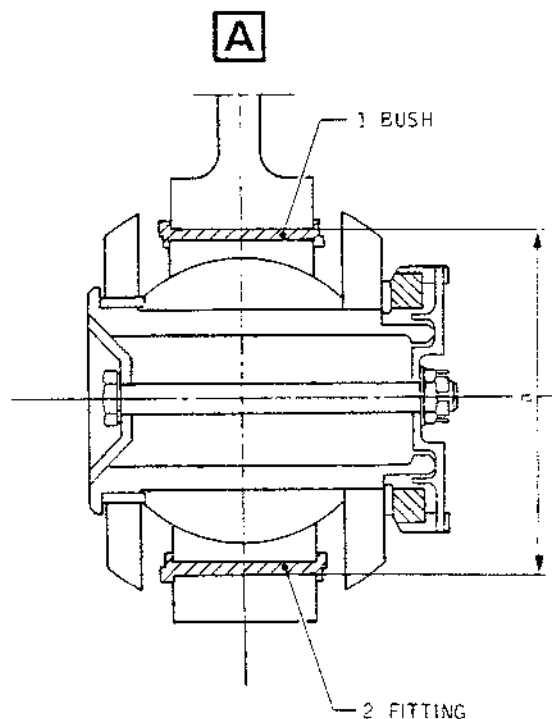
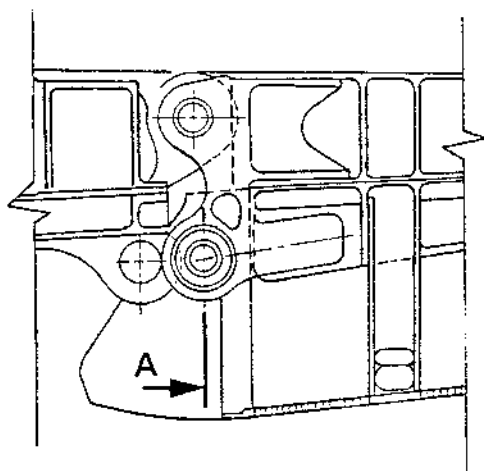
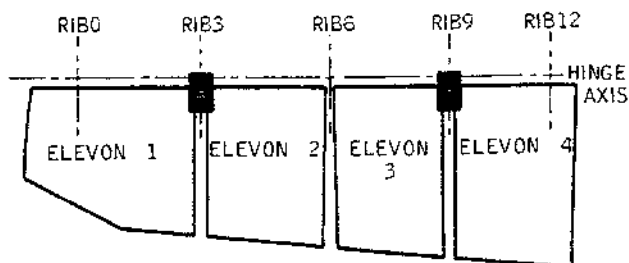
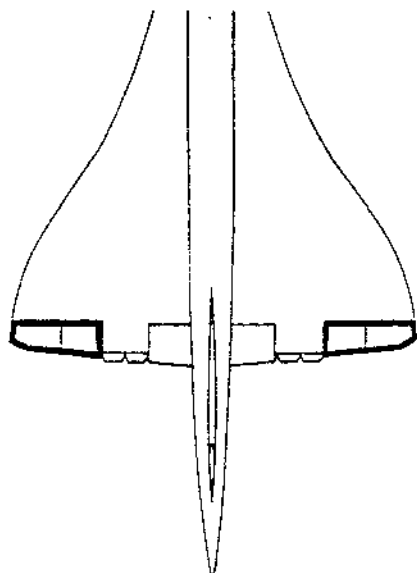
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## MAINTENANCE MANUAL



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Elevon Control Fitting  
Figure 806

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## MAINTENANCE MANUAL

OVERSIZE REAMING OF DIMENSION a					
PART 1			PART 2		
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
a THEORETICAL	71.7	K6 +0.004 -0.015	BAS 7084 - 032	71.7	h6 -0.000 -0.019
a 1st STAGE	71.9	K6 +0.004 -0.015	NSA 5114 - 02 - 32	71.9	h6 -0.000 -0.019
a 2nd STAGE	72.1	K6 +0.004 -0.015	NSA 5114 - 04 - 032	72.1	h6 -0.000 -0.019
a 3rd STAGE	72.3	K6 +0.004 -0.015	NSA 5114 - 06 - 032	72.3	h6 -0.000 -0.019
a 4th STAGE	72.5	K6 +0.004 -0.015	NSA 5114 - 08 - 032	72.5	h6 -0.000 -0.019

OVERSIZE REAMING OF DIMENSION a					
PART 1			PART 2		
	DIMENSION	TOLERANCE		DIMENSION	TOLERANCE
a THEORETICAL	2.822	K6 +0.0002 -0.0006	BAS 7084 - 032	2.822	h6 -0.000 -0.0007
a 1st STAGE	2.830	K6 +0.0002 -0.0006	NSA 5114 - 02 - 032	2.830	h6 -0.000 -0.0007
a 2nd STAGE	2.838	K6 +0.0002 -0.0006	NSA 5114 - 04 - 032	2.838	h6 -0.000 -0.0007
a 3rd STAGE	2.846	K6 +0.0002 -0.0006	NSA 5114 - 06 - 032	2.846	h6 -0.000 -0.0007
a 4th STAGE	2.854	K6 +0.0002 -0.0006	NSA 5114 - 08 - 032	2.854	h6 -0.000 -0.0007

CMA 27 31 62 8 BEMO

Tolerance Table

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# *Concorde*

## MAINTENANCE MANUAL

### ARTIFICIAL FEEL - DESCRIPTION AND OPERATION

#### 1. General

##### A. Purposes

The AF system has three purposes :

- To restore loads to the flight controls compatible with precise and stable piloting.
- To cut-in on the autopilot load limitation.
- To provide warnings at high angle of attack configuration in the form of pressure surges in the artificial feel jacks.  
(This warning, known as the "wobbler" cannot go unperceived by the pilot).

##### B. Principle of Operation

For the pitch axis, the object is to apply a load at the control column which remains virtually constant for the same load factor whatever the flight conditions.

As the efficiency of the control surfaces varies according to the flight ranges, the variable resistance depends on functions of mach numbers and trim deflections. The variable resistance is ensured by 2 hydraulic jacks, each controlled by a computer. Both jacks are controlled permanently but only one is operative, the second one being at a stop.

The first, or "normal" jack is supplied with hydraulic power by the Blue hydraulic system, and its computer is in operation when the PITCH switch on ARTIFICIAL FEEL engage switch unit No.1 (on overhead panel) is engaged. The second jack is supplied by the Green hydraulic system and its computer is in operation when the PITCH switch on ARTIFICIAL FEEL engage switch unit No.2 (on overhead panel) is engaged.

When both PITCH switches are engaged, the Green jack automatically replaces the Blue jack in the case of Blue jack failure.

The stand-by hydraulic pressure (Yellow) is not used.

A spring rod provides the resistance corresponding to low speed conditions and ensures a minimum safety in case of a double electro-hydraulic failure.

At high angle of attack configurations the wobbler warning is obtained by surges of the hydraulic pressure in the jacks, caused by logic signals coming from the SFC computers.

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# *Concorde*

## MAINTENANCE MANUAL

### R 2. Description

#### R A. Artificial Feel Mechanical System R (Ref. Fig. 001 )

R The Artificial Feel components for the three Flight Con-  
R trol axes are mounted on a single chassis attached to the  
R aircraft structure in the forward compartment (zone 121).

R The system comprises :

- R - an INTEGRAL TRIM ASSEMBLY which enables the loads of the  
R Artificial Feel system to be cancelled by a mechanical  
R differential
- R - a double action-load limiting spring rod which restores  
R loads proportional to out of trim deflections.
- R - a rocker arm which transmits loads delivered by the  
R electro-hydraulic jacks.
- R - two electro-hydraulic jacks, controlled by computers,  
R ensuring variable resistance.

#### R B. Artificial Feel Electronic System R (Ref. Fig. 002 )

R Two identical Artificial Feel systems are provided on the  
R aircraft. They operate simultaneously.

R The two systems comprise :

- R - two Artificial Feel computers :

R Computer No.1 (1C235) is located in LH electronics rack  
R on shelf 6-215. Computer No.2 (2C235) in RH electronics  
R rack on shelf 6-216.

R They develop load laws and monitor the system.

- R - two Artificial Feel engage switch units (1C236 and 2C236)  
R located on overhead panel

R They allow activation of the system and transmit orders  
R generated by the computer

- R - two press to test push buttons (1C245 and 2C245) located  
R on panel 29-214 at Flight Engineer's station

R They initiate the computer monitoring channel tests

- R - two compensated inductive potentiometers (C240 and  
R C241) fitted at integral trim assembly level. The  
R assembly worm screw drives these potentiometers which  
R transmit to the computers an electrical signal propor-  
R tional to the trim deflection angle (Dt)

R In addition, the two systems are connected to the follo-  
R wing components :

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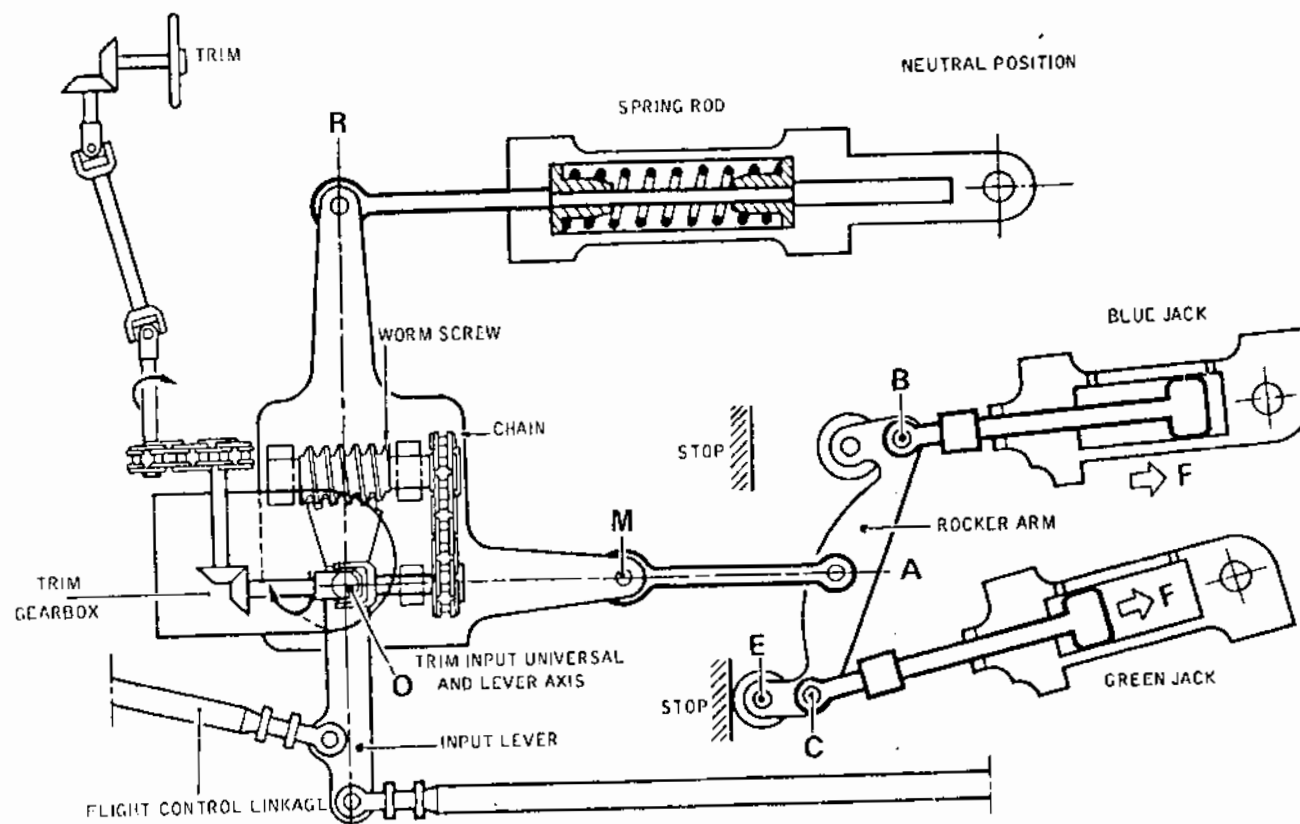
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# Concorde

## MAINTENANCE MANUAL

CMA 27 32 00 0 AAM0



Artificial Feel Mechanical System  
Figure 001

R

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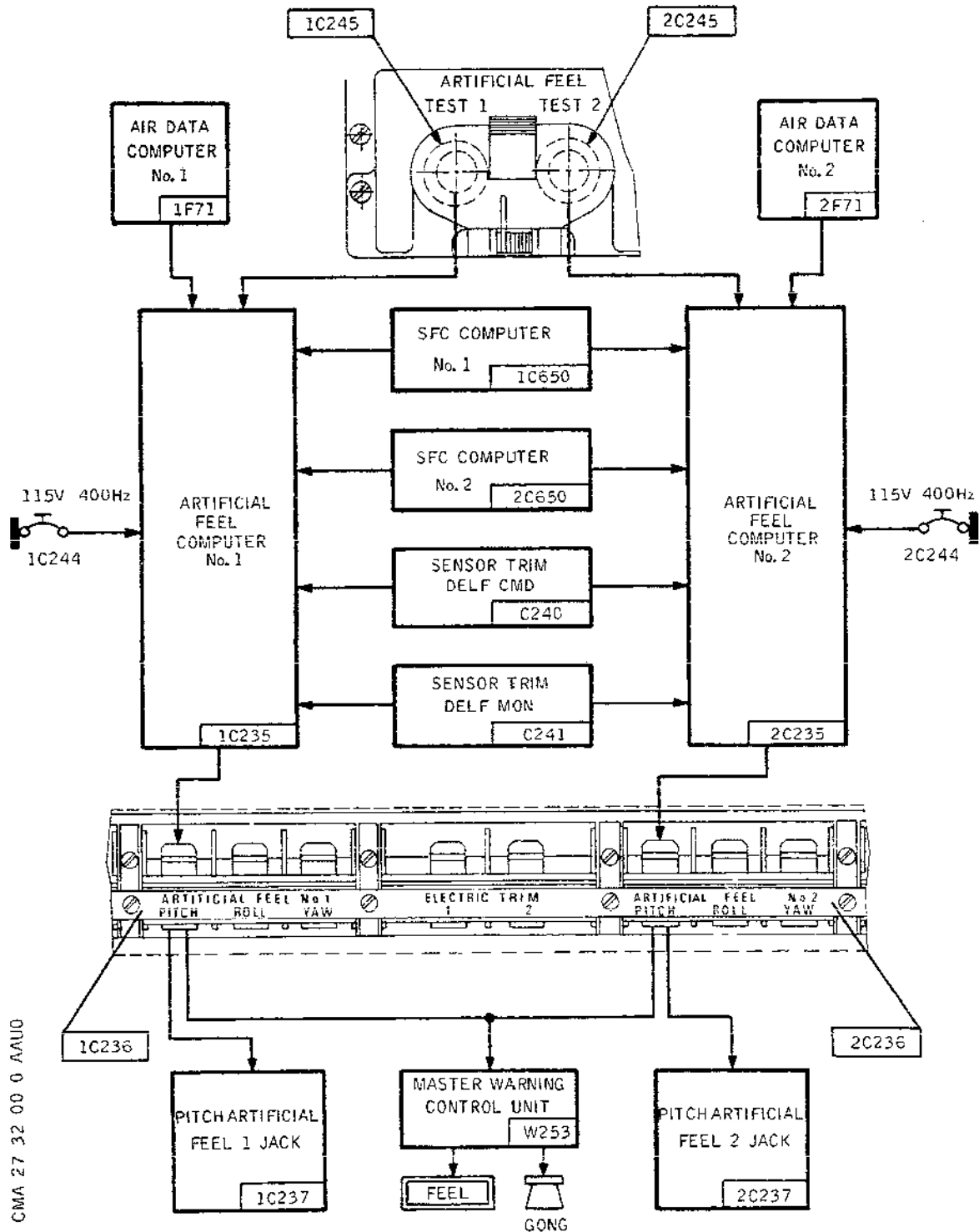
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# Concorde

## MAINTENANCE MANUAL



Artificial Feel Electronic System  
Figure 002

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# *Concorde*

## MAINTENANCE MANUAL

- R - air Data Computer, for data concerning Mach and General
- R ADC failure
- R - safety Flight Control Computers for transmission of the
- R wobbler warning activation order
- R - Master Warning System which receives the Gong and FEEL
- R warning light activation order

### 3. Assembly-Integral Trim (Ref. Fig. 001 )

The assembly comprises :

An input lever actuated by the order from the pilot's mechanical controls. The end of this lever is machined to form a toothed sector.

R A worm screw in which the input lever toothed sector is enmeshed. The worm screw attached to the assembly flanges is fitted with a double pinion ensuring its drive by the trim gears.

R This drive is achieved by a universal joint whose rotational axis is exactly the same as that of the input lever.

R The assembly flanges form a right angle, the apexes of which are indicated by the letters O, R and M on the illustrations.

R This assembly ensures two functions :

- R - cancellation of artificial feel system loads through a
- R differential mechanism
- R - control of elevons and rudders, through an irreversible
- R mechanical control (flight using trim) independent of the
- R main Flight Control

R These two functions are ensured by the toothed sector/worm

R screw mechanism described above.

### R 4. Spring Rod

R (Ref. Fig.001 and 003)

R The spring rod is made up of :

- R - a body (stationary) anchored to the chassis
- R - a mobile rod attached to point R on the integral trim
- R assembly flanges
- R - springs providing the load limit for returning control
- R column to neutral position and the variable resistance
- R corresponding to low speed conditions :
- R - two sliders ensuring junction between springs and mobile rod.
- R Whatever the direction of movement, the reaction of the
- R spring rod tends to align points O, M and A.

### 5. Jack-Artificial Feel (Ref. Fig. 004 )

EFFECTIVITY: ALL

BA

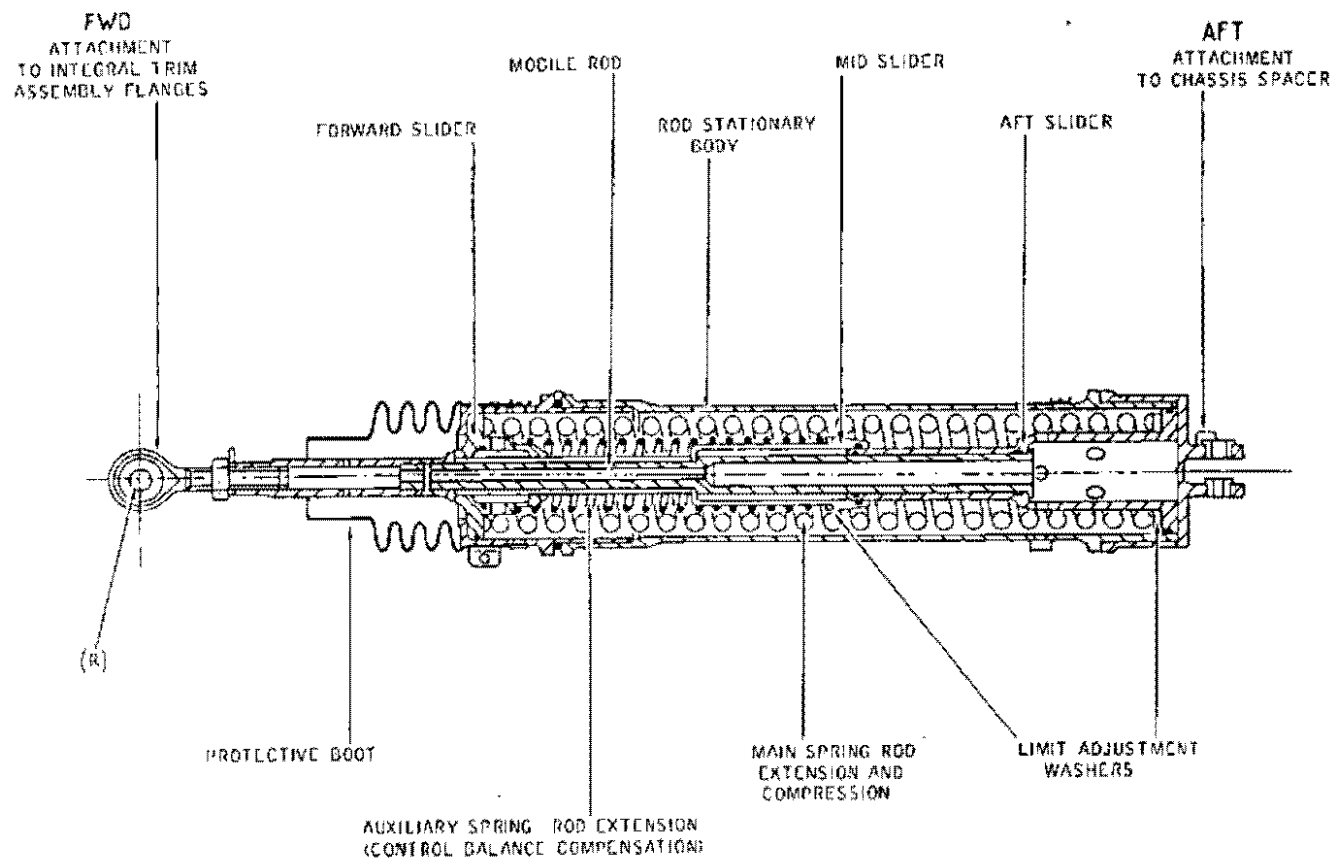
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# Concorde

## MAINTENANCE MANUAL

CMA 27 32 00 0 ABMO



R

Spring Rod  
Figure 003

**27-32-00**

EFFECTIVITY: ALL

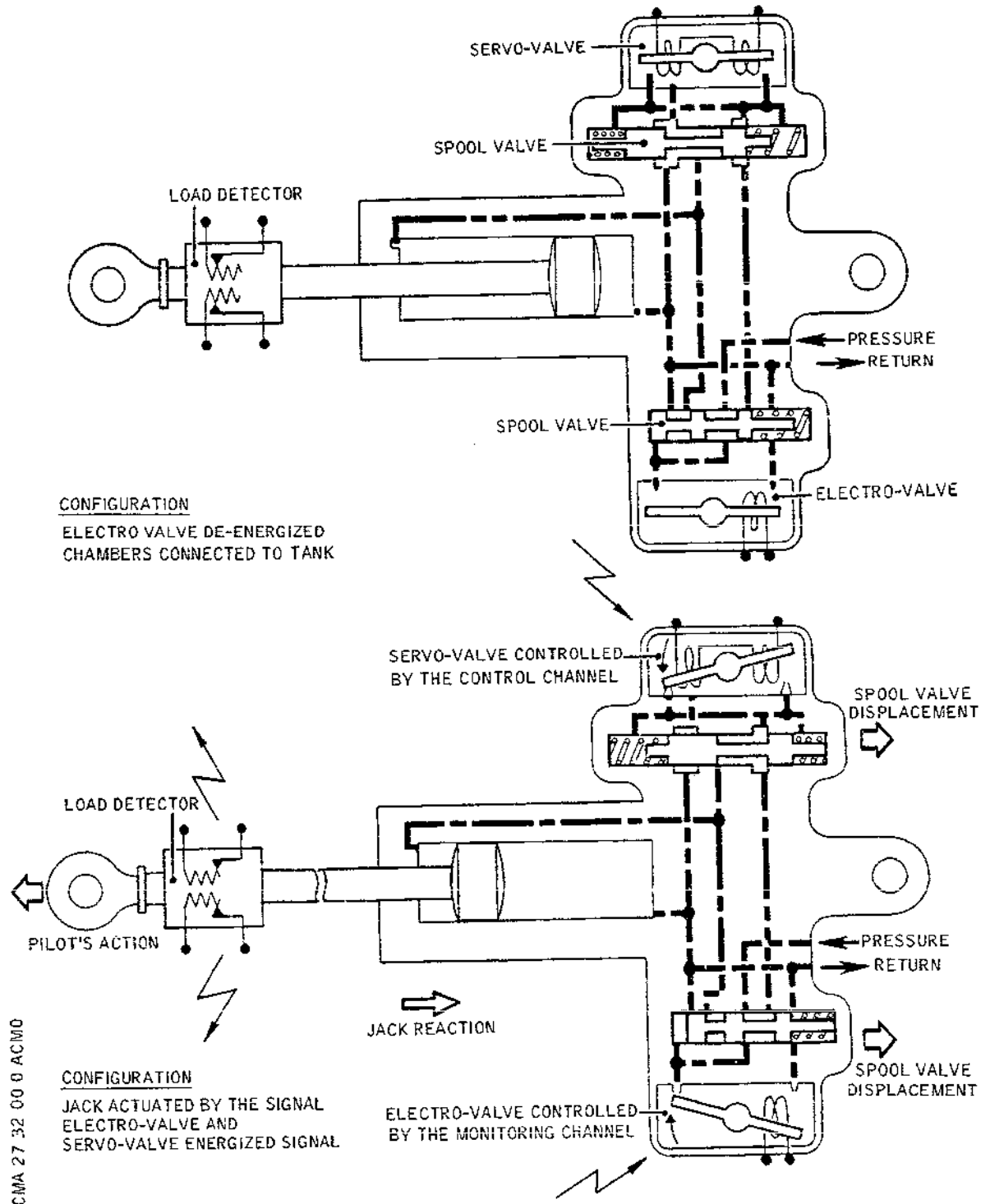
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## MAINTENANCE MANUAL



Artificial Feel Jack - Operation  
Figure 004

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## MAINTENANCE MANUAL

The artificial feel jack consists of an hydraulic section and an electrical section.

Hydraulic supply to the cylinder is through a spool valve controlled by an electro-valve.

Pressure control in the jack is regulated by a servo-valve.

The electro-valve is controlled by the electrical monitoring channel.

R The servo-valve is controlled by the electrical control channel.  
The piston rod is fitted with a load detector which compares the actual load on the jack with the control signal.

R If the electro-valve receives no signal, there is no hydraulic  
R pressure on the servo-valve and the jack chambers are at  
R tank return.

If the electro-valve is energized, hydraulic pressure is admitted to the servo-valve.

R The servo-valve regulates the pressure according to the signal received from the control mode.

This pressure, admitted to the front chamber of the jack, maintains a load corresponding to the control signal. The rear chamber of the jack is at tank return.

### 6. Computers-Artificial Feel (Ref. Fig. 005 )

R Each computer is located in a housing.

R This housing comprises :

R On the front panel, a P23 connector for testing and maintenance  
R purposes, an hour meter and a handling grip. On the rear panel  
R a double connector (DP x 2) is provided for connection to the  
R aircraft electrical network.

A computer controls the hydraulic pressure of a jack. For each jack, the electronic assembly comprises :

- 1 control channel
- 1 monitoring channel
- The supply of these channels
- R - The circuits necessary for testing of monitoring circuits.

The control channel achieves :

- R - The development of the control electrical order from the  
R various control signals with which it is provided
- The comparison of this order with the return signals from the load detector
- The development of the servovalve control signal.

The monitoring channel supervises the control channel.

- R - It receives identical (and independent) control signals and  
R develops a second electrical order
- R - It compares this second order to the return signal

EFFECTIVITY: ALL

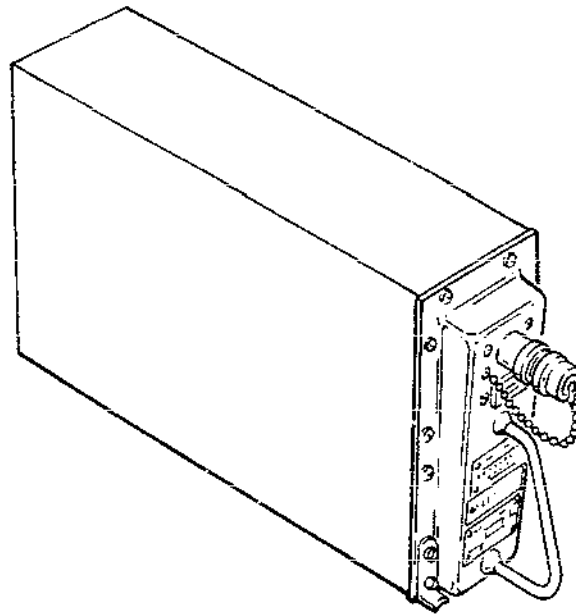
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*Concorde*  
MAINTENANCE MANUAL



CMA 27 32 00 0 ADMO

Artificial Feel Computer  
Figure 005

R

from the load detector second circuit

R

- It switches off the electro-valve electrical supply if the error signal resulting from the comparison, exceeds a fixed threshold.

Computer No.1 receives data from ADC No.1 and controls the Blue jacks while computer No.2 receives data from ADC No.2 and controls the Green jacks.

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## MAINTENANCE MANUAL

### R 7. Hydro-Mechanical Operation (Ref. Fig. 006 )

R Actuated by the flight controls, the input lever acts, through the integral trim assembly :

On the spring rod through point R.

R On the rocker arm through point M, the ends of the rocker arm are connected to two hydraulic jacks at B and C.

R The upper (Blue) jack is supplied by the Blue hydraulic system, and the lower (Green) jack by the Green hydraulic system.

When the two jacks are supplied they apply an equal force at points B and C.

R As the lever AB of the rocker arm is longer than lever AC the Blue jack is given priority. The Green jack abuts the stop at point E.

R Movement of the control compresses the spring rod and moves the rocker arm against the action of the hydraulic jack. To overcome spring rod resistance and jack action, loads proportional to control displacement and resistance in the system must be applied to the controls.

Blue Jack Failure (Ref. Fig. 007 )

If a fault occurs and the monitoring channel closes the electro-valve :

R - There is no longer pressure at the servo-valve.  
Both chambers of the jack are connected to the tank.  
The rocker arm actuated by the Green jack, pivots.  
The Blue jack abuts the stop.

R The system operates on the Green jack.  
If both jacks fail, only the spring rod remains active.

Therefore a reduction in speed is necessary.

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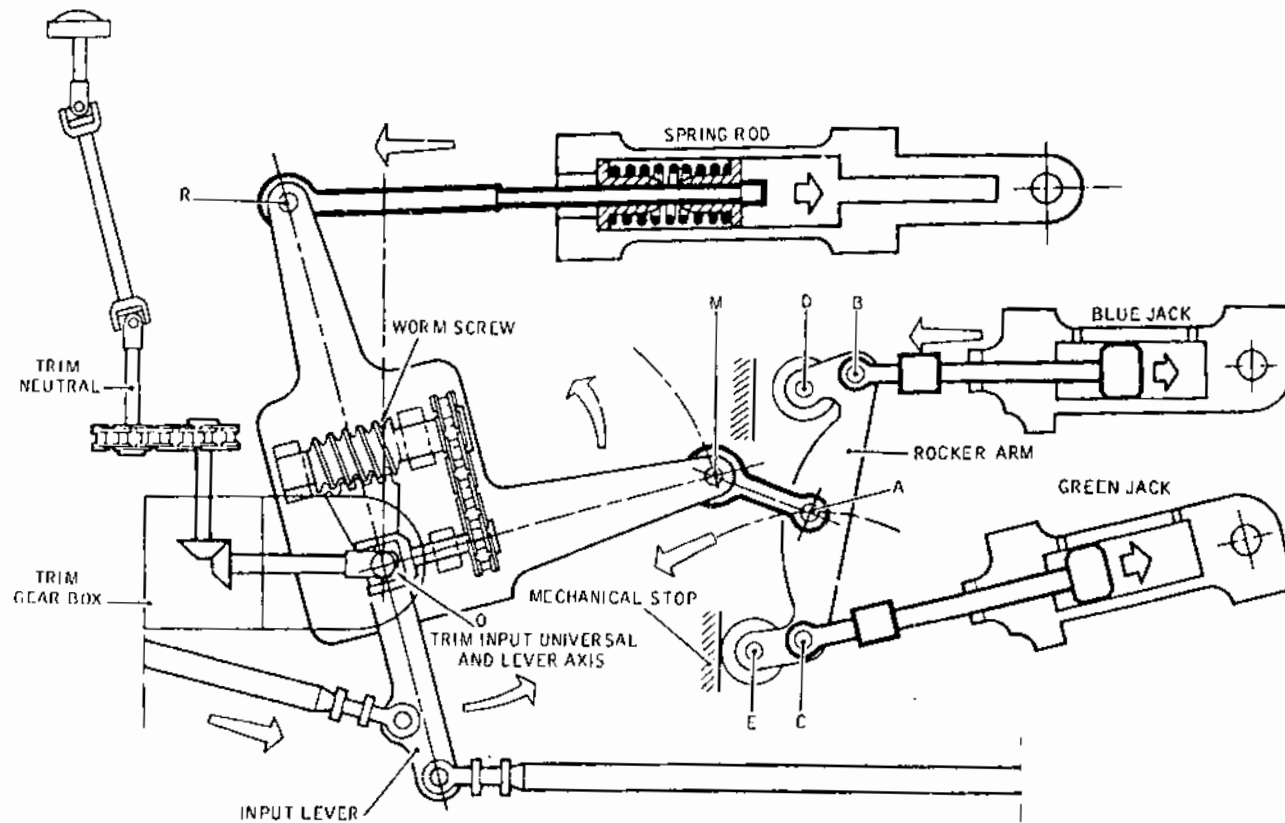
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## MAINTENANCE MANUAL

CMA 27 32 00 0 AEM0



R

Artificial Feel System - Hydro-mechanical Operation  
Figure 006

EFFECTIVITY: ALL

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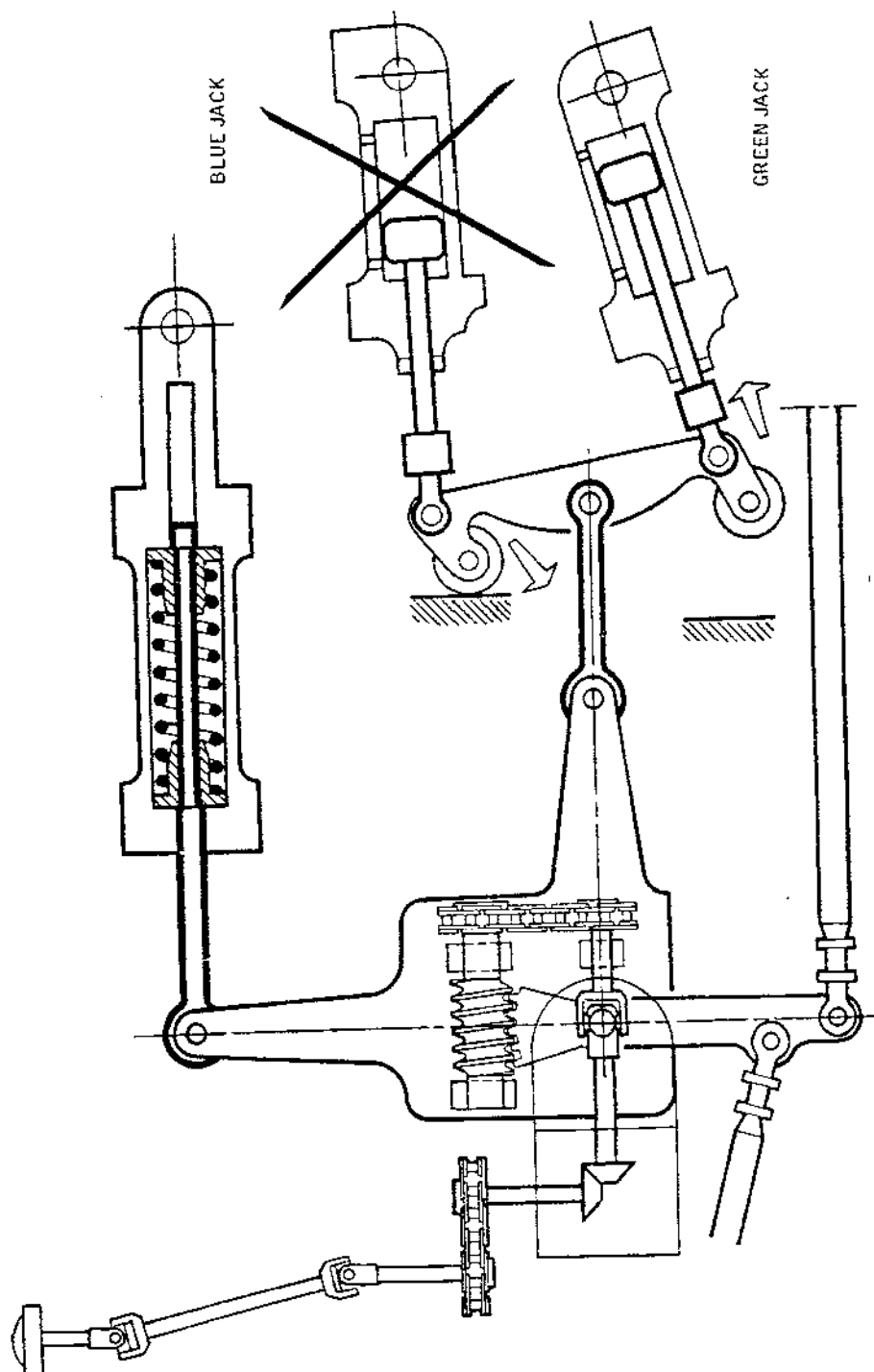
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## MAINTENANCE MANUAL



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Blue Jack Failure  
Figure 007

R

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### 8. Electronic Operation

#### A. Achieved Load Law (Ref. Fig. 008 )

##### (1) Normal operation

The load exerted by the jack is a law :

- proportional to a function of mach number developed by the ADC
- inversely proportional to the difference between a theoretical deflection (obtained from a second mach function developed by the ADC) and the pitch trim deflection
- reduced by a constant value

The load exerted by the jack can be expressed as :

$$F_j = \frac{K/L}{D_o - D_t} - h$$

where,

- $F_j$  is the load exerted by the jack
- $1/L$  and  $D_o$  are functions of mach number,
- $D_t$  is the pitch trim deflection
- $K$  and  $h$  are constants

##### (2) Load law Limitations

The load law being inversely proportional to the deflection difference ( $D_o - D_t$ ), a circuit has been provided for :

- limiting the load law to the required maximum load ( $F_{max}$ )
- retaining a minimum deflection difference corresponding to  $2^\circ$

##### (3) Wobbler Operation

This warning which consists in load pulsations generated by the pitch artificial feel jacks is triggered by the SFC computers when the aircraft corrected angle of attack increased by the time derivative of this angle of attack (this term is limited to  $3^\circ$ ) is greater than  $19.5^\circ$ .

The corrected angle of attack is the sum of the wing angle of attack (aircraft angle of attack +  $0.5^\circ$ ) and 0.3 times the pitch rate

The operation of this device is limited to :

- a calibrated airspeed less than 270 kts
- a nose up out of trim deflection

During the wobbler operation, the SFC computer develops

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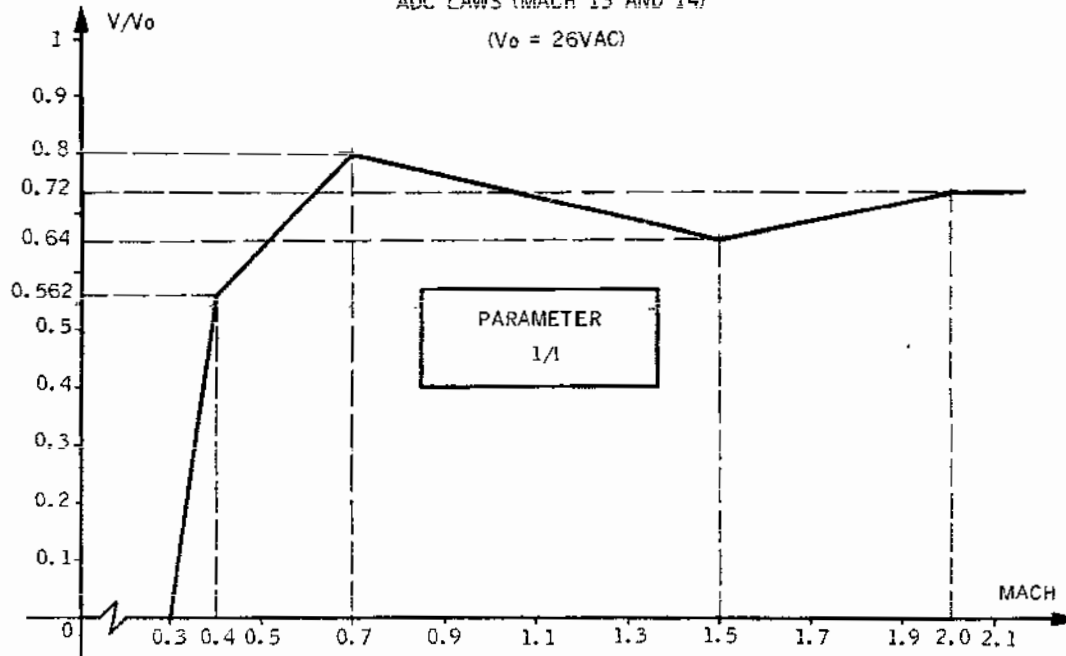
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## MAINTENANCE MANUAL

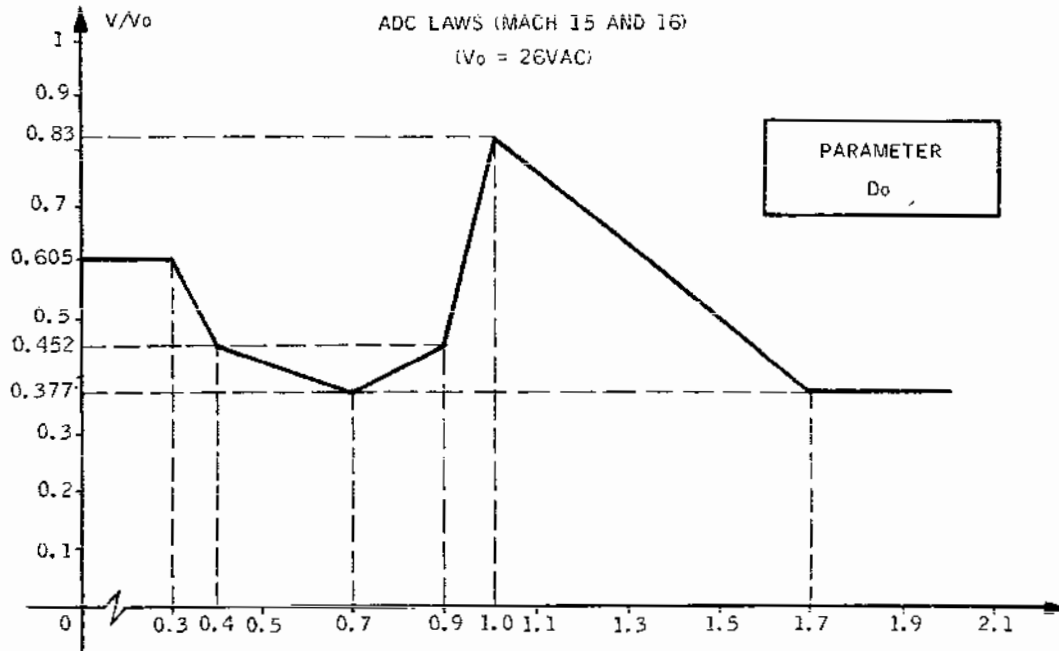
ADC LAWS (MACH 13 AND 14)

(V<sub>0</sub> = 26VAC)



ADC LAWS (MACH 15 AND 16)

(V<sub>0</sub> = 26VAC)



CMA 27 32 00 0 AHMO

NOTE : CONTROL COLUMN RESISTANCE = JACK LOAD X 0.0218 + ROD RESISTANCE

- Laws Generated by ADC  
Figure 008

R

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R a logic order in the form of  $\pm 12$  volt square signals  
R to modulate the  $\Delta F$  (Do-Dt) signal at a frequency of  
R 3 Hz in each artificial feel computer.

R B. Control Channel  
R (Ref. Fig. 009 )

R This channel is made up of four cards :

- R - a functional amplifier
- R - a variable gain amplifier
- R - a functional output amplifier
- R - load detector supply

R (1) Functional amplifier

R In the functional amplifier, the return signal from  
R the load detector is summed to the signals necessary  
R for the development of the load law.  
R A bias is superimposed on the error signal (differen-  
R ce between order to be carried out and measured force)  
R and the sum of these two signals is transmitted to  
R the variable gain amplifier. From the output of this  
R amplifier, the functional channel control signal is  
R fed to the functional amplifier for demodulation.  
R A demodulator filters parasitic components in the  
R control signal by converting the alternating compo-  
R nents of the latter to a DC signal. The parasitic  
R components are then eliminated by the corrective  
R network.

R (2) Variable gain amplifier

R This amplifier divides the error signal by the (Do-  
R Dt) deflection difference. This division is obtained  
R by means of a standard operational amplifier, the gain  
R of which is controlled by a logarithmic feedback diode  
R (with a voltage proportional to the logarithm  
R of the current which flows through it).  
R The dynamic resistance of this diode is an inverse  
R function of the DC current passing through it. This  
R DC current is obtained by rectification and filtering  
R of the 400 Hz reference voltage proportional to the  
R (Do-Dt) deflection difference.

R (3) Functional output amplifier

R This amplifier comprises :  
R - a phase lead corrective network  
R - a current amplifier  
R - a circuit limiting the servo valve current

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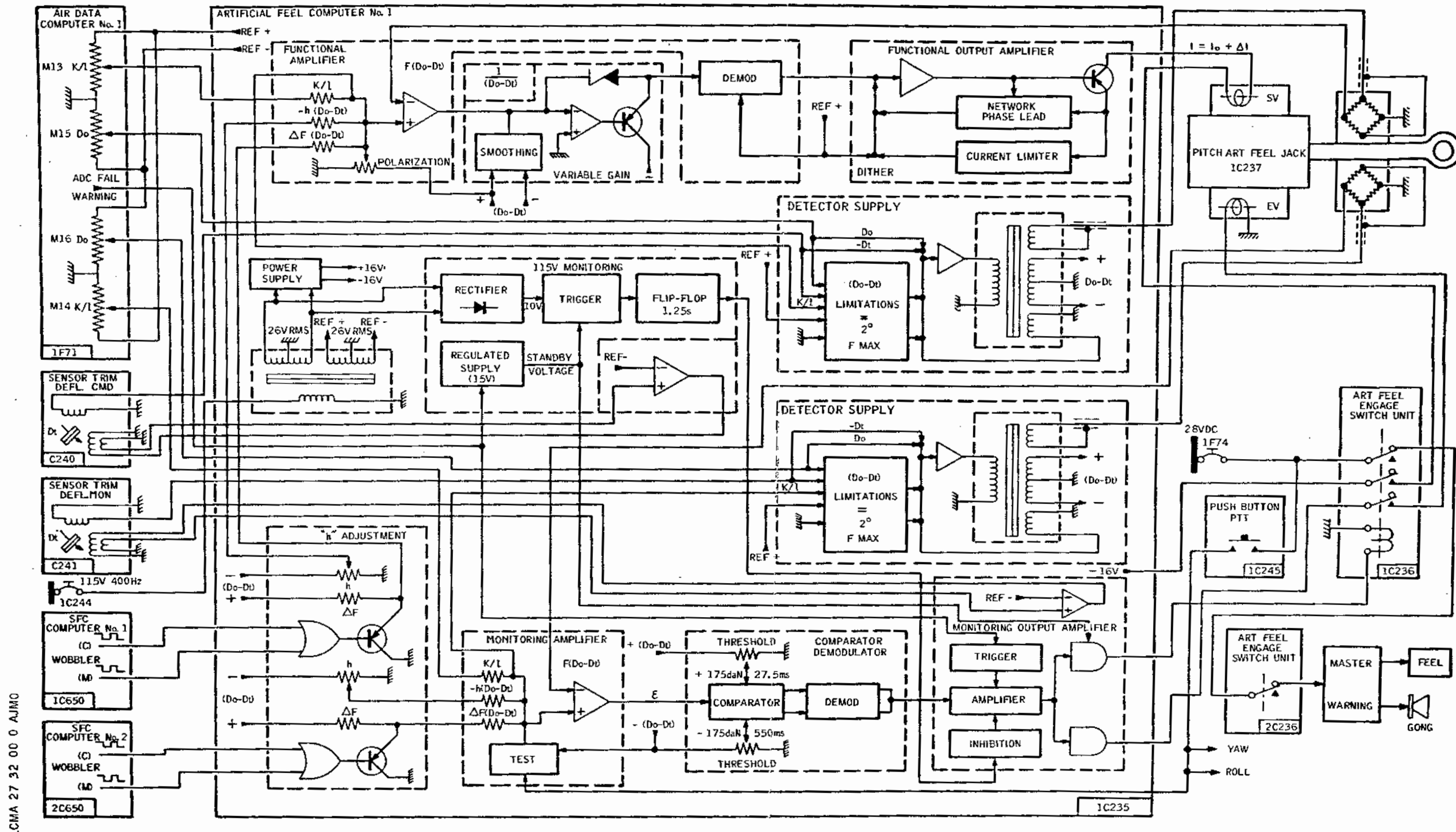
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## MAINTENANCE MANUAL



Artificial Feel Electronic Diagram System No. 1  
Figure 009

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## MAINTENANCE MANUAL

At the channel output, the servovalve control current  $I$  is divided in two parts :

$$I = I_0 + \Delta I$$

where

$I_0$  = constant current resulting from the bias signal amplification

$\Delta I$  = variable current, positive or negative, resulting from the error signal amplification.

This method permits the control of the servovalve the zero of which is offset (zero hydraulic flow for a  $I_0$  control current) in order to connect the jack to tank return in the event of accidental suppression of the servovalve current.

To reduce the inertia of the jack servo valve flapper, a 400 Hz signal is superimposed on the error signal at the "Dither" input of the output amplifier.

### (4) Load detector supply

An amplifier receives  $D_0$  and  $D_t$  orders and the feedback voltage from a special winding from the output transformer ; in addition it receives the  $(D_0 - D_t)$  difference limitation orders. The amplifier output supplies the primary winding of a transformer which has three secondary windings.

- one secondary supplies the load detector
- a symmetrical secondary supplies the variable reference voltages intended for the variable gain circuit, the comparison thresholds and the  $h$  adjustment card
- the third secondary is intended for the general feedback fed to the force detector supply card

### C. Monitoring channel

This channel is made up of five cards :

- a monitoring amplifier
- a comparator demodulator
- a monitoring output amplifier
- the load detector supply
- the  $h$  adjustment card

#### (1) Monitoring amplifier

The monitoring channel is provided with inputs (force order and feedback) identical with those of the functional channel. In addition a TEST input causes the triggering of the monitoring channel. There is no bias

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R input on the monitoring amplifier.

R (2) Comparator demodulator

R The AC variation ( $\epsilon$ ) voltage, developed by the monitoring amplifier is summed separately with two AC voltages proportional to the desired triggering thresholds ( $\pm$  threshold). The result of each summing is demodulated ; polarity of voltage from either channel of the demodulator is negative if variation ( $\epsilon$ ) is greater than the triggering threshold during a period of time greater than the monitoring timing.

R NOTE : The triggering thresholds are proportional to the load detector supply voltage ; i.e. proportional to the deflection difference ( $D_o - D_t$ ).

R (3) Monitoring output amplifier

R If a variation greater than the triggering threshold has been detected, or if a failure of the associated ADC occurs, the supply of the electrovalve and the engage switch holding coil is cut off.

R To avoid disconnection in the event of a temporary 115 VAC power supply loss :  
R - the comparator is inhibited if the 115 VAC loss occurs on the three axes (pitch, yaw, roll) of the computer considered.  
R - the magnetically held switch is supplied with a standby voltage from the 115 volt monitoring card

R Inhibit duration is 1.25 seconds.  
R This card comprises, in addition, a circuit intended for the supply of one of the two trim deflection sensor inductive potentiometers (monitoring side).

R (4) Load detector supply

R This card is identical with that of the functional channel.

R (5) h adjustment card

R This card receives :

R - the positive and negative references of ( $D_o - D_t$ ) difference  
R - logic signals from the two SFC computers

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R Potentiometers supplied by voltages proportional  
R to  $(Do-Dt)$  generate voltages equal to  $h (Do-Dt)$   
R and  $\Delta F (Do-Dt)$

R The  $\Delta F (Do-Dt)$  voltage is sent to the functional  
R amplifier by means of a OR logic gate and a  
R switching transistor when the level of the logic  
R signal from one of the two SFC computers is - 12  
R volts.

R An identical circuit enables the  $\Delta F (Do-Dt)$  voltage  
R to be sent to the monitoring amplifier.  
R This circuit is controlled by logic signals from  
R the monitoring channel of the two SFC computers.

### R D. 115 volts monitoring card

R This card is common to the three axes (roll, yaw, pitch).  
R It comprises :  
R - a regulated DC power supply, which, from the 28 volt va-  
R lidity of the ADC, enables the monitoring output ampli-  
R fiers and the magnetically held engage switch to be  
R supplied in the event of loss of 115 VAC.  
R - a circuit which generates a signal inhibiting the monito-  
R ring comparators in the event of loss of the 115 volt  
R supplies on the three axes  
R Inhibit duration (1.25 second) is controlled by a mono-  
R stable circuit.

R In addition, this card comprises a circuit designed to  
R supply one of the trim deflection sensor inductive poten-  
R tiometers on functional side.

### R E. General power supply

R A transformer supplies the following outputs from the  
R 115V 400 Hz power supply :  
R - supply of the various potentiometers generating force  
R orders (symmetrical windings 2 x 26 volts RMS Ref + and  
R Ref -)  
R - supply of electrical channels : two symmetrical win-  
R dings supply a diode bridge followed by two LC filters.  
R These circuits deliver the two + 16V and - 16V voltages  
R which are the stabilized power supplies.

## R 9. Controls and Indicating R (Ref. Fig. 009 )

### R A. Controls and Indicating of the two artificial feel systems

R Each Artificial Feel system is activated by the engagement

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R of the magnetically held PITCH switch integral with each  
R ARTIFICIAL FEEL engage switch unit No.1 and No.2 located  
R on the overhead panel.  
R This switch remains engaged if the monitoring channel does  
R not detect a fault of the control channel.  
R When detecting a fault :

- R - the supply to the switch engagement holding coil is
- R cut-out
- R - the supply to the electro-valve is cut-out
- R - the supply to the servo valve is cut-out
- R - the engagement switch disengages and indicates OFF
- R - the gong sounds and the FEEL warning light illuminates
- R on the master warning panel. However, these two warnings
- R are only activated when both systems 1 and 2 being
- R engaged, both monitoring channels detect a fault.

### R B. Tests

R At Flight Engineer's station two ARTIFICIAL FEEL push  
R buttons : TEST 1 and TEST 2 enable the monitoring channels  
R of each systems 1 and 2 to be checked. When the engagement  
R switches of a system are placed in engaged position, action  
R on the corresponding test push button causes the switch  
R to disengage.

### 10. Electrical Supply

	SERVICE	BUSBAR	C/B PANEL
R	Computer No.1	No.2 ESSENTIAL	2-213
R	(1C236) PITCH stage	115VAC 6X	
	power supply		
R	Computer No.2	B AVIONICS	13-216
R	(2C236) PITCH stage	115VAC 11X	
R	power supply		

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## MAINTENANCE MANUAL

### ARTIFICIAL FEEL - TROUBLE SHOOTING

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEARS.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN 24-00-00, SERVICING.

#### 1. General

The following information is intended to enable faults found in flight or on the ground to be quickly rectified.  
This information is given in the form of fault analysis synoptic charts.

The defect can be isolated with the aid of the trouble shooting procedures and traced through OK and NOT OK paths to the appropriate charts or other specified rectification action as may be necessary.

If a defect occurs, perform the appropriate rectification action, then repeat the operation at which the defect was encountered to ensure the operation is OK.

Bracketed numbers in the procedures and charts indicate items on the component identification table (at the end of section). The table provides information, including component location, required for rectification.

The electrical wiring is assumed to be serviceable. However if the component fault is not found, check the wiring in accordance with the Wiring Diagram Manual (22-23-00).

The system consists of two channels.

Trouble shooting procedure described is for channel 1, trouble shooting procedure for channel 2 is indicated between brackets.

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## MAINTENANCE MANUAL

### 2. Prepare

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Test Set - Artificial Feel Jack and Multimeter	TE3098000
or Adapter - Control Column Effort Measurement and Spring Scale 0 - 30 daN (0-67.4 lbf.)	D921636000
Access Platform 4.470 m (14 ft. 8 in.)	
Circuit Breaker Safety Clips	

B. Take the precautions described in the previous WARNING paragraph.

C. Carry out Prepare operations described in 27-32-00, Adjustment/Test ; paragraph 2 - Operational Test.

D. Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RH UC WEIGHT SW A SYS SUP	1-213	G 295	M 18
SAFETY FLT CONT NO.1 SUP		1C 651	S20
AUTO STAB 1 COMP SUP	2-213	1C 37	E 5
SAFETY FLT CONT NO.2 SUP	5-213	2C 651	D17
TRIM SYNCHRO SYS 1 SUP	13-215	1C 163	E 5
SAFETY FLT CONT COMP		1C 652	E 6
NO.1 115V SUP			
SAFETY FLT CONT COMP		1C 653	F 6
NO.1 26V SUP			
TRIM SYNCHRO SYS 2 SUP	13-216	2C 163	A16
SAFETY FLT CONT COMP		2C 653	C16
NO.2 26V SUP			

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## MAINTENANCE MANUAL

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SAFETY FLT CONT COMP		2C 652	C17
No.2 115V SUP			
AUTO STAB 2 COMP SUP		2C 37	D17

- E. Set Flight Controls in mechanical mode  
(Ref. 27-00-00, Servicing).
- F. On overhead panel, on Flight Control Unit make certain  
that both ANTI STALL SYSTEM switches are in OFF position.
- G. On centre console, set pitch trim wheel to a value differ-  
ent from zero.

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## MAINTENANCE MANUAL

### 3. Trouble Shooting

\*\*\*\*\*  
R \* On ADC control panel (centre console), place ADC1 \*  
\* (ADC2) switch in ON position, then place ADC1 \*  
R \* (ADC2) TEST switch in position 1. After 30 seconds \*  
R \* approximately blue TEST indicator light must \*  
\* illuminate. Press then release amber ADC1 (ADC2) \*  
R \* warning light ; it must go off. \*  
\* On overhead panel, on ARTIFICIAL FEEL No.1 \*  
\* (ARTIFICIAL FEEL No.2) unit, engage PITCH switch. \*  
\* PITCH switch remains engaged. \*  
\*\*\*\*\*

R			Disconnection of pitch Artificial Feel No.1 (No.2) (PITCH switch does not engage) Ref. Chart 101
	OK	NOT OK--	

\*\*\*\*\*  
\* Deflect Captain's or First Officer's control \*  
\* column and note that operation is carried out \*  
\* normally (without vibrations) \*  
\*\*\*\*\*

R			Pressure pulsations of the jack causing light vibrations of the control column for deflec- tions without trim. Ref. Chart 102
	OK	NOT OK--	

\*\*\*\*\*  
\* On circuit breakers panels 1-213 and 3-213 (3-213 \*  
\* and 1-213) trip, safety and tag circuit breakers \*  
\* LH UC WEIGHT SW A and B SYS SUP G 292 and G 293 \*  
\* (RH UC WEIGHT SW B and A SYS SUP G 294 and G 295) \*  
R \* Map Ref. M17 and B8 (B9 and M18) \*  
\* On overhead panel, on Flight Control Unit, place \*  
\* ANTI STALL SYSTEM 1 (ANTI STALL SYSTEM 2) switch \*  
\* in ON position. \*  
\* - Lightly pull Captain's or First Officer's control \*  
\* column and note presence of pulsations. (On \*  
\* overhead panel on ARTIFICIAL FEEL No1 (ARTIFICIAL \*  
\* FEEL No.2) unit, PITCH switch remains engaged). \*  
\*\*\*\*\*

R			NOT OK
	OK		

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## MAINTENANCE MANUAL

R

OK

NOT OK--

Artificial Feel No.1 (No.2) disconnection in  
high angle-of-attack configuration  
(wobbler activated by SFC No.1 (SFC No.2)  
Replace Artificial Feel computer No.1 1C 235  
[1] (No.2 2C 235 [2])

\*\*\*\*\*

\* On overhead panel : \*  
\* On Flight Control Unit, place ANTI STALL SYSTEM 1 \*  
\* switch (2) in OFF position. \*  
\* On ARTIFICIAL FEEL No.1 (ARTIFICIAL FEEL No.2) unit\*  
\* PITCH switch remains engaged. \*

\*\*\*\*\*

R

OK

NOT OK--

Artificial Feel No.1 (No.2) disconnection when  
wobbler stops.  
Replace Artificial Feel computer No.1 1C 235  
[1] (No.2 2C 235 [2]).

R

\*\*\*\*\*

R \* On ADC control panel (centre console), place ADC1 \*  
\* (ADC2) TEST switch in NORM position. Amber ADC1 \*  
R \* (ADC2) warning light must illuminate. \*  
\* On overhead panel, on ARTIFICIAL FEEL No.1 \*  
\* (ARTIFICIAL FEEL No.2) unit, PITCH switch disenga- \*  
\* ges. \*

\*\*\*\*\*

R

OK

NOT OK--

Artificial Feel does not disconnect when an  
ADC failure occurs.  
Replace Artificial Feel computer No.1 1C 235  
[1] (No.2 2C 235 [2]).

R

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# Concorde

## MAINTENANCE MANUAL

R       ||  
          OK  
          ||

\*\*\*\*\*

R \* On ADC control panel (centre console), place ADC2 \*  
\* (ADC1) switch in ON position. \*  
\* On circuit breakers panels 3-213 and 1-213 (1-213 \*  
\* and 3-213) trip, safety and tag circuit breakers \*  
\* RH UC WEIGHT SW B and A SYS SUP G 294 and G 295 \*  
\* (LH UC WEIGHT SW A and B SYS SUP G 292 and G 293 \*  
R \* Deflect LH and RH angle-of-attack sensor vanes \*  
R \* (zone 113 and 114) until angle-of-attack value \*  
\* read on Captain's and First Officer's indicators \*  
\* reaches 21°. \*  
R \* On ADC control panel (centre console) press then \*  
R \* release ADC1 and ADC2 amber warning lights ; they \*  
\* must go off. \*  
\* On overhead panel, on Flight Control Unit, place \*  
\* ANTI STALL SYSTEM 2 (1) switch in ON position and \*  
\* on ARTIFICIAL FEEL No.1 (ARTIFICIAL FEEL No.2) unit \*  
\* engage PITCH switch. \*  
\* Lightly deflect Captain's or First Officer's \*  
\* control column and note presence of pulsations. \*  
\* On overhead panel on ARTIFICIAL FEEL No.1 unit \*  
\* (ARTIFICIAL FEEL No.2) PITCH switch remains \*  
\* engaged) \*

\*\*\*\*\*

R			Disconnection of Artificial Feel No.1 (No.2)
R			in high angle-of-attack configuration
	OK	NOT OK--	(wobbler activated by SFC No.2 (SFC No.1)
R			Replace Artificial Feel computer No.1 1C 235
R			[1] (NO.2 2C 235 [2]).

\*\*\*\*\*

\*\*\*\*\*

\* On Flight Engineer's panel 29-214, press \*  
\* ARTIFICIAL FEEL TEST 1 (TEST 2) push button. \*  
\* On overhead panel, on ARTIFICIAL FEEL No.1 \*  
\* (ARTIFICIAL FEEL No.2) unit, PITCH switch \*  
\* disengages. \*

\*\*\*\*\*

		Test No.1 (No.2) inconclusive (PITCH switch
OK	NOT OK--	does not disengage)
		Ref. Chart 103

\*\*\*\*\*

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## MAINTENANCE MANUAL

R       ||  
          OK  
          ||

\*\*\*\*\*  
\* On overhead panel, on ARTIFICIAL FEEL No.2 unit       \*  
\* (ARTIFICIAL FEEL No.1) engage then disengage PITCH \*  
\* switch.   \*  
\* Gong sounds and FEEL warning light illuminates (on \*  
\* master warning panel)                                       \*  
\*\*\*\*\*

R	 OK	 NOT OK--	Gong does not sound and FEEL warning light does not illuminate upon loss of both Artificial Feel systems Ref. Chart 104
---	--------	--------------	--

\*\*\*\*\*  
\* On overhead panel, on ARTIFICIAL FEEL No.1       \*  
\* (ARTIFICIAL FEEL No.2) unit, engage PITCH switch       \*  
\* On circuit breaker panel 2-213 (13-216) trip and       \*  
\* set during a time smaller than 1 second circuit       \*  
\* breaker PITCH ART FEEL COMP 1 SUP (2 SUP) 1C 244       \*  
R \* (2C 244) Map Ref. E4 (G18)                               \*  
\* On overhead panel, on ARTIFICIAL FEEL unit No.1       \*  
\* (ARTIFICIAL FEEL No.2) PITCH switch remains engaged\*  
\*\*\*\*\*

R	 OK	 NOT OK--	Disconnection of Artificial Feel due to loss of supply during a time smaller than 1 second Replace Artificial Feel computer No.1 1C 235 [1] (No.2 2C 235 [2])
---	--------	--------------	--

\*\*\*\*\*  
\* Carry out Prepare paragraph and tests described in \*  
\* 27-32-00, Adjustment/Test, paragraph 3 or 4       \*  
R \* (depending on test equipment available)               \*  
\* Results of tests are conclusive                               \*  
\*\*\*\*\*

R	 OK	 NOT OK--	Failure at functional channel causing an error (on jack load) smaller than the triggering threshold of the comparison channel. Ref. Chart 105
---	--------	--------------	--

\*\*\*\*\*  
R \* End of Pitch Artificial Feel trouble shooting       \*  
\*\*\*\*\*

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## MAINTENANCE MANUAL

*****		
* DISCONNECTION OF PITCH ARTIFICIAL *	GROUND EQUIPMENT REQUIRED	
* FEEL No.1 (No.2) (PITCH SWITCH DOES *	-----	
* NOT ENGAGE) *	DESCRIPTION	PART NO.
*****		
R	MULTIMETER	_____
-----		

\*\*\*\*\*

- R \* Replace Artificial Feel computer No.1 1C 235 [1] \*
- R \* (No.2 2C 235 [2]) \*
- \* On overhead panel, on ARTIFICIAL FEEL No.1 unit \*
- \* (ARTIFICIAL FEEL No.2) engage PITCH switch : it \*
- \* disengages. \*

\*\*\*\*\*

R			-----	
	YES	NO---	Replaced Artificial Feel computer was faulty	
			-----	

\*\*\*\*\*

- R \* Replace ARTIFICIAL FEEL No.1 unit 1C 236 \*
- R \* [3] (No.2 2C 236 [4]) \*
- \* On overhead panel, on ARTIFICIAL FEEL No.1 unit \*
- \* (ARTIFICIAL FEEL No.2) engage PITCH switch : it \*
- \* disengages. \*

\*\*\*\*\*

R			-----	
	YES	NO---	Replaced ARTIFICIAL FEEL unit was faulty.	
			-----	

\*\*\*\*\*

- \* On centre console set PITCH trim wheel to 0 \*
- \* degrees. \*
- \* On overhead panel, on ARTIFICIAL FEEL No.1 unit \*
- \* (ARTIFICIAL FEEL No.2) engage PITCH switch : it \*
- \* disengages. \*

\*\*\*\*\*

YES	NO

Chart 101 (Sheet 1 of 3)

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		*****	
R			* Remove Flight Engineer's seat (Ref. 25-11-31, *
			* Removal/Installation) *
			* Remove floor panel 211HF. *
			* On circuit breaker panels 2-213 and 13-216 *
			* trip, safety and tag circuit breakers PITCH *
			* ART FEEL COMP 1 and 2 SUP 1C 244 and 2C 244 *
			* (Map Ref. E4 and G18) *
			* Interchange connectors C 240A and C 240B of *
	YES	NO---	* deflection sensor C 240 [13]. *
R			* Remove safety clips and set circuit breakers *
R			* tripped previously. *
			* On centre console, place PITCH trim wheel in *
			* a position different from zero. *
			* On overhead panel, on ARTIFICIAL FEEL No.1 *
			* unit (ARTIFICIAL FEEL No.2 unit) engage *
			* PITCH switch ; it disengages. *
		*****	
		YES	NO---
			Replace deflection sensor
			C 240 [13].
			-----
			Replace deflection sensor
			C 241 [14].
			-----
		*****	
R			* Replace AIR DATA COMPUTER 1 1F 71 [5] (ADC2 *
R			* 2F 71 [6]) *
R			* On ADC control panel (centre console), place *
R			* ADC1 (ADC2) TEST switch in position 1. After *
R			* 30 seconds approximately, blue TEST indicator light *
			* must illuminate. Press then release, amber ADC1 *
R			* (ADC2) warning light ; it must go off. *
			* On overhead panel, on ARTIFICIAL FEEL No.1 unit *
			* (ARTIFICIAL FEEL No.2) engage PITCH switch : it *
			* disengages. *
		*****	
	YES	NO---	Replaced ADC was faulty
			-----

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||  
YES  
||

\*\*\*\*\*  
\* Connect a voltmeter between pins 40 and 42 of \*  
R \* test connector P23, on front face of Artificial \*  
R \* Feel computer No.1 (No.2) 1C 235 (2C 235) \*  
\* AC voltage read on voltmeter is : \*  
\*\*\*\*\*

R	26 V	0 V--	Replace circuit breaker PITCH ART FEEL COMP 1 SUP 1C 244 [7] (COMP 2 SUP 2C 244 [8])
R	-----		Replace blue Artificial Feel jack [9] (Green 2C 237 [10])

Chart 101 (Sheet 3 of 3)

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```
*****-----
* PRESSURE PULSATIONS ON THE JACK * | GROUND EQUIPMENT REQUIRED |
* CAUSING LIGHT VIBRATIONS OF THE * |-----|
* CONTROL COLUMN FOR DEFLECTIONS * | DESCRIPTION PART NO. |
* WITHOUT TRIM * |-----|
*****
```

```
*****
R * Replace Artificial Feel computer No.1 1C 235 [1] *
R * (No.2 2C 235 [2]) *
* On overhead panel, on ARTIFICIAL FEEL No.1 unit *
* (ARTIFICIAL FEEL No.2 unit) engage PITCH switch *
* Deflect Captain's or First Officer's control *
* column and note that deflection is carried out *
* normally (without vibrations) *
*****
```

```
*****
R | | |-----|
| YES NO---| Replace blue jack 1C 237 [9] (Green 2C 237 | | |
| | | | [10]) |
| | |-----|
R | |-----| Replaced Artificial Feel computer was faulty |
| |-----|
```

Chart 102 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****		
* TEST NO.1 (NO.2) INCONCLUSIVE	*	GROUND EQUIPMENT REQUIRED
* (PITCH SWITCH DOES NOT DISENGAGE)	*	
*****		
	DESCRIPTION	PART NO.
*****		

\*\*\*\*\*  
\* On circuit breaker panel 2-213 (13-216) check that \*  
\* circuit breaker YAW ART FEEL COMP 1 SUP 1C 242 \*  
R \* (COMP 2 SUP 2C 242) Map Ref. E2 (E16) is set \*  
\* On overhead panel, on ARTIFICIAL FEEL No.1 unit \*  
\* (ARTIFICIAL FEEL No.2) engage PITCH and YAW \*  
\* switches \*  
\* On Flight Engineer's panel 29-214, press \*  
\* ARTIFICIAL FEEL TEST 1 (TEST 2) push button \*  
\* On overhead panel, on ARTIFICIAL FEEL No.1 unit \*  
\* (ARTIFICIAL FEEL No.2) YAW switch disengages \*  
\*\*\*\*\*

R	YES	NO---	Replace Artificial Feel test button 1C 245 [11] (2C 245 [12])
R		-----	Replace Artificial Feel computer No.1 1C 235 [1] (No.2 2C 235 [2])
R			

Chart 103 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****		
	* GONG DOES NOT SOUND AND FEEL	*   GROUND EQUIPMENT REQUIRED
	* WARNING LIGHT DOES NOT ILLUMINATE	*   -----
R	* UPON LOSS OF BOTH ARTIFICIAL	*   DESCRIPTION PART NO.
	* FEEL SYSTEMS.	*   -----
R	*****	*   MULTIMETER

\*\*\*\*\*

\* On circuit breaker 2-213 (13-216) check that \*

\* circuit breaker ROLL ART FEEL COMP 1 SUP 1C 243 \*

R \* (COMP 2 SUP 2C 243) Map Ref. E3 (G17) is set. \*

\* On overhead panel, on ARTIFICIAL FEEL No.1 and No.2\*

R \* units engage ROLL switches (ROLL switch No.2 \*

R \* (No.1) disengages). \*

\* On Flight Engineer's 29-214, press ARTIFICIAL FEEL \*

\* TEST 1 (TEST 2) push button. \*

\* FEEL warning light illuminates on master warning \*

\* panel and gong sounds. \*

\*\*\*\*\*

		-----
YES	NO---	Ref. 33-15-00, Trouble Shooting
		-----

\*\*\*\*\*

R \* On overhead panel, remove ARTIFICIAL FEEL No.1 unit\*

R \* [3] 1C 236, then on this unit check continuity \*

\* between pins 10 and 9 then between pins 16 and 18 \*

\* (PITCH switch indicates OFF). There is continuity. \*

\*\*\*\*\*

		-----
YES	NO---	Replace ARTIFICIAL FEEL No.1 unit 1C 236 [3].
		-----

\*\*\*\*\*

R \* On overhead panel, remove ARTIFICIAL FEEL No.2 unit\*

R \* [4] 2C 236, then on this unit check continuity \*

\* between pins 10 and 9 then between pins 16 and 19 \*

\* (PITCH switch indicates OFF). There is continuity \*

\*\*\*\*\*

		-----
YES	NO---	Replace ARTIFICIAL FEEL No.2 unit 2C 236
		[4].
		-----
		-----
		-----
		Ref. 33-15-00, Trouble Shooting
		-----

Chart 104 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****			-----	
	* FAILURE OF FUNCTIONAL CHANNEL	*	GROUND EQUIPMENT REQUIRED	
	* CAUSING AN ERROR (ON JACK LOAD)	*	-----	
R	* SMALLER THAN THE TRIGGERING	*	DESCRIPTION	PART NO.
	* THRESHOLD OF THE COMPARISON CHANNEL*		-----	-----
	*****		TEST SET ARTIFICIAL	
			FEEL JACK	TE3098000
			VOLTMETER	
			or	
R			ADAPTER-CONTROL COLUMN	
R			EFFORT MEASUREMENT	
				b921636000
			SPRING SCALE 0-30 daN	
R			(0-67.4 lbf.)	
	*****		-----	
R	* Replace Artificial Feel computer No.1 [1] 1C 235	*		
R	* (No.2 [2] 2C 235)	*		
	* Repeat tests which led to the fault ; results of	*		
	* these tests are conclusive.	*		
	*****		-----	
R	YES	NO---	Replace blue jack 1C 237 [9] (Green 2C 237	
			[10])	
			-----	-----
R		-----	Replaced Artificial Feel computer was faulty	
			-----	-----

Chart 105 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

R

	ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
						MAINT. TOPIC	WIRING DIAGRAM
R	[1] Artificial Feel computer No.1	215BS	6-215	1C235	Electronics rack LH	27-32-44 R/I	27-32-01
R	[2] Artificial Feel computer No.2	216BS	6-216	2C235	Electronics rack RH	27-32-44 R/I	27-32-01
R	[3] Artificial Feel Engage Switch unit No1		4-211	1C236	Overhead Panel	27-32-41 R/I	27-32-01
R	[4] Artificial Feel Engage Switch unit No2		4-211	2C236	Overhead Panel	27-32-41 R/I	27-32-01
R R	[5] Air Data Computer 1	215BS	6-215	1F 71	Electronics rack LH	34-00-00 R/I	27-32-01
R R	[6] Air Data Computer 2	216BS	6-216	2F 71	Electronics rack RH	34-00-00 R/I	27-32-01
R	[7] Circuit Breaker 115VAC		2-213	1C244	Map Ref. E 4	24-50-00 R/I	27-32-01
R	[8] Circuit Breaker 115VAC		13-216	2C244	Map Ref. G18	24-50-00 R/I	27-32-01
R	[9] Artificial Feel jack-Blue	121DB	122	1C237	Under cabin floor	27-34-11 R/I	27-32-01
	[10] Artificial Feel jack-Green	121DB	122	2C237	Under cabin floor	27-34-13 R/I	27-32-01
R	[11] Press to test push-button		29-214	1C245	Flight Engineer's Panel		
R	[12] Press to test push-button		29-214	2C245	Flight Engineer's Panel		27-32-01 27-32-01

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R

ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[13] Deflection Sensor	211HF	211	C240	Under cabin floor	27-32-11 R/I	27-32-01
[14] Deflection Sensor	211HF	211	C241	Under cabin floor	27-32-11 R/I	27-32-01

Component Identification  
Table 101

#### 4. Close-Up

- R
- A. Carry out Close-Up operations described in 27-32-00, Adjustment/Test, paragraph 3 or 4 : Functional Test
  - B. Remove safety clips and tags and set circuit breakers.
  - C. On Flight Control Unit (overhead panel) place ANTI STALL SYSTEM switches in OFF position.

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## MAINTENANCE MANUAL

### ARTIFICIAL FEEL - ADJUSTMENT/TEST

R \*\*ON A/C 001-006,  
WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR  
DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPEC-  
TIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS  
CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED  
ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH  
THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE,  
MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SUR-  
FACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL  
CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION  
OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM  
SAFETY DEVICES ARE IN POSITION.

R \*\*ON A/C 007-007,  
WARNING : MAKE CERTAIN THAT THE POSITION OF NOSE AND MAIN GEAR DOORS  
CORRESPONDS WITH THE ACTUAL POSITION OF THE OPERATING  
HANDLE LOCATED ON LH MAIN GEAR LEG.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS  
CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED  
ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH  
THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE,  
MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SUR-  
FACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL  
CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION  
OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM  
SAFETY DEVICES ARE IN POSITION.

R EFFECTIVITY: 001-007,

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## MAINTENANCE MANUAL

### 1. General

The purpose of the following tests is to :

A. Check the correct operation of Artificial Feel No.1 and 2 monitoring and control channels.

- (1) Pressure test
- (2) Wobbler test
- (3) Disconnection due to overpressure (Test function)
- (4) Disconnection due to underpressure
- (5) Disconnection due to Air Data Computer failure
- (6) Functional test of jack electrovalve

B. Check the Loads Delivered by Artificial Feel systems No.1 and 2

- (1) By means of equipment TE 3098000.
- (2) When equipment TE 3098000 is not available.

### 2. Operational Test

A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Electrical Ground Power Unit

Circuit Breaker Safety Clips

B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Aircraft must be on the ground ; shock absorbers compressed.
- (3) Trip, safety and tag the following circuit breaker :

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
---------	-------	--------------------	-------------

STICK SHAKER SUP                      1-213      W 513      P15

(4) Check that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
---------	-------	--------------------	-------------

LH U/C WEIGHT SW "A" SYS              1-213      G 292      M17  
SUP

ADC1 28V SUP                              1F    74      P12

ADC1 26V SUP                              2-213      1F    78      A 2

1ST PLT ADC INST SUP                      1F    75      B 3

PITCH ART FEEL COMP 1                      1C    244      E 4  
SUP

ADC1 115V SUP                              1F    73      F 3

RH U/C WEIGHT SW "B" SYS              3-213      G 294      B 9  
SUP

ADC2 28V SUP                              5-213      2F    74      F12

2ND PLT ADC INST SUP                      13-216      2F    75      A14

ADC2 26V SUP                              2F    78      F14

ADC2 115V SUP                              2F    73      F15

PITCH ART FEEL COMP 2                      2C    244      G18  
SUP

(5) Remove safety clip and tag and set the following  
circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
---------	-------	--------------------	-------------

NAV INST BUS 13XS                      13-216      X 345      G 4

(6) On ADC control panel, (centre console) check that :

ADC 1 and ADC 2 switches are in OFF position.

ADC 1 and ADC 2 TEST selector switches are in NORM

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position.

- (7) Carry out Prepare paragraph operations of Procedure to set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).

NOTE : During the following tests do not take into account visual and aural warnings or indicators which are not mentioned.

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### C. Pressure Test

- (1) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (2) Move control column in both directions and note that the load applied is progressive.

NOTE : Check on ICOVOL indicator (Flight Control Surface Position Indicator) (on First Officer's instrument panel) the deflection value of the control surfaces.

- (3) On ADC control panel (centre console)
  - (a) Place ADC 1 and ADC 2 switches in ON position.
  - (b) Place ADC 1 and ADC 2 TEST selector switches in position 1
    - (b1) Amber ADC 1 and ADC 2 warning lights must illuminate.
    - (b2) After approximately 30 seconds, the Blue TEST indicator lights must illuminate.
    - (b3) Press then release amber ADC 1 and ADC 2 warning lights : they must go off.
- (4) On overhead panel, on ARTIFICIAL FEEL No.1 engage switch unit, engage PITCH switch : It must remain engaged.
- (5) Move control column in both directions and check that load applied is progressive and, for a same deflection, greater than during operation described in (2).

NOTE : On ICOVOL indicator (on First Officer's instrument panel), check the deflection values of the control surfaces.
- (6) On centre console, rotate pitch trim wheel in nose down direction (4 to 5° approximately).
- (7) Move control column in both directions and check that the load applied is progressive and, for a same deflection, greater than during operation described in (5).
- (8) On overhead panel :

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- (a) On ARTIFICIAL FEEL No.1 engage switch unit disengage PITCH switch.
- (b) On ARTIFICIAL FEEL No.2 engage switch unit engage PITCH switch : It must remain engaged.
- (9) Repeat operations (5) (6) and (7) : results must be identical.
- (10) On ADC control panel (centre console)
  - (a) Place ADC 1 and ADC 2 TEST selector switches in NORM position, then place ADC 1 and ADC 2 switches in OFF position.
  - (b) On ARTIFICIAL FEEL No.2 engage switch unit (on overhead panel) PITCH switch must disengage.
- (11) On centre console, set pitch trim wheel to zero.
- (12) Shut down pressurization of Blue and Green hydraulic systems (Ref. 29-12-00 and 29-11-00, Servicing).
- (13) On overhead panel, on Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in PRW OFF position.

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### D. Wobbler Test

Repeat tests described in 27-39-00, Adjustment/Test, paragraph 3. Wobbler operational test.

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### E. Disconnection Due to Overpressure (Test Function)

- (1) On ADC control panel (centre console) place ADC 1 and ADC 2 switches in ON position.  
If amber ADC 1 and ADC 2 warning lights illuminate, press then release ; they must go off.
- (2) On overhead panel, on ARTIFICIAL FEEL No.1 engage switch unit and ARTIFICIAL FEEL No.2 engage switch unit engage PITCH switches ; they must remain engaged.
- (3) On Flight Engineer's panel 29-214, press then release each ARTIFICIAL FEEL TEST 1 and TEST 2 push-buttons.
  - (a) When the first push-button is pressed, PITCH switch on ARTIFICIAL FEEL No. 1 engage switch unit must disengage.
  - (b) When the second push-button is pressed :
    - Gong must sound
    - On overhead panel, on master warning panel, FEEL warning light must illuminate.
    - PITCH switch on ARTIFICIAL FEEL No. 2 engage switch unit must disengage.
- (4) On ADC control panel, (centre console) place ADC1 and ADC2 switches in OFF position.
- (5) On overhead panel, on master warning panel, press and release FEEL warning light.
  - It must go off.

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### F. Disconnection Due to Underpressure - Test

No hydraulic systems pressurized.

- (1) On ADC control panel (centre console)
  - (a) Place ADC 1 and ADC 2 switches in ON position
  - (b) Place ADC 1 and ADC 2 TEST selector switches in position 1
    - (b1) Amber ADC 1 and ADC 2 warning lights must illuminate.
    - (b2) After approximately 30 seconds the blue TEST indicator lights must illuminate.
  - (c) Press then release amber ADC 1 and ADC 2 warning lights ; they must go off.
- (2) On centre console, set pitch trim wheel to 3° nose down.
- (3) On overhead panel, check that, on ARTIFICIAL FEEL No.1 and ARTIFICIAL FEEL No.2 engage switch units, PITCH switches disengage as soon as they are engaged.
  - When the second switch disengages, gong must sound, and FEEL warning light, on master warning panel, must illuminate.
- (4) On ADC control panel (centre console)
  - (a) Place ADC 1 and ADC 2 TEST selector switches in NORM position.
  - (b) Place ADC 1 and ADC 2 switches in OFF position.
- (5) On overhead panel, on master warning panel, press and release FEEL warning light.
  - It must go off.
- (6) On centre console, set pitch trim wheel to 0°.

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### G. Disconnection Due to ADC Failure - Test

- (1) On ADC control panel (centre console), place ADC 1 and ADC 2 switches in ON position.  
If the amber ADC 1 and ADC 2 warning lights illuminate, press them then release ; they must go off.
- (2) On overhead panel, on ARTIFICIAL FEEL No.1 and ARTIFICIAL FEEL No.2 engage switch units engage PITCH switches ; they must remain engaged.

- (3) On ADC control panel (centre console), place ADC 1 and ADC 2 switches in OFF position.

On overhead panel, on ARTIFICIAL FEEL No.1 and ARTIFICIAL FEEL No.2 engage switch units, PITCH switches must disengage.

When the second switch disengages, gong must sound and FEEL warning light, on master warning panel, must illuminate.

- (4) On overhead panel, on master warning panel, press and release FEEL warning light.

- It must go off.

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### H. Functional Test of Jack Electrovalve

- (1) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (2) Place pitch trim wheel (centre console) between 0 and 1 degree nose down.
- (3) On ADC control panel (centre console)
  - (a) Place ADC 1 and ADC 2 switches in ON position
  - (b) Place ADC 1 and ADC 2 TEST selector switches in position 1
    - (b1) The amber ADC 1 and ADC 2 warning lights must illuminate.
    - (b2) After approximately 30 seconds the blue TEST indicator lights must illuminate.
  - (c) Press then release the amber ADC 1 and ADC 2 warning lights : they must go off.
- (4) Move control column in nose up and nose down directions, from stop to stop, and note load required to carry out this operation.
- (5) On overhead panel, on ARTIFICIAL FEEL No.1 engage switch unit, engage PITCH switch.
  - This switch must remain engaged.
- (6) Move control column in nose up and nose down directions, from stop to stop, and check that load needed to carry out this action is greater than that applied during operation (4).
- (7) Place control column midway between neutral and full nose up position (full nose down position), and hold in this position;
  - (a) Hold PITCH switch engaged.
  - (b) On unit 29-214 located on Flight Engineer's panel press ARTIFICIAL FEEL TEST 1 push button and hold it.
    - As soon as this button is pressed, pulsations (20Hz frequency) must be felt at control column. To avoid unnecessary stress on linkage, pulsa-

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tion test must not exceed 3 seconds.

- (8) Release PITCH switch, while keeping TEST 1 push-button pressed.
  - This switch must disengage and indicate OFF
- (9) On Flight Engineer's panel 29-214, release ARTIFICIAL FEEL TEST 1 push-button.
- (10) Repeat operations described from (3) to (8) replacing terms ARTIFICIAL FEEL No.1 by ARTIFICIAL FEEL No.2 and ARTIFICIAL FEEL TEST 1 by ARTIFICIAL FEEL TEST 2.
- (11) On ADC control panel (centre console).
  - (a) Place ADC 1 and ADC 2 TEST selector switches in NORM position.
  - (b) Place ADC 1 and ADC 2 switches in OFF position.
- (12) Shut down pressurization of Blue and Green hydraulic systems (Ref. 29-12-00 and 29-11-00, Servicing).

### J. Close-Up

- (1) Remove safety clip and tag and set circuit breaker W 513.
- (2) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).
- (3) On overhead panel, on Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position.
- (4) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT & NAV BUS 14XS	2-213	X 355	H 2
NAV INST BUS 13XS	13-216	X 345	G 4

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### 3. Functional Test Using Equipment TE 3098000

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Protractor - Elevon and Rudder	TE2012000
Test Set - Artificial Feel Jack	TE3098000
Access Platform 9 ft.3 in. (2.833 m)	
Electrical Ground Power Unit	
Circuit Breaker Safety Clips	
Ground Service Telephone	
Voltmeter, DC : 0-5V range, 0.1 % accuracy	

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
STICK SHAKER SUP	1-213	W 513	P15
YAW ART FEEL COMP 1 SUP	2-213	1C 242	E 2
ROLL ART FEEL COMP 1 SUP		1C 243	E 3
PITCH ART FEEL COMP 1 SUP		1C 244	E 4
YAW ART FEEL COMP 2 SUP	13-216	2C 242	G16
ROLL ART FEEL COMP 2 SUP		2C 243	G17
PITCH ART FEEL COMP 2 SUP		2C 244	G18

- (3) Make certain that the following circuit breakers are set :

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH U/C WEIGHT SW "A"	1-213	G 292	M17
SYS SUP			
ADC1 28V SUP		1F 74	P12
ADC1 26V SUP	2-213	1F 78	A 2
1ST PLT ADC INST SUP		1F 75	B 3
ADC1 115V SUP		1F 73	F 3
RH U/C WEIGHT SW "B"	3-213	G 294	B 9
SYS SUP			
ADC2 28V SUP	5-213	2F 74	F12
2ND PLT ADC INST SUP	13-216	2F 75	A14
ADC2 26V SUP		2F 78	F14
ADC2 115V SUP		2F 73	F15

- (4) Remove safety clip and tag and set the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
NAV INST BUS 13XS	13-216	X 345	G 4

- (5) On shelf 6-215 :

- (a) Unlock and remove Artificial Feel computer No.1 (1C235) (Ref. 27-32-44, Removal/Installation).
- (b) Connect equipment TE3098000 in place of the computer.
- (c) Connect computer (1C235) to equipment TE3098000.

NOTE : Refer to the operational handbook to operate equipment TE3098000.

- (6) On front face of equipment TE3098000, make certain that the M-A switches are in position A.
- (7) On ADC control panel (centre console), make certain that :

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- (a) ADC 1 and ADC 2 switches are in OFF position.
- (b) The TEST selector switches for ADC 1 and ADC 2 systems are in NORM position.
- (8) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (9) Install protractor on middle elevons. Set to zero.

### C. Test

- (1) Remove safety clip and tag and reset the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PITCH ART FEEL COMP 1 SUP	2-213	1C 244	E 4
(2) On shelf 6-215, on the front face of equipment TE3098000, connect voltmeter to SORTIE terminals of PROFONDEUR channel and place the relevant switch in position M.			
<u>NOTE</u> : If required, adjust voltmeter zero position.			
(3) At centre console, on ADC control panel, place ADC 1 switch in ON position.			
The ADC 1 warning light may illuminate.			
(4) If required, press and release ADC 1 warning light to extinguish it.			
(5) On overhead panel on ARTIFICIAL FEEL No.1 engage switch unit, engage PITCH switch.			
(6) On shelf 6-215, on equipment TE3098000, the voltage read at the voltmeter must be 0V plus 0.15 V.			
(7) On ADC control panel (centre console), place ADC 1 TEST selector switch in position 2.			
(a) The ADC 1 warning light must illuminate.			
(b) If aircraft nose is in down position, the blue TEST indicator light must illuminate after appro-			

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ximately 1 minute.

- (8) On centre console, set pitch trim wheel to 1° nose down. (Check value on protractor).
- On equipment TE3098000, the voltage read at the voltmeter must be 1.99 plus or minus 0.7 V.
- (9) On centre console, set pitch trim wheel to 1° nose up. (Check value on protractor).
- On equipment TE3098000 voltage read at the voltmeter must be 0.90 plus or minus 0.59 V.
- (10) On centre console, on ADC control panel, place TEST selector switch in NORM position and place ADC 1 switch in OFF position.
- (11) On ARTIFICIAL FEEL No.1 engage switch unit, engage PITCH switch.
- (12) On centre console, set pitch trim wheel to zero.
- (13) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PITCH ART FEEL COMP 1 SUP	2-213	1C 244	E 4

- (14) On shelf 6-215 :
- (a) On equipment TE3098000, PROFONDEUR channel, place M-A switch in position A.
- (b) Disconnect voltmeter.
- (c) Remove Artificial Feel computer No.1 (1C235) from equipment TE 3098000.
- (d) Remove equipment TE3098000.
- (e) Install and lock Artificial Feel computer No.1 (1C235) on shelf (Ref. 27-32-44, Removal/Installation).
- (15) On shelf 6-216 :

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- (a) Unlock and remove Artificial Feel computer No.2 (2C235) (Ref. 27-32-44, Removal/Installation).
  - (b) Connect equipment TE3098000 in place of the computer.
  - (c) Connect Artificial Feel computer No.2 (2C235) to equipment TE3098000.
  - (d) Connect voltmeter to SORTIE terminals of PROFONDEUR channel.
- (16) On equipment TE3098000 make certain that M-A switches are in position A.
- (17) Remove safety clip and tag and reset the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PITCH ART FEEL COMP 2 SUP	13-216	2C 244	G18

- (18) Repeat operations from paragraph (2) to (12) inclusive for ARTIFICIAL FEEL No. 2 and ADC 2 systems. Results must be identical.
- (19) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PITCH ART FEEL COMP 2 SUP	13-216	2C 244	G18

- (20) On shelf 6-216 :
- (a) On equipment TE3098000, PROFONDEUR channel, place M.A. switch in position A.
  - (b) Disconnect voltmeter.
  - (c) Disconnect Artificial Feel computer No.2 (2C235) from equipment TE3098000.
  - (d) Remove equipment TE3098000.

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- (e) Install and lock Artificial Feel computer No.2  
(2C235) on shelf (Ref. 27-32-44, Adjustment/Test).

(21) Remove protractor.

(22) Carry out test (Ref. 27-32-44, Adjustment/Test).

### D. Close-Up

- (1) Carry out Close-up operations of Procedure to set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (2) Remove safety clips and tags and set the circuit breakers.
- (3) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
NAV INST BUS 13XS	13-216	X 345	G 4

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### 4. Functional Test Without Equipment TE 3098000

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Adapter - Control Column Effort Measurement	D921636000
Electrical Ground Power Unit	
Spring Scale 0-30 daN (0-67.4 lbf.)	
Circuit Breaker Safety Clips	

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
STICK SHAKER SUP	1-213	W 513	P15
(3) On control handwheel, install Adapter D921636100 and attach spring scale to adapter centre attachment point.			
(4) Make certain that the following circuit breakers are set :			

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH U/C WEIGHT SW A SYS SUP	1-213	G 292	M17
ADC 1 28V SUP		1F 74	P12
ADC 1 26V SUP	2-213	1F 78	A 2
1ST PLT ADC INST SUP		1F 75	B 3
PITCH ART FEEL COMP 1 SUP		1C 244	E 4
ADC 1 115V SUP		1F 73	F 3
RH U/C WEIGHT SW B SYS SUP	3-213	G 294	B 9

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ADC 2 28V SUP	5-213	2F 74	F12
2ND PLT ADC INST SUP	13-216	2F 75	A14
ADC 2 26V SUP		2F 78	F14
ADC 2 115V SUP		2F 73	F15
PITCH ART FEEL COMP 2 SUP		2C 244	G18

- (5) Remove safety clip and tag and set circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
NAV INST BUS 13XS	13-216	X 345	G 4

- (6) On ADC control panel (centre console), make certain that ADC 1 and ADC 2 switches are in OFF position and ADC 1 and ADC 2 TEST selector switches are in NORM position.
- (7) Carry out Procedure to set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (8) Make certain that trim controls are set to zero.
- (9) On overhead panel, on ARTIFICIAL FEEL No.1 and ARTIFICIAL FEEL No.2 engage switch units check that PITCH switches are not engaged.

NOTE : During test, do not take aural and visual warnings which are not mentioned into account.

### C. Test

NOTE : When during the following test a force is to be exerted on spring scale, this force shall be applied progressively and continuously.

- (1) Pull spring scale attached to adapter D921636100 which is installed on control handwheel (Nose up command) until an elevon deflection of 2 degrees is read on ICOVOL indicator.

- Spring scale must read F2=6 daN (13.5 lbf.) approx.

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- (2) Continue to pull spring scale until an elevon deflection of 4 degrees is obtained.
- Spring scale must read  $F4=10.5 \text{ daN}$  (23.6 lbf.) approx.
- (3) Release force on spring scale.
- (4) Calculate mechanical resistance as per formula  $\frac{F4 - F2}{4 - 2}$

This mechanical resistance must be between 2.03 daN (4.56 lbf.) and 2.47 daN (5.55 lbf.) for each degree of elevon deflection.

- (5) On ADC control panel, (centre console), place ADC 1 switch in ON position. If ADC 1 warning light illuminates, press and release it ; it must go off.
- (6) On overhead panel, on ARTIFICIAL FEEL No.1 engage switch unit engage PITCH switch.  
It must remain engaged.
- (7) Pull spring scale (Ref. NOTE) until an elevon deflection of 2 degrees is obtained.
- Spring scale must read :  $F2$  plus or minus 0.7 daN. ( $F2$  plus or minus 1.57 lbf.).
- (8) Continue to pull spring scale until an elevon deflection of 4 degrees is obtained.
- Spring scale must read :  $F4$  plus or minus 0.7 daN. ( $F4$  plus or minus 1.57 lbf.).
- (9) Release force on spring scale.
- (10) On ADC control panel (centre console), place ADC 1 TEST selector switch in position 1.
- Amber ADC 1 warning light must illuminate.
  - PITCH switch, on ARTIFICIAL FEEL No.1 engage switch unit, must disengage.
  - After approximately 30 seconds, ADC 1 blue TEST indicator light must illuminate.
- (11) Press and release ADC 1 warning light.
- This light must go off.
- (12) On overhead panel, on ARTIFICIAL FEEL No.1 engage

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switch unit, engage PITCH switch.

- This switch must remain engaged.

(13) Turn pitch trim wheel in nose down direction until an elevon deflection of 3 degrees is obtained.

(14) Pull spring scale (Ref. NOTE) until 1 degree nose down is read on ICOVOL indicator (2 degrees nose up deflection).

- Spring scale must read : F1=20 daN approx. (45 lbf.) approx.

(15) Continue to pull spring scale until 0 is read on ICOVOL indicator (3 degrees nose up deflection).

- Spring scale must read : F3=29.3 daN. (65.9 lbf.) approx.

(16) Release force on spring scale.

(17) Calculate mechanical resistance as per formula  $\frac{F3 - F1}{3 - 2}$

- This mechanical resistance must be between 7.92 daN (17.8 lbf.) and 9.68 daN (21.76 lbf.) for each degree of elevon deflection.

(18) On ADC control panel (centre console), place ADC 1 TEST selector switch in position 2.

- ADC 1 warning light must illuminate.

- PITCH switch on ARTIFICIAL FEEL No.1 engage switch unit must disengage.

- If aircraft nose is in down position, ADC 1 blue TEST indicator light must illuminate after approximately 1 minute.

(19) Press and release ADC 1 warning light

- This light must go off.

(20) On ARTIFICIAL FEEL No.1 engage switch unit, engage PITCH switch again.

(21) Turn pitch trim wheel to zero.

(22) Pull spring scale (Ref. NOTE) until an elevon deflection of 2 degrees is read on ICOVOL indicator.

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- Spring scale must read : F5 = 11.3 daN approx.  
(25.4 lbf.).

(23) Continue to pull spring scale until an elevon deflection of 4 degrees is read on ICOVOL indicator.

- Spring scale must read : F6 = 21.5 daN approx.  
(48.33 lbf.).

(24) Release force on spring scale.

(25) Calculate mechanical resistance as per formula :

$$\frac{F6 - F5}{4 - 2}$$

This mechanical resistance must be between 4.32 daN (9.71 lbf.) and 5.28 daN (11.87 lbf.) for each degree of elevon deflection.

(26) On overhead panel, on ARTIFICIAL FEEL No.1 engage switch unit disengage PITCH switch.

(27) On ADC control panel (centre console), place ADC 1 TEST selector switch in NORM position, then place ADC 1 switch in OFF position.

(28) Repeat above operations (1) to (27) inclusive, replacing ADC 1 and ARTIFICIAL FEEL No.1 by ADC 2 and ARTIFICIAL FEEL No.2.

- Results must be identical.

### D. Close-up

(1) Carry out close-up operations of Procedure to set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).

(2) Remove spring scale and Adapter D921636100.

(3) Remove safety clip and tag and set the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
STICK SHAKER SUP	1-213	W 513	P15

(4) Trip, safety and tag the following circuit breaker :

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
NAV INST BUS 13XS	13-216	X 345	G 4

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**END OF THIS  
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### TRIM DEFLECTION SENSOR - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The removal/installations procedures of the trim deflection sensors are identical : therefore only the removal/installation procedure of the LH Trim deflection sensor is dealt with.

#### 2. Trim Deflection Sensor

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Zero Rigging Device - Relay Chassis	E925019000
Rigging Pin - Synchro Pack	D925252000
Rigging Pin - Integral Trim	D921277000
Wrench - Trim Deflection Detector - Elevator	D921212000
Test Set - Zero Setting - Resolver	TE 3016
Lockwire - Dia. 0.80 mm (0.032 in.) Corrosion Resistant Steel	

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DESCRIPTION	PART NO.
-------------	----------

Access Platforms 4.47 m (14 ft.8 in.)  
3.67 m (12 ft.)

Circuit Breaker Safety Clips

### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PITCH ART FEEL COMP 1 SUP	2-213	1C 244	E 4
PITCH ART FEEL COMP 2 SUP	13-216	2C 244	G18
(3) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).			
(4) Make certain that pitch and roll trim controls are in zero position.			
(5) Open access door 121FB and immobilize resolvers with rigging pins D925252003 and D925252001 (pitch and roll).			
(6) Open access door 121GB and position equipment E925019010 and E925019012 on pitch control.			
(7) Open access door 151AB and depressurize the Green, Blue and Yellow hydraulic systems.			
(8) Open access door 121DB and insert rigging pin D921277000 in Artificial Feel lever.			
(9) Remove floor panel 211HF.			
(10) Remove protective housing from integral trim assembly.			
(11) Remove pitch fuel sensor (Ref. 22-23-81, Removal/Installation).			
<u>NOTE</u> : Pitch fuel sensor removal is necessary for			

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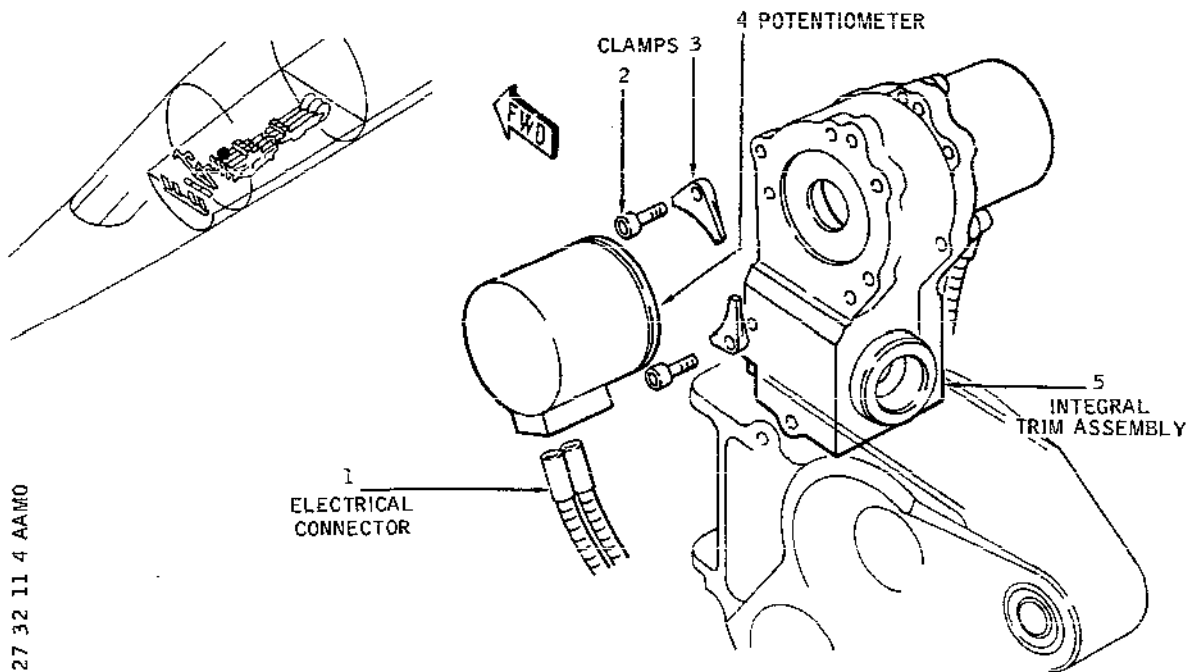
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removal of RH deflection sensor only.

### C. Remove

- (1) Disconnect electrical connector (1).
- (2) Unscrew and remove bolts (2) attaching potentiometer (4) recover clamps (3).
- (3) Carefully remove sensor (4) from integral trim assembly (5).



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Trim Deflection Sensor  
Figure 401

### D. Preparation of Replacement Component

### E. Install

- (1) Make certain that the Artificial Feel lever is immobilized with rigging pin.
- (2) On the sensor to be installed, bring the reference mark engraved on the front face round to coincide with the

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red groove on the integral trim assembly shaft by turning the sensor output spindle.

- (3) With the sensor thus adjusted engage it in the nearest spline to that of the integral trim assembly, the unit being positioned as shown in the figure.
- (4) Maintain the sensor in the correct position whilst installing clamps (3) and lightly tighten attachment bolts (2).
- (5) Install pitch feel sensor (Ref. 22-23-81, REmoval/Installation).

### F. Adjustment

- (1) Connect up wire bundle TE3016-203 to the TRIM SENSORS connection of the test set and the plugs on the wire bundle to the respective connectors of the sensors.
- (2) Before carrying out the adjustment of a sensor, connect the test set to a 115V, 400Hz 28VDC electrical supply.
- (3) Place AFCS SENSORS selector switch on TRIM PO 1 position.
- (4) Using the adjustment wrench proceed to rotate the housing of the sensor until zero can be read on test set indicator, using successive sensitivities.
- (5) Tighten bolts (2) attaching clamps (3), make certain that the electrical adjustment carried out has not changed and safety the bolts, with lockwire.

NOTE : Deviation Final Tolerance : 5 minutes.

- (6) Place AFCS SENSORS selector switch in TRIM PO 2 position and repeat the operations above.

NOTE : During adjustment of each sensor, make certain that one complete turn of the adjustment wrench in a clockwise direction produces a variation of the test set indicator needle in the negative (-) direction.

- (7) Disconnect the test set and re-connect the sensor plugs to the aircraft network.
- (8) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).

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- (9) Remove rigging pins D925252003 and D925252001 from resolvers, D921277000 from Artificial Feel Lever. Remove equipment E925019012 and E925019010.
- (10) Shut down pressurization of hydraulic systems. (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in electrical mode).

### F. Tests

- (1) Carry out operational tests (Ref. 27-32-00, Adjustment/ Test, paragraph 2.C pressure test).
- (2) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Install the integral trim assembly protective housing
- (3) Close access doors 121FB, 121GB, 151AB, 121DB and floor panel 211HF.
- (4) Remove safety clips and tag and reset the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PITCH ART FEEL COMP 1 SUP	2-213	1C 244	E 4
PITCH ART FEEL COMP 2 SUP	13-216	2C 244	G18

- (5) Remove access platforms.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### TRIM DEFLECTION SENSOR - ADJUSTMENT/TEST

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The purpose of the following test is to check the operation of the trim deflection sensor (C240 or C241) further to maintenance operations.

#### 2. Test

##### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Electrical Ground Power Unit	
------------------------------	--

Circuit Breaker Safety Clips	
------------------------------	--

##### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Aircraft must be on the ground, shock absorbers compressed.

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(3) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
STICK SHAKER SUP	1-213	W 513	P15

(4) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW "A" SYS SUP	1-213	G 292	M17
ADC 1 28V SUP		1F 74	P12
ADC 1 26V SUP	2-213	1F 78	A 2
1st PLT ADC INST SUP		1F 75	B 3
PITCH ART FEEL COMP.1 SUP		1C 244	E 4
ADC 1 115V SUP		1F 73	F 3
RH UC WEIGHT SW "B" SYS SUP	3-213	G 294	B 9
ADC 2 28V SUP	5-213	2F 74	F12
2nd PLT ADC INST SUP	13-216	2F 75	A14
ADC 2 26V SUP		2F 78	F14
ADC 2 115V SUP		2F 73	F15
PITCH ART FEEL COMP 2 SUP		2C 244	G18

(5) Remove safety clips and tags and set the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT & NAV BUS 14XS	2-213	X 355	H 2
NAV INST BUS 13XS	13-216	X 345	G 4

(6) On ADC control panel (centre console), make certain that ADC1 and ADC2 switches are in OFF position and

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ADC1 and ADC2 TEST selector switches are in NORM position.

- (7) Carry out Prepare operations detailed in Procedure to set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).

NOTE : Disregard aural or visual warnings which are not mentioned.

### C. Test

- (1) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (2) On ADC control panel (centre console).
  - (a) Place ADC1 and ADC2 switches in ON position.
  - (b) Place ADC1 and ADC2 TEST selector switches in position 1.
    - (b1) Amber ADC1 and ADC2 warning lights must illuminate.
    - (b2) After approximately 30 seconds, blue TEST indicator lights must illuminate.
  - (c) Press and release each blue TEST indicator light; they must go off.
- (3) At overhead panel, on ARTIFICIAL FEEL No.1 engage switch unit, engage PITCH switch; This switch must remain engaged.
- (4) Turn pitch trim wheel fully nose up, then nose down and return to zero.  
On ARTIFICIAL FEEL No.1 engage switch unit, PITCH switch must remain engaged.
- (5) At overhead panel, on ARTIFICIAL FEEL No.1 engage switch unit, disengage PITCH switch, then on ARTIFICIAL FEEL No.2 engage switch unit engage PITCH switch; this switch must remain engaged.
- (6) Repeat operation (4) above:  
  
PITCH switch, on ARTIFICIAL FEEL No.2 engage switch unit, must remain engaged.
- (7) At overhead panel, on ARTIFICIAL FEEL No.2 engage

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switch unit, disengage PITCH switch.

### D. Close-Up

- (1) At centre console, on ADC control panel, place ADC1 and ADC2 TEST selector switches in NORM position, then ADC1 and ADC2 switches in OFF position.
- (2) Carry out Close-Up operations detailed in Procedure to set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (3) Remove safety clip and tag and set circuit breaker W 513.
- (4) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT & NAV BUS 14XS	2-213	X 355	H 2
NAV INST BUS 13XS	13-216	X 345	G 4

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### SPRING ROD - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The spring rod constitutes the artificial feel at low speeds.

#### 2. Spring rod

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Zero Rigging Device - Relay Chassis	E925019000
Rigging Pins - Synchro Pack	D925252000
Rigging Pins - Set - Integral Trim-Pitch/Roll/Yaw	D921277000
Access Platform 3.672 m (12 ft.)	
Circuit Breaker Safety Clips	
Corrosion-Resistant Steel Lockwire Dia. 1 mm (0.041 in.)	

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## MAINTENANCE MANUAL

### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Set flight controls in mechanical mode (Ref. 27-00-00, Servicing).
- (3) Make certain that the pitch and roll trim controls are in zero position.
- (4) Remove access panel 121FB and insert rigging pins D925252001 and D925252003 in pitch and roll synchro packs.
- (5) Remove access panel 121GB and install equipment E925019010 and E925019012 on pitch control.
- (6) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).

**WARNING :** DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (7) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

- (8) Remove access panel 121DB and insert rigging pin in pitch integral trim assembly using equipment D921277000
- (9) Remove floor panels 211HF and 213AF.

EFFECTIVITY: ALL

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- (10) Cut and remove lockwire, loosen the clamp holding spring rod boot onto casing ; remove boot from casing. Remove integral trim assembly upper casing.

### C. Remove

- (1) Remove cotter, nut (1) and washer (2).
- (2) Cut and remove lockwire and remove bolt (6).
- (3) Support spring rod (5) and remove bolts (3) and (6). Remove spring rod.

### D. Preparation of Replacement Component

### E. Install

- (1) Offer up spring rod.

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NOTE : Position rod so that screw on gaiter aft clamp (7) is located downward.

- (2) Install bolts (3) and (6) and adjust the length if necessary.  
Torque to  $1.1 \pm 0.1$  m.daN (100 lbf.in.  $\pm$  7 lbf.in.).  
If length adjustment is necessary, the adjustment must be such that installation can be effected without strain or tension.
- (3) Tighten bolt (6). Torque to between 0.75 and 0.85 m.daN (65 and 75 lbf.in.). Safety with lockwire.
- (4) Install washer (2) and tighten nut (1).  
Torque to between 0.50 and 0.55 m.daN (45 and 50 lbf.in.). Safety with cotter.
- (5) Remove warning notices.
- (6) Reset circuit breaker M626, PANEL 15-216, MAP REF F22.
- (7) Set flight controls in mechanical mode (Ref. 27-00-00, Servicing).
- (8) Remove equipment E925019012 and E925019010. Remove rigging pins D921277000.
- (9) Remove rigging pins D925252001 and D925252003 from synchro packs.

EFFECTIVITY: ALL

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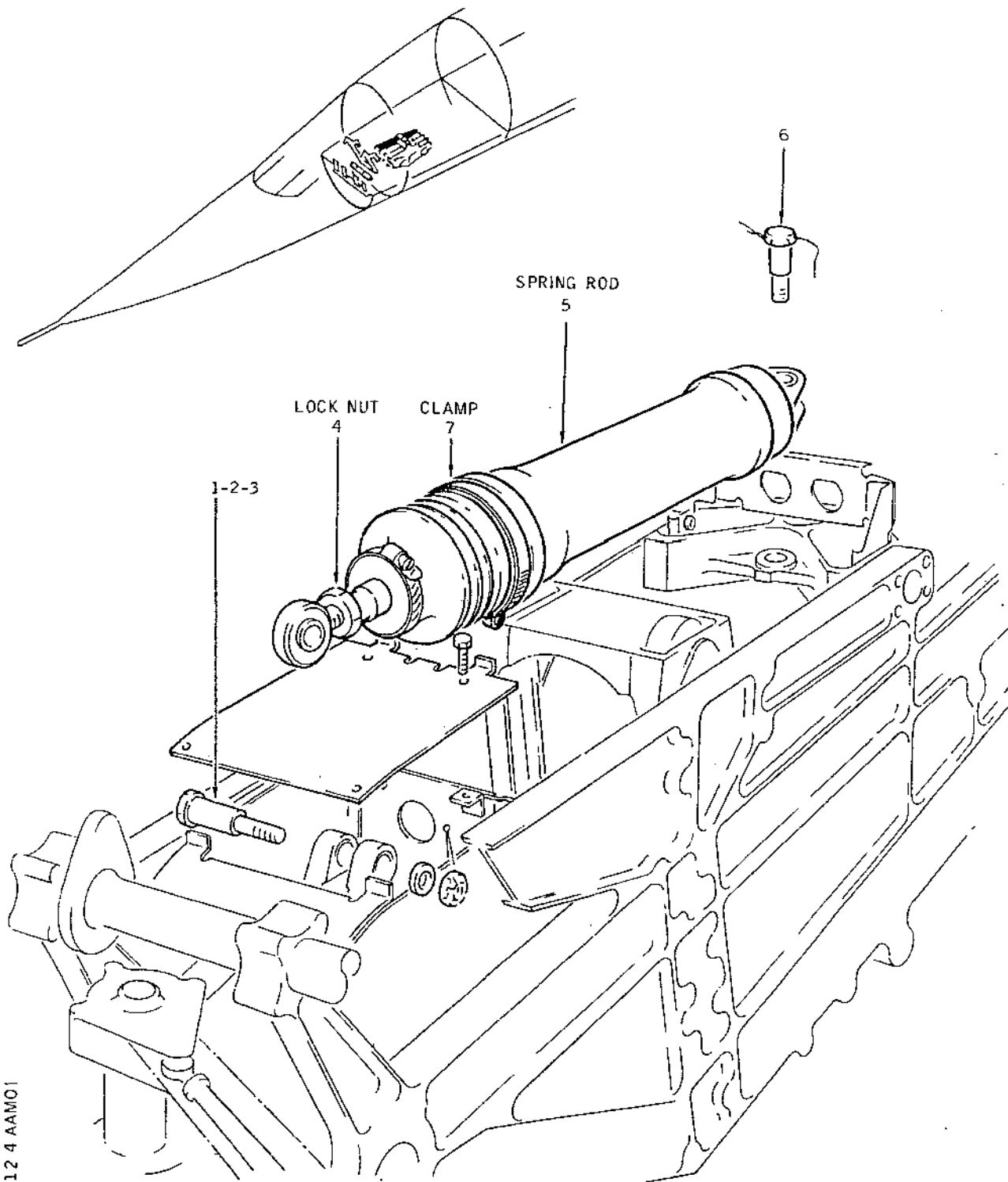
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## MAINTENANCE MANUAL



Spring Rod  
Figure 401

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## MAINTENANCE MANUAL

- (10) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).

### F. Test

- (1) Set flight controls in mechanical mode (Ref. 27-00-00, Servicing).
- (2) Fully deflect control column and return to Neutral. Make certain that control surfaces return to neutral.
- (3) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
- (4) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
- (2) Install integral trim assembly upper casing. Install spring rod boot on casing, tighten clamp and wirelock (Ref. 20-21-13).
- (3) Close access doors and panels 121FB, 121GB and 121DB.
- (4) Install floor panels 211HF and 213AF.
- (5) Remove access platforms.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### SPRING ROD - INSPECTION/CHECK

#### 1. General

The purpose of the following procedure is to check the pitch control Artificial Feel spring rod.

#### 2. Spring Rod

##### A. Equipment and Materials

##### B. Prepare

- (1) Remove floor panels 211HF and 213AF.
- (2) Remove integral trim assembly upper cover plate (9).

##### C. Check

- (1) At rod end/integral trim assembly attachment.
  - (a) Check that attaching bolt is not ruptured by applying force to rod.
  - (b) Check that total play (hinge play at (1) plus rod internal play, plus hinge play at (3) is less than 0.15 mm (0.0059 in.).
  - (c) Check that nut is correctly tightened and safetied with cotter pin.
  - (d) Check rod end for cracks and signs of corrosion.
- (2) Rod protective boot (2).
  - (a) Check that boot is not torn, pierced or worn.
  - (b) Check that clamp attaching boot to integral trim assembly casing is correctly installed and tightened.
  - (c) Check that clamp (6) attaching boot (2) to rod body is correctly tightened and safetied.
- (3) At rod end/structure attachment (3)
  - (a) Check that bolt is not ruptured by applying force to rod.
  - (b) Check that nut is correctly tightened and safetied

EFFECTIVITY: ALL

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- (c) Check rod end for cracks and signs of corrosion.
- (4) Check that end fittings (4) are correctly tightened and safetied with lockwire.
- (5) On spring clips (5)
  - (a) Check that spigot is inserted in housing.
  - (b) Check lockwire for correct condition.
- (6) Check that adjusting nut (8) is correctly tightened and safetied.
- (7) Using lockwire, check through safety aperture (7) that threaded end is tightened within limits.
- (8) Check rod body for cracks, scores or signs of corrosion.  
(Ref. Fig. 601 )

### D. Test

### E. Close-Up

- (1) Install integral trim assembly upper cover plate (9).
- (2) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (3) Close floor panels 211HF and 213AF.

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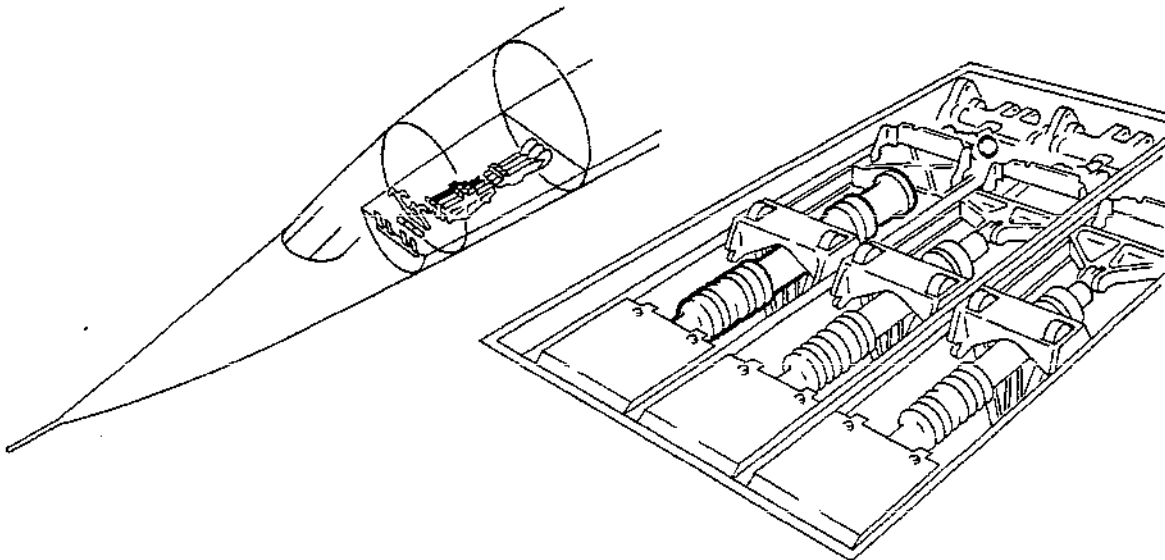
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## MAINTENANCE MANUAL



UPPER COVER PLATE

9

BOOT

2

3

4 END FITTINGS

5 SPRING CLIP

6 CLAMP

7 APERTURE

8

CMA 27 32 12 6 AAM0

Spring Rod  
Figure 601

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## MAINTENANCE MANUAL

### ARTIFICIAL FEEL JACK ROCKER ARM - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The Artificial Feel jack rocker arm transmits to the mechanical control, loads exerted by the Blue and Green Artificial Feel Jacks.

#### 2. Artificial Feel Jack Rocker Arm

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins - Synchro Pack	D925252000
Zero Rigging Device - Relay Chassis	E925019000
Circuit Breaker Safety Clips	
Access Platform 3.672 m (12 ft.)	
Lockwire Dia. 1 mm (0.041 in.) Corrosion Resistant Steel	
Warning Notices	

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### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PITCH ART FEEL COMP 1 SUP	13-216	1C 244	E 4
PITCH ART FEEL COMP 2 SUP		2C 244	G18
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

- (3) Make certain that pitch Flight controls and trim controls are set to zero.
- (4) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).
- (5) Remove access panels 121DB and 121FB, and immobilize pitch resolvers with rigging pin D925252003.
- (6) Remove access panel 121GB, and position rigging equipment E925019010 and E925019012 to immobilize pitch control.
- (7) Shut down pressurization of hydraulic system (Ref. 27-00-00, Procedure to set Flight Controls in electrical mode).
- (8) Open access door 151DB under fuselage, and depressurize Blue, Green and Yellow hydraulic systems.

**WARNING :** DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

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- (9) Open floor panel 213AF.
- (10) Remove Artificial Feel spring rod (Ref. 27-32-12, Removal/Installation).

### C. Remove (Ref. Fig.401 and 402)

- (1) Disconnect Blue Artificial Feel Jack from rocker arm (Ref. 27-34-13, Removal/Installation, Paragraph C.).
- (2) Disconnect Green Artificial Feel Jack from rocker arm (Ref. 27-34-11, Removal/Installation, Paragraph C.).
- (3) Disconnect rocker arm from integral trim assembly (Ref. 27-33-11, Removal/Installation).
- (4) Remove mounting (1) attachments.  
For each bolt, remove cotter pin and nut (5). Remove bolt (6) and washer (7).
- (5) Lift to disengage mounting/rocker arm assembly.
- (6) Remove mounting (1).
  - (a) Remove cotter pin, remove nut (2), bolt (3) and washer (4).
  - (b) Remove support arms (8).
- (7) Remove spacer (21).
  - (a) Unsafety and remove nut (10), remove bolt (18) and washer (9).
  - (b) Remove spacer (21).
- (8) Remove cotter pin, remove nut (11) and washer (12).
- (9) Remove nut (13) and bolt (17).
- (10) Remove support arm (8) from rocker arm then remove shackle (15) connecting rocker arm to integral trim assembly.
- (11) Separate the two side plates (14) and (16) of the rocker arm ; remove washers (19) and rollers (20).

### D. Preparation of Replacement Component

- (1) Install washers (19) and rollers (20) between the two

EFFECTIVITY: ALL

**27-32-14**

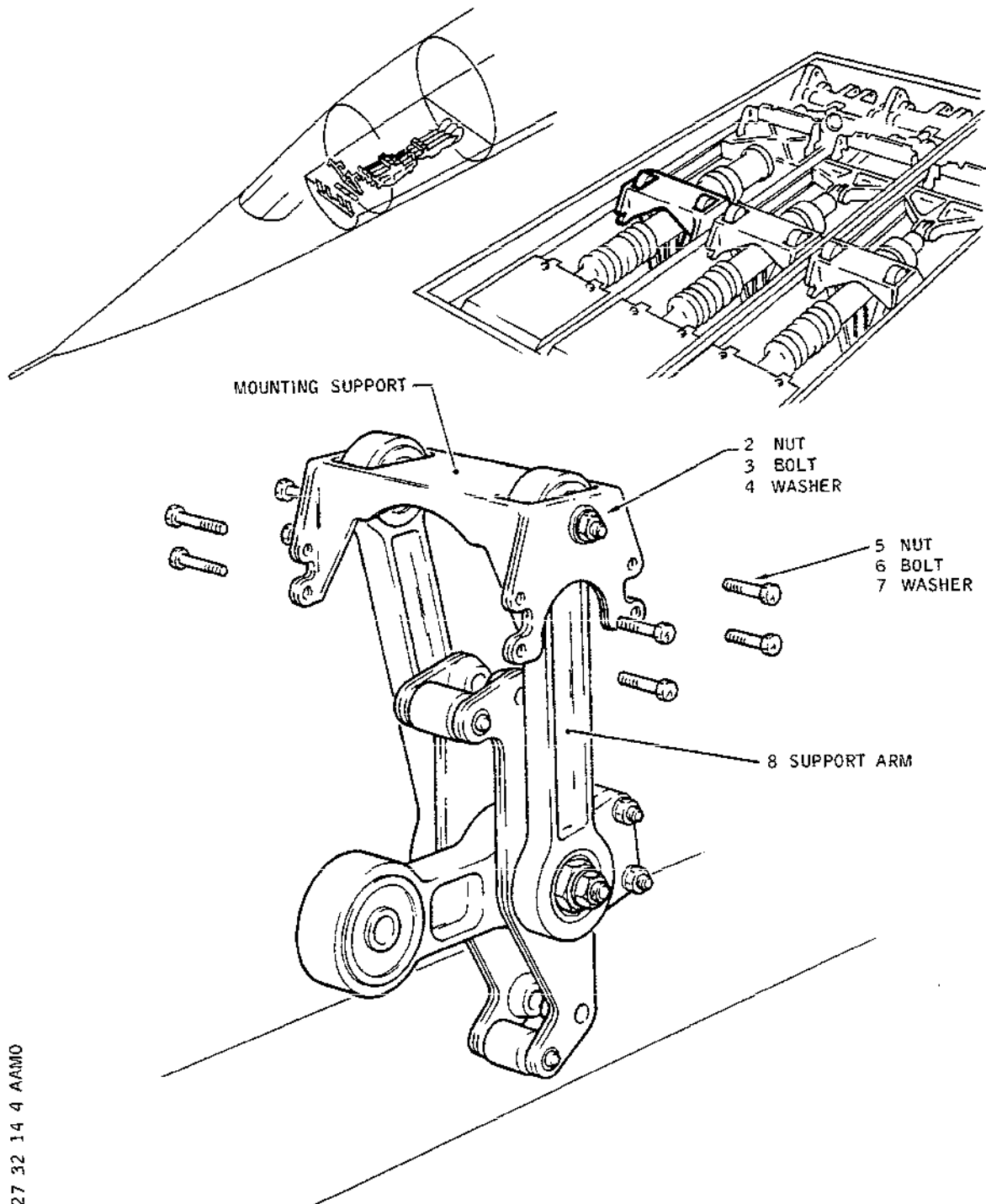
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Rocker Arm/Mounting Assembly  
Figure 401

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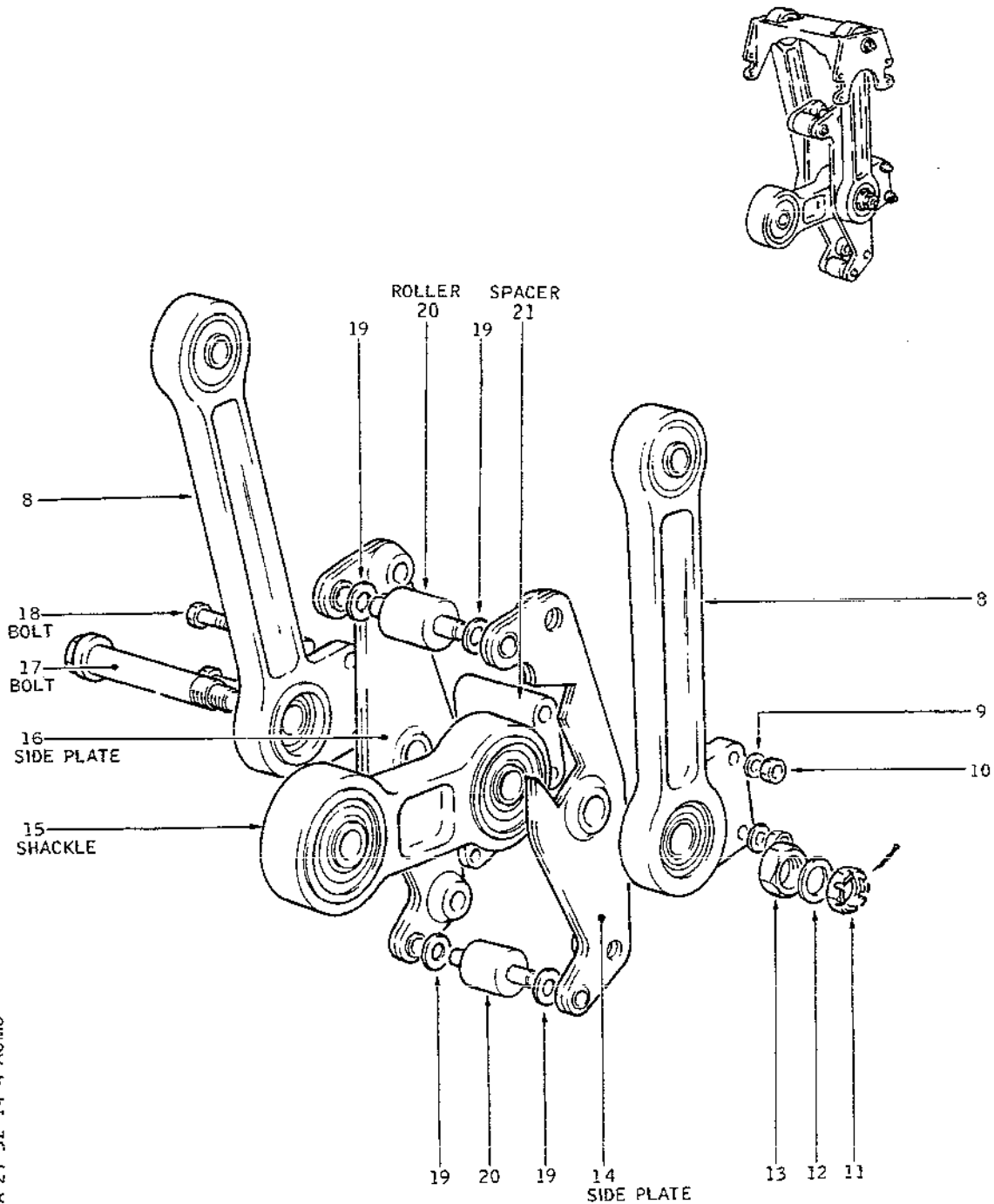
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CMA 27 32 14 4 ACM0

Rocker Arm  
Figure 402

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side plates (14) and (16) of the rocker arm.

- (2) Install support arms (8) and shackle (15) on rocker arm.
- (3) Install bolt (17) and tighten nut (13).  
Torque to between 240 and 260 lbf.in. (2.74 and 2.937 m.daN).
- (4) Install washer (12) and tighten nut (11).  
Torque to between 140 and 145 lbf.in. (1.581 and 1.638 m.daN).  
Safety with cotter pin.
- (5) Safety head of bolt (17) and nut (13) with lockwire as per 20-21-13.
- (6) Install spacer (21) bolts (18) washers (9) and nuts (10). Safety with cotter pin.
- (7) Attach mounting (1) to rocker arm.
- (8) Install bolts (3) washers (4) and nuts (2). Tighten nuts (2). Safety with cotter pin.
- (9) Check that rocker arm pivots freely about its axis.  
Check that rollers rotate freely.

### E. Install

- (1) Position rocker arm/mounting assembly on chassis.
- (2) Install bolts (6), washers (7) and tighten nuts (5).  
Safety nuts with cotter pin.
- (3) Attach shackle (15) to integral trim assembly (Ref. 27-33-13, Removal/Installation).
- (4) Check that minimum clearance A between upper roller and chassis is 2 mm (0.0787 in.).  
(Ref. Fig. 403 )
- (5) Connect Green Artificial Feel Jack to rocker arm  
(Ref. 27-34-11, Removal/Installation, Paragraph C.).
- (6) Connect Blue Artificial Feel Jack to rocker arm  
(Ref. 27-34-13, Removal/Installation, Paragraph C.).
- (7) Install Artificial Feel spring rod.  
(Ref. 27-32-12, Removal/Installation).

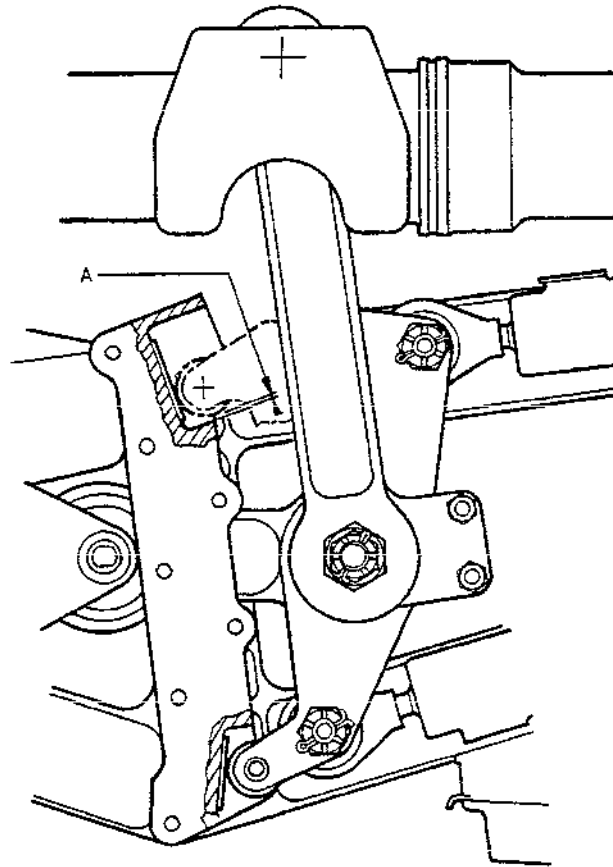
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CMA 27 32 14 4 AEMO

Measurement of Clearance A  
Figure 403

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- (8) Remove safety clips and tags and set circuit breakers.
- (9) Remove warning notices.
- (10) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).
- (11) Remove rigging equipment E925019010 and E925019012 from pitch control.
- (12) Remove rigging pin E925252003 from pitch resolvers.
- (13) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Procedure to set Flight Controls in Electrical mode).

### F. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access doors and panels 121DB, 121FB, 121GB, 151DB and floor panel 213AF.

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## MAINTENANCE MANUAL

### ARTIFICIAL FEEL ENGAGE SWITCH UNIT - REMOVAL/INSTALLATION

#### 1. General

The engage switch units of artificial feel systems 1 and 2 are located at overhead panel. Removal/installation is identical for each of them.

#### 2. Engage Switch Unit

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	

##### B. Prepare

(1) Trip, safety and tag the following circuit breakers :

(a) For system 1 :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ADC1 28V SUP	1-213	1F 74	P12
YAW	2-213	1C 242	E 2
ROLL		1C 243	E 3
PITCH		1C 244	E 4
ROOF PNL.INST.LTS.SUP	13-215	L 379	F11
(b) For system 2 :			

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ADC2 28V SUP	5-213	2F 74	F12
ROOF PNL.INST.LTS.SUP	13-215	L 379	F11
YAW	13-216	2C 242	G16
ROLL		2C 243	G17
PITCH		2C 244	G18

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### C. Remove

(Ref. Fig. 401 )

- (1) Unscrew tab (6) attaching the supply cable of lighting bar (3).
- (2) Disconnect electrical connector (5).
- (3) Unscrew attachment screws (4) of the lighting bar (support the latter during removal of the last screw).

**CAUTION** : HANDLE LIGHTING BAR WITH CARE WHEN REMOVING IT FROM THE U RAIL ATTACHED TO THE FRONT FACE OF THE UNITS.

- (4) Remove lighting bar (3).
- (5) Unscrew attachment screw of each separator (2) located on each side of the unit to be removed.
- (6) Unscrew the 2 attachment screws (1) of unit (7).
- (7) Remove unit.

### D. Install

- (1) Engage switch unit (7) in its housing.
- (2) Tighten attachment screws (2).
- (3) Position separators (2) and tighten attachment screws.
- (4) Install lighting bar (3) in U rail.
- (5) Tighten attachment screws (4).
- (6) Connect electrical connector (5).
- (7) Engage lighting bar cable under attach tab (6) and tighten attachment screws of this tab.
- (8) Remove safety clips and tags and reset the circuit breakers.

### E. Test

- (1) Carry out test described in 27-32-41 A/T.

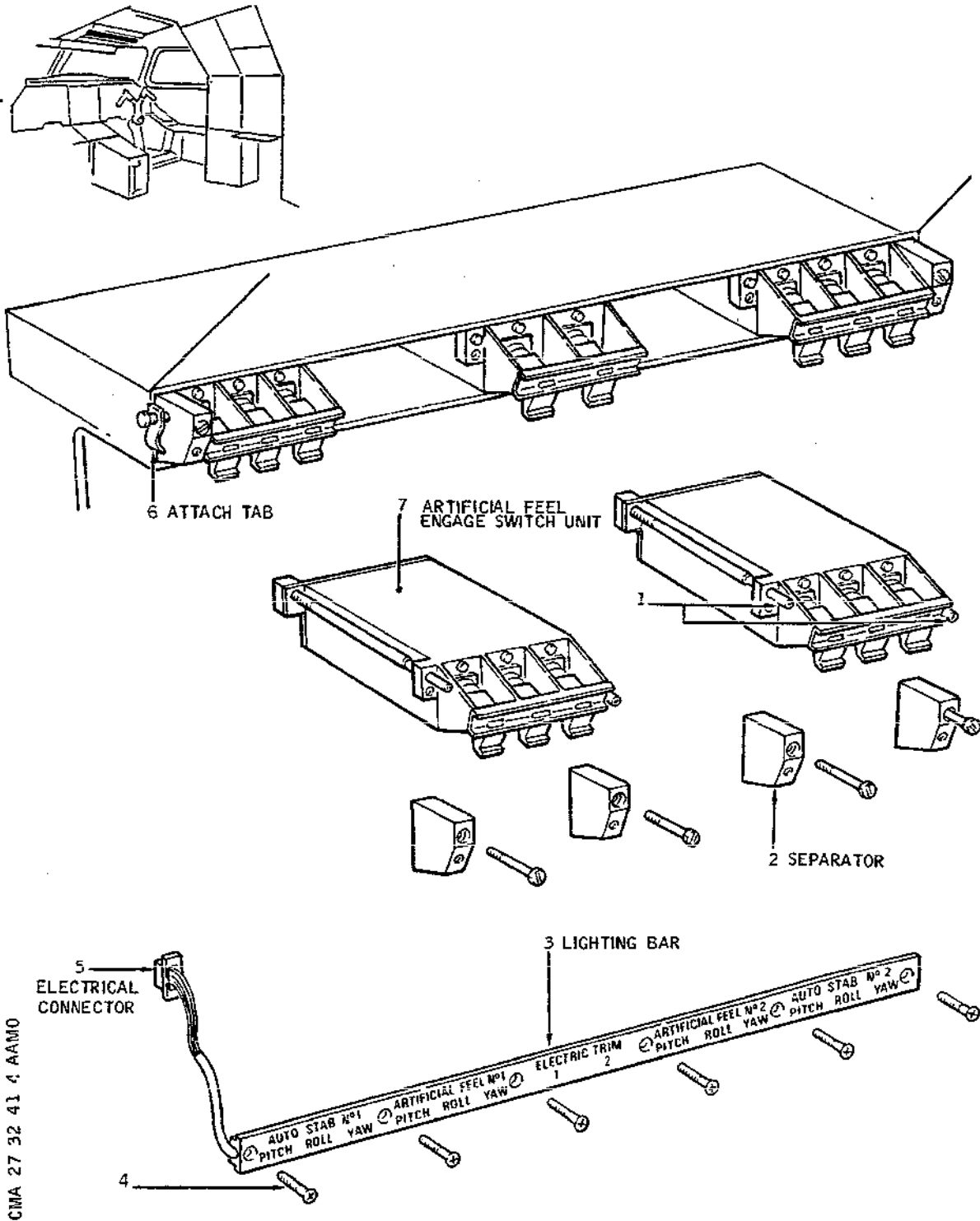
EFFECTIVITY: ALL

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## MAINTENANCE MANUAL



Engage Switch Unit Removal  
Figure 401

R EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

### ARTIFICIAL FEEL ENGAGE SWITCH UNIT - ADJUSTMENT/TEST

#### 1. General

R The purpose of this test is to check the operation of the  
R Artificial Feel engage switch unit further to maintenance  
R operations.

#### R 2. Test

##### A. Equipment and Materials

---

DESCRIPTION

PART NO.

---

Electrical Ground Power Unit

##### B. Prepare

(1) Make certain that the following circuit breakers are set :

---

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
AUDIO WARN SYS SUP 1	1-213	W 371	M21
MWS SUP 1		W 252	N21
ADC1 28V SUP		1F 74	P12
ADC1 26V SUP	2-213	1F 78	A 2
YAW ART FEEL COMP 1 SUP		1C 242	E 2
ROLL ART FEEL COMP 1 SUP		1C 243	E 3
PITCH ART FEEL COMP 1 SUP		1C 244	E 4
ADC1 115V SUP		1F 73	F 3
AUDIO WARN SYS SUP 2	5-213	W 372	C17
MWS SUP 2		W 251	D15
ADC2 28V SUP		2F 74	F12
ROOF PNL INST LTS SUP	13-215	L 379	F11
ADC2 26V SUP	13-216	2F 78	F14
ADC2 115V SUP		2F 73	F15
YAW ART FEEL COMP 2 SUP		2C 242	G16
ROLL ART FEEL COMP 2 SUP		2C 243	G17
PITCH ART FEEL COMP 2 SUP		2C 244	G18

---

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## MAINTENANCE MANUAL

- R (2) On centre console, on ADC control panel, check that both switches are in OFF position and TEST selector switches are in NORM position.
- R (3) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

NOTE : Do not take into account aural and visual warnings which are not mentioned.

### C. Test

- R (1) Lighting strip test
- (a) On LIGHTING unit (located on RH side of overhead panel) operate ROOF rotary switch.
- R - Markings engraved on strip must illuminate; brightness of these markings must vary when rotary switch is operated.
- R (b) Move rotary switch to OFF position.
- R - Brightness of markings must gradually fade out.
- (2) Test of unit
- R (a) On centre console, on ADC control panel;
- R (a1) Place ADC1 and ADC2 switches in ON position.
- R (a2) If necessary press ADC1 or (and) ADC2 warning light(s) in order to extinguish it (them).
- R (b) On overhead panel, engage PITCH switches on ARTIFICIAL FEEL No.1 and ARTIFICIAL FEEL No.2 engage switch units.
- R - Both switches must remain engaged.
- R (c) At Flight Engineer's station, on panel 29-214;
- R (c1) Press and release ARTIFICIAL FEEL TEST 1 push-button.
- R - The switch on ARTIFICIAL FEEL No.1 engage switch unit must disengage and indicate OFF.
- R (c2) Press and release ARTIFICIAL FEEL TEST 2

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## MAINTENANCE MANUAL

push-button :

- Gong must sound
- On overhead panel, FEEL warning light on master warning panel must illuminate and the ARTIFICIAL FEEL No.2 engage switch must disengage and indicate OFF.

R (d) At overhead panel, on master warning panel, press  
R FEEL warning light then release it : this light must go off.

R (e) Engage ROLL switches on ARTIFICIAL FEEL No.1 and  
ARTIFICIAL FEEL No.2 engage switch units.

- Both switches must remain engaged.

R (f) Repeat steps (c) and (d) above

- Identical results.

R (g) Engage YAW switches on ARTIFICIAL FEEL No.1 and  
R ARTIFICIAL FEEL No.2 engage switch units.

- Both switches must remain engaged.

R (h) Repeat steps (c) and (d) above.

- Identical results.

R (i) On centre console, on ADC control panel, place  
ADC1 and ADC2 switches in OFF position.

### D. Close-Up

R (1) De-energize the aircraft electrical network (Ref.  
24-41-00, Servicing) and remove electrical ground power unit.

EFFECTIVITY: ALL

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***Concorde***  
**MAINTENANCE MANUAL**  
**COMPUTER - REMOVAL/INSTALLATION**

1. General

2. Artificial Feel Computer

A. Equipment and Materials

---

DESCRIPTION

PART NO.

---

Circuit Breaker Safety Clips

B. Prepare

(1) Trip, safety and tag the following circuit breakers :

(a) For computer No.1 (1C 235)

---

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
YAW	2-213	1C 242	E 2
ROLL		1C 243	E 3
PITCH		1C 244	E 4

---

(b) For computer No.2 (2C 235)

---

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
YAW	13-216	2C 242	G16
ROLL		2C 243	G17
PITCH		2C 244	G18

---

(2) Remove panel 215BS (for computer 1C 235, on shelf 6-215) or 216BS (for computer 2C 235, on shelf 6-216).

C. Remove

(1) On unit 1C 235 (or 2C 235), unscrew the two locking knurled knobs and disengage the locking system downwards.

(2) Remove unit pulling it by its handle.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

R (3) Note condition of unit rear connector, as a guide to  
R reactionnary damage at its mating rack connector  
R which may be found in D-(1) below.

### D. Install

R (1) Check that the unit rear connector and its mating  
R rack connector are clean and free from damage.

R (2) Engage unit on its guiding rails, and push it fully  
home. (Proceed with care in order not to damage elec-  
trical connector pins).

R (3) Install both locking systems and screw up knurled  
knobs.

R (4) Remove safety clips and tags and reset circuit breakers

### E. Test

Carry out a test (Ref. 27-32-44, A/T)

### F. Close-Up

Install and lock panel 215BS on shelf 6-215 (or 216BS on  
shelf 6-216).

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### ARTIFICIAL FEEL COMPUTER - ADJUSTMENT/TEST

WARNING: MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE: DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED: DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The purpose of the following test is to check the correct operation of the computer further to maintenance operations.

NOTE: The following test is described for Artificial Feel Computer No.1 (1C235). For the test of Artificial Feel Computer No.2 (2C235) follow indications between brackets.

#### 2. Test

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical ground power unit	-

##### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Aircraft must be on the ground, shock absorbers compressed.

EFFECTIVITY: ALL

# *Concorde*

## MAINTENANCE MANUAL

- (3) Check that the following circuit breakers are set:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW 'A' SYS SUP	1-213	G 292	M17
ADC 1 28 V SUP		1F 74	P12
1ST PLT ADC INST SUP	2-213	1F 75	B 3
ADC 1 26 V SUP		1F 78	A 2
YAW ART FEEL COMP 1 SUP		1C 242	E 2
ROLL ART FEEL COMP 1 SUP		1C 243	E 3
PITCH ART FEEL COMP 1 SUP		1C 244	E 4
ADC 1 115V SUP		1F 73	F 3
RH UC WEIGHT SW 'B' SYS SUP	3-213	G 294	B 9
ADC 2 28 V SUP	5-213	2F 74	F12
2ND PLT ADC INST SUP	13-216	2F 75	A14
ADC 2 26 V SUP		2F 78	F14
ADC 2 115 V SUP		2F 73	F15
YAW ART FEEL COMP 2 SUP		2C 242	G16
ROLL ART FEEL COMP 2 SUP		2C 243	G17
PITCH ART FEEL COMP 2 SUP		2C 244	G18

- (4) Remove safety clips and tags and set the following circuit breakers:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT & NAV BUS 14XS	2-213	X 355	H 2
NAV INST BUS 13XS	13-216	X 345	G 4

### C. Prepare Test

NOTE: Tests must be performed at a nominal pressure of 4000 psi.

- (1) Carry out Operational Test, Prepare detailed in:
- for roll axis (Ref. 27-12-00, Adjustment/Test)
  - for yaw axis (Ref. 27-22-00, Adjustment/Test)
  - for pitch axis (Ref. 27-32-00, Adjustment/Test).
- (2) Carry out procedure to set Flight Controls in Mechanical Mode (Ref. 27-00-00, Servicing).

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

(3) On ADC control panel (centre console):

- place ADC1 and ADC2 switches in ON position,
- place ADC1 and ADC2 TEST switches in position 1.

The amber ADC1 and ADC2 warning lights must illuminate. After approximately 30 seconds the blue TEST indicator lights must illuminate.

- press then release the amber ADC1 and ADC2 warning lights. They must go off.

### D. Operational Test

Perform test of the three artificial feel jacks on the roll, yaw and pitch axes, Blue and Green hydraulic systems.

RB

(1) Roll axis.

- (a) On centre console, make certain that trim knob is set to 0.
- (b) On overhead panel, on ARTIFICIAL FEEL No.1 engage switch unit, engage ROLL switch. It must remain engaged.
- (c) Move control handwheel in both directions, from stop to stop. Note load needed to carry out this operation.
- (d) While moving control handwheel:
  - hold ROLL switch engaged,
  - press and hold ARTIFICIAL FEEL TEST 1 push-button, located on unit 29-214 of 3CM panel.

As soon as TEST push-button is pressed, pulsations should be felt at the control handwheel. To avoid unnecessary stress on linkage, pulsation test must not exceed 3 seconds.

- (e) Stop moving control handwheel.
- (f) Release ROLL switch while holding ARTIFICIAL FEEL TEST 1 push-button pressed.

This switch must disengage and indicate OFF.

- (g) On 3CM panel unit 29-214, release ARTIFICIAL FEEL TEST 1 push-button.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (h) Repeat operations described from (b) to (g) replacing terms ARTIFICIAL FEEL No.1 by ARTIFICIAL FEEL No.2 and ARTIFICIAL FEEL TEST 1 by ARTIFICIAL FEEL TEST 2.

NOTE: If, during the above test, no load reduction is noted at the pilot control the artificial feel jack electro-valve involved must be replaced prior to further flight.

If, during the above test, the number of pulsations felt at the pilot control is around 5 per second or less the artificial feel jack electro-valve involved must be replaced within 20 flights.

(2) Yaw axis.

- (a) On centre console, make certain that trim knob is set to 0.
- (b) Fully deflect rudder pedals to the right and left. Note load required to carry out this operation.
- (c) On overhead panel, on ARTIFICIAL FEEL No.1 engage switch unit, engage YAW switch.

It must remain engaged.

- (d) Fully deflect rudder pedals in both directions and check that load needed to carry out this operation is greater than that applied during operation (b).
- (e) With rudder pedals deflected midway to right (or left):
- maintain YAW switch engaged,
  - press and hold ARTIFICIAL FEEL TEST 1 push-button, located on unit 29-214 of 3CM panel.

As soon as TEST push-button is pressed, pulsations are felt at rudder pedals. To avoid unnecessary stress on linkage, pulsation test must not exceed 3 seconds.

- (f) Release YAW switch while holding ARTIFICIAL FEEL TEST 1 push-button pressed.

This switch must disengage and indicate OFF.

- (g) On 3CM panel unit 29-214, release ARTIFICIAL FEEL TEST 1 push-button.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (h) Repeat operations described from (b) to (g) replacing ARTIFICIAL FEEL No.1 by ARTIFICIAL FEEL No.2 and ARTIFICIAL FEEL TEST 1 by ARTIFICIAL FEEL TEST 2.

NOTE: If, during the above test, no load reduction is noted at the pilot control the artificial feel jack electro-valve involved must be replaced prior to further flight.

If, during the above test, the number of pulsations felt at the pilot control is around 5 per second or less the artificial feel jack electro-valve involved must be replaced within 20 flights.

(3) Pitch axis.

- (a) Place pitch trim wheel (centre console) between 0 and 1 degree nose down.

NOTE: This condition is essential in order to correctly perform the test.

- (b) Move control column in nose up and nose down directions, from stop to stop. Note load required to carry out this operation.
- (c) On overhead panel, on ARTIFICIAL FEEL No.1 engage switch unit, engage PITCH switch.

This switch must remain engaged.

- (d) Move control column in nose up and nose down directions, from stop to stop and check that load needed to carry out this action is greater than that applied during operation (b).
- (e) Place control column midway between neutral and full nose up position (or full nose down position) and hold in this position:
- Hold PITCH switch engaged,
  - On unit 29-214 located on 3CM panel, press ARTIFICIAL FEEL TEST 1 push-button and hold it.

As soon as this button is pressed, pulsations are felt at control column.  
To avoid unnecessary stress on linkage, pulsation test must not exceed 3 seconds.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (f) Release PITCH switch while keeping ARTIFICIAL FEEL TEST 1 push-button pressed.

This switch must disengage and indicate OFF.

- (g) On 3CM panel unit 29-214, release ARTIFICIAL FEEL TEST 1 push-button.

- (h) Repeat operations described from (b) to (g) replacing terms ARTIFICIAL FEEL No.1 by ARTIFICIAL FEEL No.2 and ARTIFICIAL FEEL TEST 1 by ARTIFICIAL FEEL TEST 2.

NOTE: If, during the above test, no load reduction is noted at the pilot control the artificial feel jack electro-valve involved must be replaced prior to further flight.

If, during the above test, the number of pulsations felt at the pilot control is around 5 per second or less the artificial feel jack electro-valve involved must be replaced within 20 flights.

### E. End of Tests

- (1) On ADC control panel (centre console).

- (a) Place ADC1 and ADC2 TEST selector switches in NORM position.

- (b) Place ADC1 and ADC2 switches in OFF position.

### F. Close-Up

- (1) Carry out Close-Up operations detailed in:

- for roll axis (Ref. 27-12-00, Adjustment/Test),
- for yaw axis (Ref. 27-22-00, Adjustment/Test),
- for pitch axis (Ref. 27-32-00, Adjustment/Test).

- (2) Trip, safety and tag the following circuit breakers:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT & NAV BUS 14XS	2-213	X 355	H 2
NAV INST BUS 13XS	13-216	X 345	G 4

EFFECTIVITY: ALL

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# *Concorde*

## MAINTENANCE MANUAL

### TRIM CONTROL - DESCRIPTION AND OPERATION

#### 1. General (Ref. Fig. 001 )

The trim control wheel is connected to a bevel gear installation located on the centre console in the flight compartment.

The number of turns of the control wheel is limited by the interreaction of a system of washers, one driving the other, on each turn of the wheel ; the last of the washers to be driven forms the stop.

A graduated drum driven by a reduction gear, rotates in front of a fixed pointer. It indicates the degree of elevon deflection, which relates to a new artificial feel neutral point.

Movement of the control wheel operates a system of universal joints, pinions, bevel gears and chains.

The unit is connected to the artificial feel chassis and is fitted with a worm gear assembly driven by the transmission system.

One end of the input lever is fitted with a bevel gear sector which engages in the worm gear.

The mechanical control rods and linkages are attached to the other end.

The unit is in the form of a crank, two arms of which are connected to the artificial feel system (spring rod and jacks).

The transmission system is coupled to an electric motor, which is active in the auto-pilot mode. A deflection detector is mounted to the right of the unit which is used in the calculation of artificial feel loads.

EFFECTIVITY: ALL

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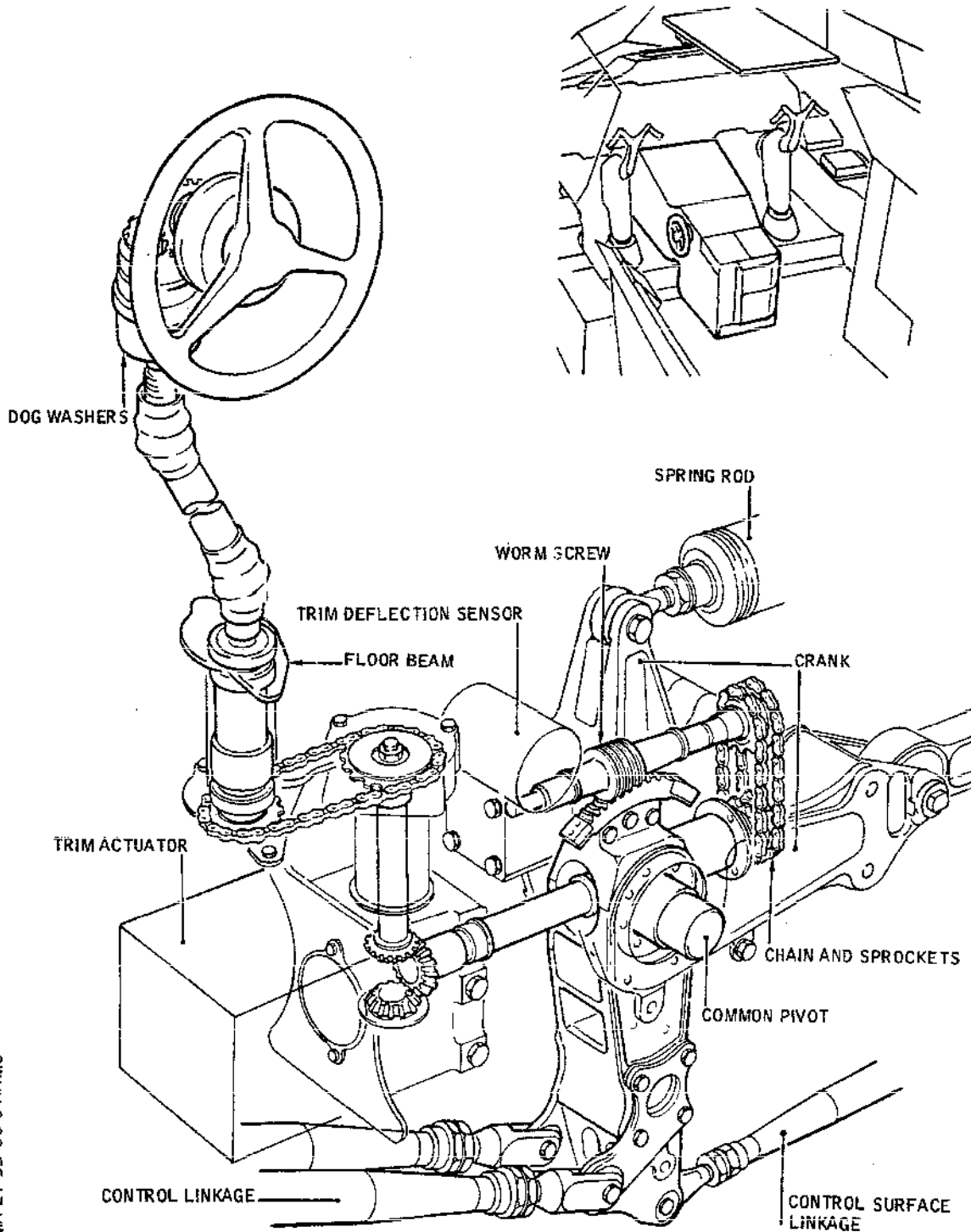
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## MAINTENANCE MANUAL



CMA 27 33 00 0 AAM0

- Trim Controls

Figure 001

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### 2. Operation (Ref. Fig.002 and 003)

Rotation of the trim control wheel causes the worm gear to rotate which, in turn, brings about relative movement of the unit in respect of the input lever.

The trim control wheel offers two functions :

- Cancellation of the reactions of the artificial feel system by displacing the control's neutral point.
- Control of elevon deflection.

This method of aircraft control is only to be used in cases of extreme urgency. As the pitch control inertia and friction forces are lower than the artificial feel system threshold, the trim action alone causes displacement of the control without involving a reaction within the artificial feel system.

EFFECTIVITY: ALL

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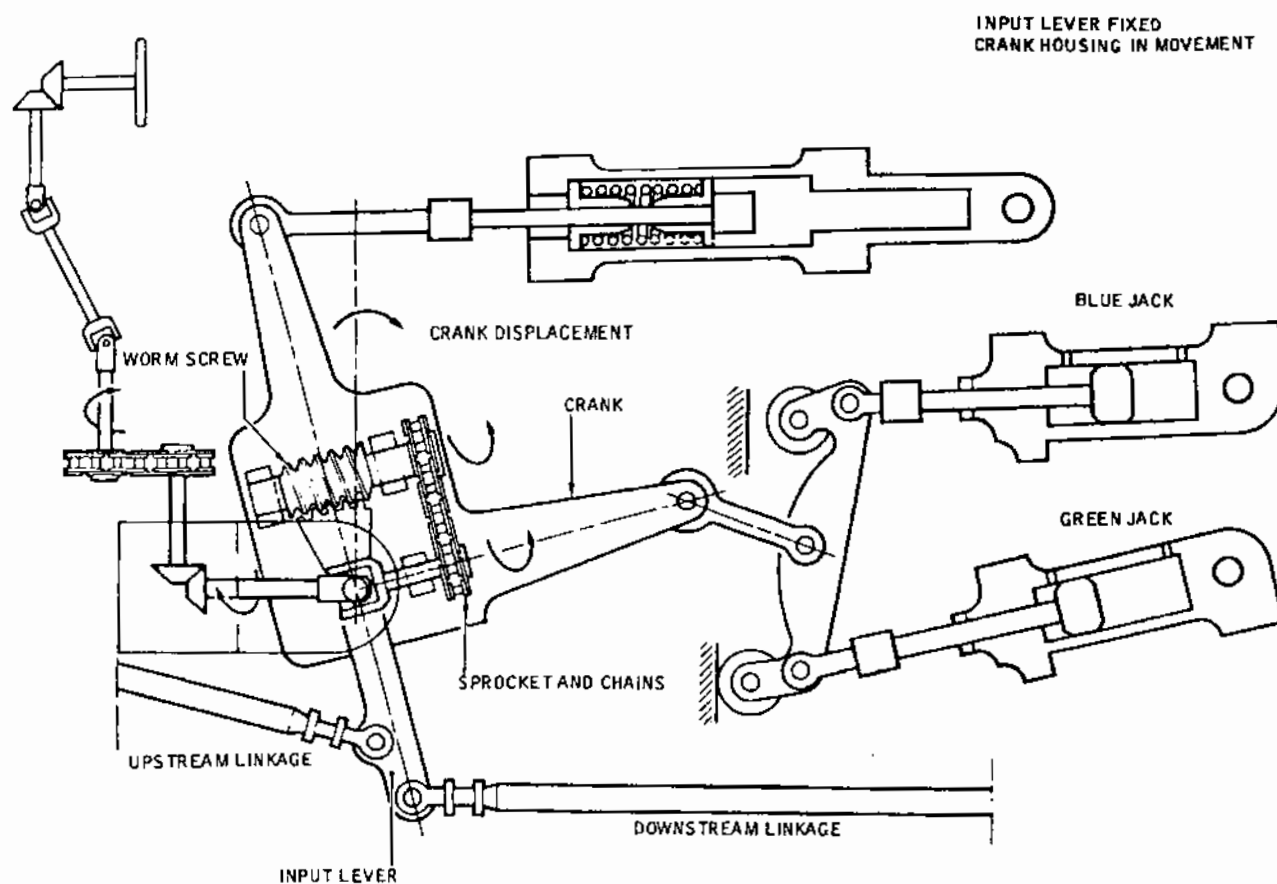
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## MAINTENANCE MANUAL

CMA 27 33 00 0 ACM0



- Artificial Feel Cancellation  
Figure 002

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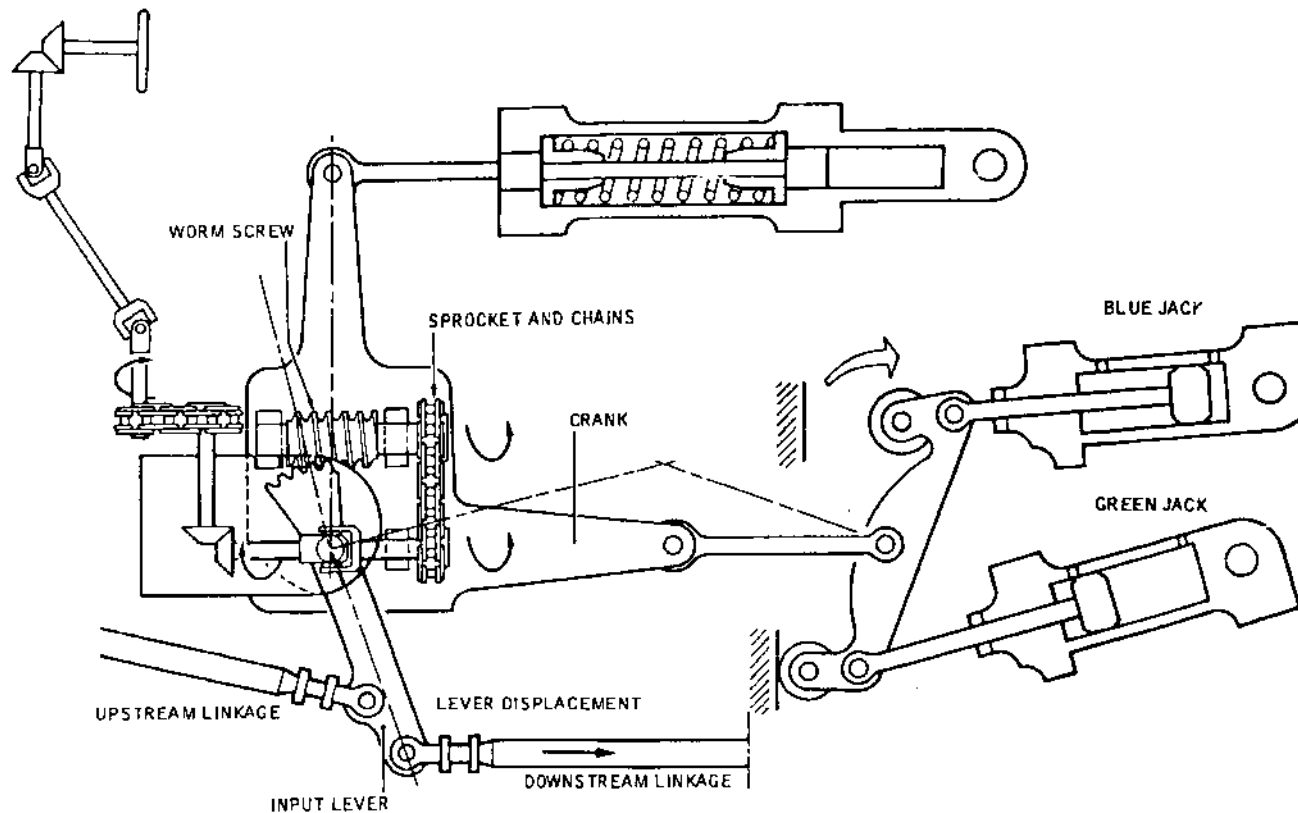
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## MAINTENANCE MANUAL

CMA 27 33 00 0 AEMO

CRANK HOUSING FIXED  
INPUT LEVER IN MOVEMENT



- Flying by Trim Controls  
Figure 003

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### TRIM CONTROL - TROUBLE SHOOTING

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The following information is intended to enable faults found in Pitch trim control operation to be quickly rectified.

This trouble shooting deals with the following faults :

- Trim linkage
- Operating loads
- Play in control.

The faults can be isolated with the aid of the trouble shooting procedures and traced through OK and NOT OK paths to the appropriate charts or other specified rectification action as may be necessary. If a defect occurs perform the appropriate rectification action, then repeat the operation at which the defect was encountered to ensure the operation is OK.

Bracketed numbers in the procedure and charts indicate items on the component identification table (Ref. Table 101).

The table provides information necessary to locate components.

#### 2. Pitch Trim

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### A. General

Flight controls (electrical channels and linkage) are assumed to operate correctly, to be free of excessive play and to be within neutral tolerances.

### B. Prepare

#### (1) Equipment and Materials

DESCRIPTION	PART NO.
Protractor, Elevons and Rudder	TE2012
Rigging Template - Integral Trim	D921250000
Access Platform 3.672 (12 ft)	

(2) Take the precautions described in the previous WARNING paragraph.

(3) Set Flight Controls in Blue electrical mode (27-00-00, Servicing).

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### C. Trouble Shooting

\*\*\*\*\*  
\* Check that artificial feel systems are not engaged\*  
\* On Flight Control Unit, place O & M ELEVONS and \*  
\* IN ELEVONS switches in BLUE position. \*  
\* Open access door 121DB \*  
\* Position pitch trim wheel so as to install \*  
\* equipment D921250000 on integral trim assembly. \*  
\* Pitch trim wheel graduated scale must read 0 \*  
\* degrees, plus or minus 0.1 degree \*  
\*\*\*\*\*

		-----
OK	NOT OK--	Incorrect reading on graduated scale or excessive play in control Ref. Chart 101
		-----

\*\*\*\*\*  
\* Install equipment TE2012 (protractor) on outer \*  
\* and middle elevons. \*  
\* Remove equipment D921250000. Rotate trim wheel \*  
\* in counter clockwise direction until it reaches \*  
\* stop. \*  
\* On protractor elevons deflect +8 degrees, plus \*  
\* 0.4 degrees, plus 0 degree. \*  
\* Trim graduated scale reads plus 8.4 degree plus \*  
\* or minus 0.2 degree. \*  
\* Rotate trim wheel in clockwise direction until it \*  
\* reaches stop. \*  
\* Elevons deflect - 15 degrees, minus 0, minus 0.75 \*  
\* degree (reading on protractor) \*  
\* Trim graduated scale reads minus 15.7 degrees \*  
\* plus or minus 0.2 degree. \*  
B\* Torque required to move control wheel shall be \*  
B\* 20±6 lbf.in. \*

		-----
OK	NOT OK--	Deflection range is incorrect Ref Chart 102
		-----

		-----
	NOT OK--	Aircraft on ground, no in-flight loads being applied, trim wheel operating load is excessive Ref. Chart 103
		-----

Trim operates correctly.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

\*\*\*\*\*

* INCORRECT READING ON GRADUATED	*	GROUND EQUIPMENT REQUIRED
* SCALE OR EXCESSIVE PLAY IN CONTROL.	*	
* GRADUATED SCALE FOLLOWS CORRECTLY	*	DESCRIPTION PART No
* ROTATION OF CONTROL WHEEL	*	
*****		COMPARATOR -

<div>OK</div> <div>NOT OK--</div>		SPRING SCALE -
		ASSEMBLY TOOLS
		TRIM CONTROL
		GEARBOX - D925184000

OK	NOT OK--	Remove cover on graduated scale. Graduated scale can be rotated by a value greater than 0.75 mm (0.0295 in.)
		Replace trim gear box assembly [1]

\*\*\*\*\*

- \* Immobilize trim control tube at floor level. \*
- \* Remove trim wheel (cover, cotter pin, washer, nut \*
- \* wheel). Install equipment D927262000. \*
- \* Using a comparator attached to casing, measure \*
- \* play at datum mark on equipment arm. \*
- \* Play is equal to or less than 1.75 mm \*
- \* (0.0689) \*

\*\*\*\*\*

OK	NOT OK--	Replace trim gear box assembly and associated tube above floor [2]
----	----------	--

\*\*\*\*\*

- \* Check tension of chain underneath floor. \*
- \* Chain deflection should be between 7 and 10 mm \*
- \* (0.275 and 0.393 in.) for a tension of 1.4 to 2.5 \*
- \* daN (10.32 and 18.43 lbf.ft) \*

\*\*\*\*\*

OK	NOT OK
----	--------

Chart 101 (Sheet 1 of 2)

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

After adjustment of chain tension (Ref.  
procedure 27-33-13, Removal/Installation.  
paragraph E) check play at pitch trim wheel

\*\*\*\*\*  
\* Replace integral trim \*  
\* assembly [3] \*  
\*\*\*\*\*

\*\*\*\*\*  
\* Shut down pressurization of hydraulic systems \*  
\* (Ref. 27-00-00, Servicing, Procedure to set Flight\*  
\* Controls in electrical mode) \*  
\* Remove comparator and equipment D927262000. \*  
\*\*\*\*\*

Chart 101 (Sheet 2 of 2)

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* DEFLECTION RANGE IS INCORRECT \*  
\*\*\*\*\*

GROUND EQUIPMENT REQUIRED

DESCRIPTION PART No

Comparator -  
Spring scale -

\*\*\*\*\*  
\* Disconnect the four rods from integral trim \*  
\* assembly lower lever (Ref 27-33-11, Removal/Instal- \*  
\* lation. Paragraph 2 C.) \*  
\* Attach a comparator to lower lever, at 200 mm \*  
\* (7.87 in.) from lever fulcrum. Apply a 2 daN \*  
\* (4.5 lbf) load to trim lever. Play is equal to \*  
\* or less than 0.34 mm (0.0134 in) \*  
\*\*\*\*\*

||  
OK NOT OK--| Ref. Chart 102, sheet 2  
||

\*\*\*\*\*  
\* Connect the four rods to integral trim assembly. \*  
\* (Ref 27-33-11, Removal/Installation, Paragraph 2E) \*  
\* Measure deflection of integral trim assembly \*  
\* lower lever at 200 mm (7.87 in) from lever \*  
\* fulcrum. \*  
\* When trim wheel is fully rotated counterclock- \*  
\* wise, deflection is between 21 and 22 mm \*  
\* (0.826 and 0.866 in.). When trim wheel is fully \*  
\* rotated in clockwise direction, deflection is \*  
\* between 43.5 and 45.7 mm (1.72 and 1.799 in). \*  
\*\*\*\*\*

NOT OK--| Check that there is no friction or jamming,  
| then remove trim gearbox assembly [1] in  
| centre console.

NOT OK--| Deflection range is incorrect.  
| Replace integral trim assembly [3]

Chart 102 (Sheet 1 of 2)

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\*\*\*\*\*  
\* Apply a 2 daN (4.5 lbf) load to control rod \*  
\* attachment point. Using a comparator attached to \*  
\* structure, measure play at rigging point at 157 \*  
\* mm (6.18 in) from trim fulcrum. Play is equal \*  
\* to or less than 0.08 mm (0.0031 in) \*  
\*\*\*\*\*

OK	NOT OK--	Check that there is no friction point, then remove trim gear box assembly [1].
----	----------	---

\*\*\*\*\*  
\* Replace integral trim assembly [3] \*  
\*\*\*\*\*

\*\*\*\*\*  
\* Shut down pressurization of hydraulic systems \*  
\* (Ref. 27-00-00, Servicing, Procedure to set Flight \*  
\* Controls in electrical mode). \*  
\* Remove comparator. \*  
-----

Chart 102 (Sheet 2 of 2)

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*****	
* AIRCRAFT ON GROUND, NO IN-FLIGHT	*   GROUND EQUIPMENT REQUIRED
* LOAD BEING APPLIED, TRIM WHEEL	*
* OPERATING LOAD IS EXCESSIVE	*   DESCRIPTION PART No
*****	
	*   SPRING SCALE -
*****	

\*\*\*\*\*  
\* Check tension of integral trim assembly input \*  
\* control chain with a 1.4 to 2.5 daN (3.147 to \*  
\* 5.620 lbf) load applied to the chain, deflection \*  
\* is between 7 and 10 mm (0.275 and 0.393 in) \*  
\*\*\*\*\*

		-----	
			Adjust tension of chain. Ref. procedure detai-
OK	NOT OK		led in 27-33-13, Removal/Installation
			Paragraph E (9).
		-----	

\*\*\*\*\*  
\* Disconnect trim control chain, on control pinion \*  
\* side. Using a spring scale, pull chain. Load is \*  
\* less than or equal to 3.5 daN (7.868 lbf) \*  
\*\*\*\*\*

		-----	
			Replace integral trim assembly [3]
OK	NOT OK		
		-----	

\*\*\*\*\*  
\* If load is abnormal check mechanism between \*  
\* control wheel and control pinion under floor. \*  
\*\*\*\*\*

\*\*\*\*\*  
\* Shut down pressurization of hydraulic systems \*  
\* (Ref. 27-00-00, Servicing, Procedure to set Flight\*  
\* Controls in electrical mode) \*  
\*\*\*\*\*

Chart 103 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[1] Trim gear-box assembly in centre console	121DB	122		Centre Console	27-33-11 R/I	
[2] Control tube	121DB	122		Under floor	27-33-11 R/I	
[3] Integral trim assembly	121DB	122		Under floor	27-33-13 R/I	

Component Identification  
Table 101

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## MAINTENANCE MANUAL

### TRIM CONTROL - ADJUSTMENT/TEST

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The following procedure concerns tests carried out by means of trim mechanical control.

For tests carried out by means of electrical control, Ref. 22-23-00, Servicing).

#### 2. Operational Test

##### A. General

The purpose of the test is to check the Flight controls operation by means of the trim.

##### B. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Access platform 4.470 m	(14 ft. 8 in.)
-------------------------	----------------

##### C. Prepare

(1) Take the precautions described in the previous WARNING paragraph.

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## MAINTENANCE MANUAL

(2) On overhead panel :

- Make certain that ARTIFICIAL FEEL No.1 and ARTIFICIAL FEEL No.2 engage switches are in OFF position.
- On SERVO CONTROLS unit check that selector switches are in NORMAL position.
- On RELAY JACK unit place switch in NORMAL position.
- On Flight Control Unit make certain that O and M ELEVONS and IN.ELEVONS switches are in MECH position.

(3) Check that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RELAY JACK HYD SEL IND & SUP	1-213	C 281	N17
PFC IND		C 287	N18
PFC & RELAY JACK "A" SYS		C 285	P16
CONT YELL/GRN GRN FAIL			
PFC & RELAY JACK "A" SYS		C 286	P17
CONT YELL/BLUE BLUE FAIL			
PFC & RELAY JACK "A" SYS		C 288	P18
CONT YELL L/LEVEL			
FLT CONT POSN IND CONT		C 83	R11
FLT CONT POSN IND 26V 400 Hz SUP	2-213	C 84	B 4
PFC & RELAY JACK "B" SYS	3-213	C 282	A 8
CONT YELL L/LEVEL			
PFC & RELAY JACK "B" SYS		C 283	A 9
CONT YELL/GRN GRN FAIL			
PFC & RELAY JACK "B" SYS		C 284	A10
CONT YELL/BLUE BLUE FAIL			

- (4) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).
- (5) On overhead panel place BLUE INVERTER and GREEN INVERTER switches in OFF INV position.
- (6) On ICOVOL indicator (Flight Control Surface Position indicator) check that the 6 magnetic indicators associated with elevons display M.
- (7) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).

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## MAINTENANCE MANUAL

- (8) Check that pitch and roll trim controls are set to zero.
- (9) Check that pitch and roll flight controls are at neutral.

### D. Test

- (1) Move pitch wheel in forward direction up to graduation 8.
  - On ICOVOL indicator, check elevon position : nose down - 8°.
- (2) Move pitch wheel in rearward direction up to graduation 15.
  - On ICOVOL indicator, check elevon position : nose up + 15°.
- (3) Bring back trim to zero position.
  - On ICOVOL indicator, check that elevons are in neutral position.

### E. Close-up

- (1) On overhead panel, place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position.
- (2) Shut down pressurization of hydraulic system.  
(Ref. 27-00-00, Servicing) Procedure to set Flight Controls in electrical mode).
- (3) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).
- (4) Remove access platform.

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### 3. System Test

#### A. General

The purpose of the test is to check that displacement values of trim controls correspond with control surface deflections.

#### B. Equipment and Materials

DESCRIPTION	PART NO.
Protractor - Elevons and Rudder	TE2012000
Rigging Pins - Synchro Pack	D925252000
Rigging Pins - Set - Integral Trim	D921277000
Access Platform 4.47 in. (14 ft.8 in.)	

#### C. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) On overhead panel
  - Make certain that ARTIFICIAL FEEL No.1 and ARTIFICIAL FEEL No.2 engage switches are in OFF position.
  - On SERVO CONTROLS unit check that selector switches are in NORMAL position.
  - On RELAY JACK unit place switch in NORMAL position.
  - On Flight Control Unit make certain that O and M ELEVONS and IN. ELEVONS switches are in MECH position.
- (3) Check that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RELAY JACK HYD SEL IND & SUP	1-213	C 281	N17
PFC IND		C 287	N18
PFC & RELAY JACK "A" SYS		C 285	P16
CONT YELL/GRN GRN FAIL			
PFC & RELAY JACK "A" SYS		C 286	P17
CONT YELL/BLUE BLUE FAIL			

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFC & RELAY JACK "A" SYS CONT YELL L/LEVEL		C 288	P18
FLT CONT POSN IND CONT		C 83	R11
FLT CONT POSN IND 26V 400 Hz SUP	2-213	C 84	B 4
PFC & RELAY JACK "B" SYS CONT YELL L/LEVEL	3-213	C 282	A 8
PFC & RELAY JACK "B" SYS CONT YELL/GRN GRN FAIL		C 283	A 9
PFC & RELAY JACK "B" SYS CONT YELL/BLUE BLUE FAIL		C 284	A10
(4) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).			
(5) On overhead panel, place BLUE INVERTER and GREEN INVERTER switches in ON position.			
(6) On ICOVOL indicator, check that the 6 magnetic indicators corresponding to elevons display m.			
(7) Set flight controls in blue electrical mode (Ref. 27-00-00, Servicing).			
(8) Check that pitch and roll trim controls are set to zero.			
(9) Check that pitch and roll flight controls are at neutral.			
(10) Make certain that rigging pin D921277000 inserts easily in integral trim assembly, and pin D925252003 in synchro pack. Leave the latter inserted in synchro pack and remove former from trim assembly.			
(11) Set up protractor equipment TE2012000 on elevons. Adjust Protractor to zero. Remove pin D925252003 from synchro pack.			

### D. Mechanical Mode Test

- (1) Turn trim wheel by successive 2° stages, through gra-

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duated scale :

- zero to nose down and return to zero.
- zero to nose up and return to zero.

NOTE : Trim value setting must be made precisely.

- (2) For each stage, check that scale graduations correspond with position of elevons. (See table).
- (3) Check that artificial feel jacks do not move during operations.

(Ref. Fig. 501 )

### E. BLUE Electrical Mode Test

- (1) On Flight Control Unit place O and M ELEVONS and IN ELEVONS switches in BLUE position.  
Press RESET push-button.  
Check that magnetic indicators on ICOVOL indicator display B.
- (2) Repeat procedure described in paragraph 3. D. "mechanical mode test".

### F. GREEN Electrical Mode Test

- (1) On Flight Control Unit place O and M ELEVONS and IN ELEVONS switches in GREEN position.  
On ICOVOL indicator, check that magnetic indicators display G.
- (2) Repeat procedure described in paragraph 3. D. "mechanical mode test".

### G. Close-Up

- (1) On Flight Control Unit place O and M ELEVONS and IN ELEVONS switches in MECH position.
- (2) On overhead panel, place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position.
- (3) Shut down pressurization of hydraulic system  
(Ref. 27-00-00, Servicing, Procedure to Set Flight Controls in electrical mode).
- (4) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

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NOSE UP				
TRIM	TRIM SCALE ROTATION ANGLE	ELEVON DEFLECTION		
		MIN	THEORETICAL	MAX
0	0	- 0.05	0	+ 0.05
2	6.375	2.05	2.13	2.25
4	12.625	4.10	4.22	4.35
6	19	6.10	6.27	6.45
8	25.375	8.10	8.33	8.55
10	31.625	10.10	10.34	10.60
12	38	12.05	12.34	12.65
14	44.375	14.00	14.36	14.70
15	47.50	15.00	15.35	15.70

NOSE DOWN				
TRIM	TRIM SCALE ROTATION ANGLE	ELEVON DEFLECTION		
		MIN	THEORETICAL	MAX
0	0	- 0.05	0	+ 0.05
2	6	1.95	2.035	2.15
4	12	3.95	4.09	4.20
6	17.875	5.95	6.14	6.30
8	23.875	8.05	8.27	8.50

CMA 27 33 00 5 AAM0

Cross-Reference Table - Pitch  
Figure 501

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- (5) Remove measuring equipment TE2012000.
- (6) Close access doors, remove access platforms.

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### 4. System Load Application Test

#### A. General

The purpose of the test is to make certain that trim control operation is normal.

#### B. Equipment and Materials

---

##### DESCRIPTION

##### PART NO.

---

Hand Equipment - Effort Measurement-  
Trim Controls

TE 3019400

Access Platform (14ft. 8 in.)

#### C. Prepare

(1) Take the precautions described in the previous WARNING paragraph.

(2) On overhead panel,

- Make certain that ARTIFICIAL FEEL No.1 and ARTIFICIAL FEEL No.2 engage switches are in OFF position
- On SERVO CONTROLS unit, check that selector switches are in NORMAL position
- On RELAY JACK unit, place switch in NORMAL position
- On FLIGHT CONTROL unit make certain that O and M ELEVONS and IN ELEVONS switches are in MECH position

(3) Check that the following circuit breakers are set :

---

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RELAY JACK HYD SEL IND & SUP	1-213	C 281	N17
PFC IND		C 287	N18
PFC & RELAY JACK "A" SYS		C 285	P16
CONT YELL/GRN GRN FAIL			
PFC & RELAY JACK "A" SYS		C 286	P17
CONT YELL BLUE FAIL			
PFC & RELAY JACK "A" SYS		C 288	P18
CONT YELL L/LEVEL			
FLT CONT POSN IND CONT		C 83	R11
FLT CONT POSN IND 26V 400HZ	2-213	C 84	B 4

---

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SUP			
PFC & RELAY JACK "B" SYS CONT YELL L/LEVEL	3-213	C 282	A 8
PFC & RELAY JACK "B" SYS CONT YELL/GRN GRN FAIL	3-213	C 283	A 9
PFC & RELAY JACK "B" SYS CONT, YELL/BLEU, BLEU FAIL		C 284	A10
(4)	Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing)		
(5)	On overhead panel, place BLUE INVERTER and GREEN INVERTER switches in ON position.		
(6)	Check that the 6 ICVOL magnetic indicators associated with elevons display M.		
(7)	Set flight controls in electrical mode (Ref. 27-00-00, Servicing).		
(8)	Check that pitch and roll trim controls are set to zero		
(9)	Check that pitch and roll Flight controls are at neutral.		
B B B	(10)	Set up equipment TE 3019407, for the measurement of load applied to trim control. Alternatively a torque wrench and 11/16 AF socket may be used.	

### D. Load measurement

- (1) Using a spring scale, pull slowly and evenly on the cord wound round the measuring equipment pulley.

Carry out the following trim operations :

- Move control wheel from neutral to nose down position, then return it to neutral.
- Move control wheel from neutral to nose up position, then return it to neutral.

- B  
B  
B
- ((2) In each case, the torque required to move the control wheel shall be  $20 \pm 6$  lbf. in.

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### E. Close-Up

- (1) On overhead panel, place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position.
- (2) Shut down pressurization of hydraulic system (Ref. 27-00-00, Servicing Procedure to set Flight Controls in electrical mode).
- (3) De-energize the aircraft electrical network, and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).
- (4) Remove equipment TE 3019407.
- (5) Remove access platform.

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## MAINTENANCE MANUAL

### TRIM GEARBOX ASSEMBLY IN CENTRE CONSOLE - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

Gearbox assembly in centre console controls Pitch trim through control wheel.

#### 2. Trim Gearbox Assy in Centre Console

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins - Set - Integral Trim - Pitch/Roll/Yaw	D921277000
Lockwire Dia. 1 mm (0.041 in.) Corrosion Resistant Steel	
Special Products (Ref. 20-30-00, No.051)	
Access Platform 3.672 m (12 ft.)	
Circuit Breaker Safety Clips	

##### B. Prepare

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- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Check that roll, pitch and yaw trim controls are set to zero.
- (3) Remove access panel 121DB, immobilize roll, pitch and yaw trim controls with rigging pins D921277000.
- (4) Open access door 151DB, depressurize Blue, Yellow and Green hydraulic systems.

**WARNING :** DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (5) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

### C. Remove

- (1) Yaw control knob (30).

Remove cover (1); remove cotter pin (2) and nut (32) ; remove washer (31), knob (30) and dial (29).

- (2) Pitch control wheel (21).

Remove cover (18)

Remove cotter pin (19) and nut (17) ; remove washer (20).

Remove wheel (21) and ratchet mechanism (22).

- (3) Roll control knob (7).

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Remove cover (3) ; remove cotter pin (5) and nut (4) ; remove washer (6), control knob (7) and dial (8).

(4) Electro-luminescent panel (9).

After removing the roll and yaw control knobs and their dials, remove screws (28), retain washers for reinstallation and remove electro-luminescent panel (9).

(5) Trim gearbox assy (27).

- (a) Remove screws (15), retain washers for reinstallation and remove side panel (16).
- (b) Remove plugs (23) from side panel (25). Remove screws (24), retain washers for reinstallation and remove side panel (25).
- (c) Remove screws (26) attaching trim gearbox assy to centre console ; retain washers for reinstallation.
- (d) Remove spring pins (12) and disconnect the three torque tubes (13) from universal joints (14), then from gearbox assembly.
- (e) Remove gearbox assembly (27) by pulling it upwards.
- (f) Remove nuts (11) and electro-luminescent panel (10).

D. Preparation of Replacement Component

E. Install

(1) Trim gearbox assy

NOTE : The electro-luminescent panel must undergo a functional check before being installed on the console.

- (a) Install electro-luminescent panel (10) on centre console, and secure with nuts (11).
- (b) Remove pitch trim control wheel (21) and ratchet mechanism (22) from gearbox assy (27).
- (c) Install gearbox assy (27) on center console with screws (26). Torque to between 0.450 and

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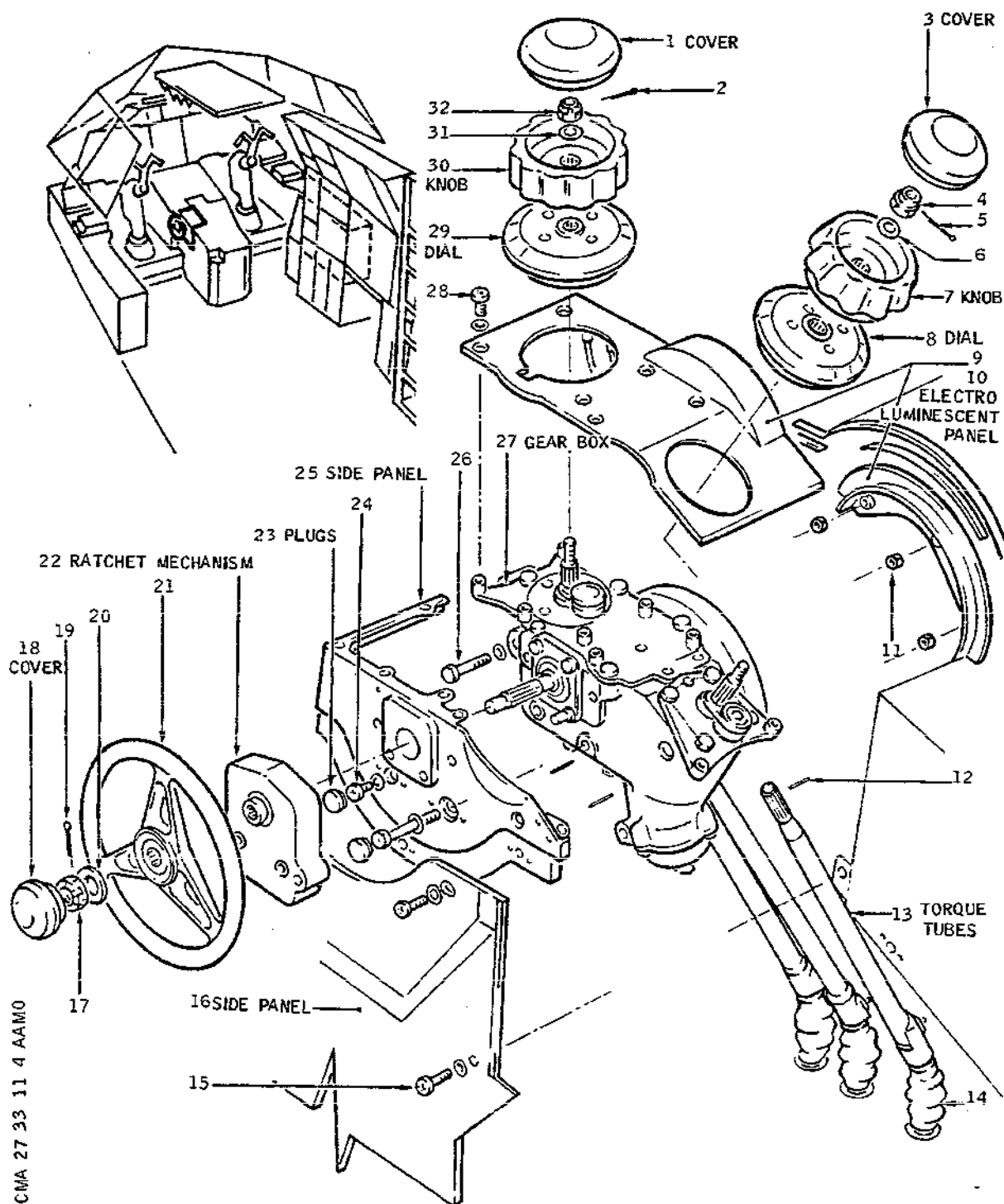
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## MAINTENANCE MANUAL



Trim Gearbox Assembly  
Figure 401

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0.565 m.daN (40 and 50 lbf.in.).

- (d) Install side panel (25) on gearbox assy (27). Make certain that panel (25) is in contact with the gearbox assembly bosses. Attach it with screws (24) and install plugs (23).

- (2) Electro-luminescent panel (9).

NOTE : The electro-luminescent panel must undergo a functional check before being installed on the centre console.

- (a) Fully turn the roll and yaw control knobs, (7) and (30) to right or left then remove.
- (b) Remove roll and yaw dials (8) and (29).
- (c) Install electro-luminescent panel (9) on gearbox assy (27) with screws (28).

- (3) Roll control knob (7).

- (a) The control knob having been turned fully to right or left before being removed :

Install the roll dial half a division beyond full travel.

Apply a light coat of product No.051 to gears and carefully mesh gear teeth.

Check the overtravel in each direction and if necessary remesh the gear teeth to obtain an equal amount of overtravel in each direction.

- (b) Install roll control knob on its splined shaft. Install washer (6) and tighten nut (4). Torque to between 0.450 and 0.565 m.daN (40 and 50 lbf.in.). Safety with cotter pin (5). Install cover (3).

CAUTION : FROM ITS NEUTRAL POSITION KNOB MUST BE ABLE TO ROTATE 4 REVS AND 283° MINIMUM IN BOTH DIRECTIONS.

- (4) Yaw control knob (30).

- (a) The control knob having been turned fully to right or left before being removed :

Install yaw dial half a division beyond full tra-

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vel.

Apply a light coat of product No.051 to gears and carefully mesh gear teeth.

Check overtravel in each direction and if necessary remesh gear teeth to obtain an equal amount of overtravel in each direction.

- (b) Engage yaw control knob (30) on its splined shaft.

Install washer (31) and nut (32). Torque to between 0.450 and 0.565 m.daN (40 and 50 lbf.in.).

Safety with cotter pin (2). Install cover (1).

CAUTION : FROM ITS NEUTRAL POSITION KNOB MUST BE ABLE TO ROTATE 4 REVS AND 287° MINIMUM IN BOTH DIRECTIONS.

- (5) Pitch control wheel (21).

Apply a light coat of product No.051 to splined shaft and install ratchet mechanism (22) and control wheel (21) on splined shaft.

Install washer (20) and nut (17). Torque to between 0.450 and 0.565 m.daN (40 and 50 lbf.in.). Safety with cotter pin (19). Install cover (18) on control wheel.

CAUTION : FROM ITS NEUTRAL POSITION HANDWHEEL MUST BE ABLE TO ROTATE 2 REVS AND 104° MINIMUM FORWARD AND 4 REVS 199° MINIMUM AFT.

- (6) Torque tubes

- (a) Place pitch, roll and yaw trim controls in neutral position.

- (b) Apply a light coat of product No.51 to torque tube (13) splines.

- (c) Install pitch, roll and yaw torque tubes, one by one, as follows :

- (c1) Engage torque tube to corresponding splined bore in gearbox assembly, taking care not to displace trim control from neutral position.

- (c2) Engage the other end of torque tube to universal joint (14)  
If necessary, slightly rotate torque tube to align splines.

- (c3) Install spring pin (12) and safety with lock-

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## MAINTENANCE MANUAL

wire (Ref. 20-21-13).

- (7) Install side panel (16) with washers and screws (15).
- (8) Remove warning notices.
- (9) Remove rigging pins D921277000 from roll, pitch and yaw trim controls.
- (10) Remove safety clip and tag and reset the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

### F. Tests

- (1) Carry out operational test of the trim controls (Ref. 27-33-00, Adjustment/Test).
- (2) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access doors and panels 121DB, 151DB.
- (3) Remove access platforms.

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### INTEGRAL TRIM ASSEMBLY - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The integral trim assembly transmits the trim control movements to the pitch linkage control rods.

#### 2. Integral Trim Assembly

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Zero Rigging Device - Relay Chassis	E925019000
Rigging Pins - Synchro Pack	D925252000
Rigging Pins - Set - Integral Trim Pitch/Roll/Yaw	D921277000
Rigging Pin - Pitch/Roll Shaft	D925367000
Rigging Template - Integral Trim	D921250000
Lockwire dia. 1 m/m (0.041 in.) Corrosion Resistant Steel	

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## MAINTENANCE MANUAL

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### DESCRIPTION

### PART NO.

---

Access Platform 3.672 (12 ft)

Circuit Breaker Safety Clips

General Lubricant (Ref. 20-30-00,  
No.51).

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (3) Make certain that pitch, yaw and roll trim controls are in zero position.
- (4) Remove panel 121FB and immobilize the pitch and roll resolvers with rigging pins D925252003 and D925252001.
- (5) Remove panel 121GB, install items of equipment E925019010 and E925019012 and immobilize pitch control with rigging pin.
- (6) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
- (7) Open door 151DB, depressurize Blue, Green and Yellow systems.
- (8) Trip, safety and tag the following circuit breakers :

---

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
TRIM 1 CONT	1-213	1C 161	Q11
TRIM 2 CONT	5-213	2C 161	B13
TRIM COMP 1 SUP	13-215	1C 162	C 5
TRIM SYNCHRO SYS1 SUP		1C 163	E 5
TRIM SYNCHRO SYS2 SUP	13-216	2C 163	A16

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
TRIM COMP 2 SUP		2C 162	E16
HYD GRND CHECK OUT SEL VALVE OUT	15-213	M 626	F22
<p><u>WARNING</u> : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.</p> <p>DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.</p> <p>IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.</p>			
(9) Open access doors 113DB and 121AB and install rigging pin D925367000 in the roll and pitch mixing cams.			
(10) Open access door 121DB allowing access to the integral trim assembly.			
(11) Remove panel 211CS.			
C. Remove			
(1) Remove spring rod (Ref. 27-32-12, Removal/Installation)			
(2) Disconnect electrical connectors and loosen clamps attaching wire bundles.			
(3) Unsafety and remove bolts attaching protective casing. Remove casing.			
(4) Unsafety and remove bolt (6) : tie feel force sensor control rod to the trim unit.			
(5) Remove cotter and unscrew nuts (14) ; remove washers (15) and (16) and bolts (17). Note position of bolts and disconnect rods (18).			
(6) Remove cotter and unscrew nut (1) ; remove washer			

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## MAINTENANCE MANUAL

(2) and bolt (3). Disconnect tension adjuster rod (4).

(7) Unscrew attachment bolts and remove housing (5). Disengage the chain.

(8) Unsafety locknut (8) : remove cotter and unscrew nut (10). Remove washer (9), unscrew locknut (8) and pivot the AF lever in order to remove bolt (7).

(9) Remove cotter and unscrew nuts (11) ; remove washers (12) and bolts (13) in order to remove the integral trim assembly. Re-install bolts (13) in order to support the yaw assembly.

### D. Preparation of Replacement Component

Install trim actuator on integral trim assembly (Ref. 22-23-61, Removal/Installation).

### E. Install

(1) Remove bolts (13) from yaw control assembly side, position the integral trim assembly. Install bolts (13) in their original positions ; install washers (12), tighten nuts (11) and safety with cotters.

(2) Pivot the AF lever and install bolt (7) : tighten locknut (8).  
Torque to between 2.7 and 3 m.daN (240 and 260 lbf.in.)

(3) Install washer (9) and tighten nut (10). Torque to between 1.53 and 1.57 m.daN (140 and 145 lbf.in.). Safety nut (10) with cotter and locknut (8) with lockwire.

(4) In flight compartment

(a) Cut lockwire and remove spring pin (32).

(b) Disconnect torque tube (31) from universal joint (30) splined shaft by sliding it upwards ; maintain torque tube in this position.

(5) Install rigging pin D921277000 in the integral trim unit, making certain that the trim control is in zero position.

(6) Engage the chain on the sprocket.

(7) Install housing (5).

EFFECTIVITY: ALL

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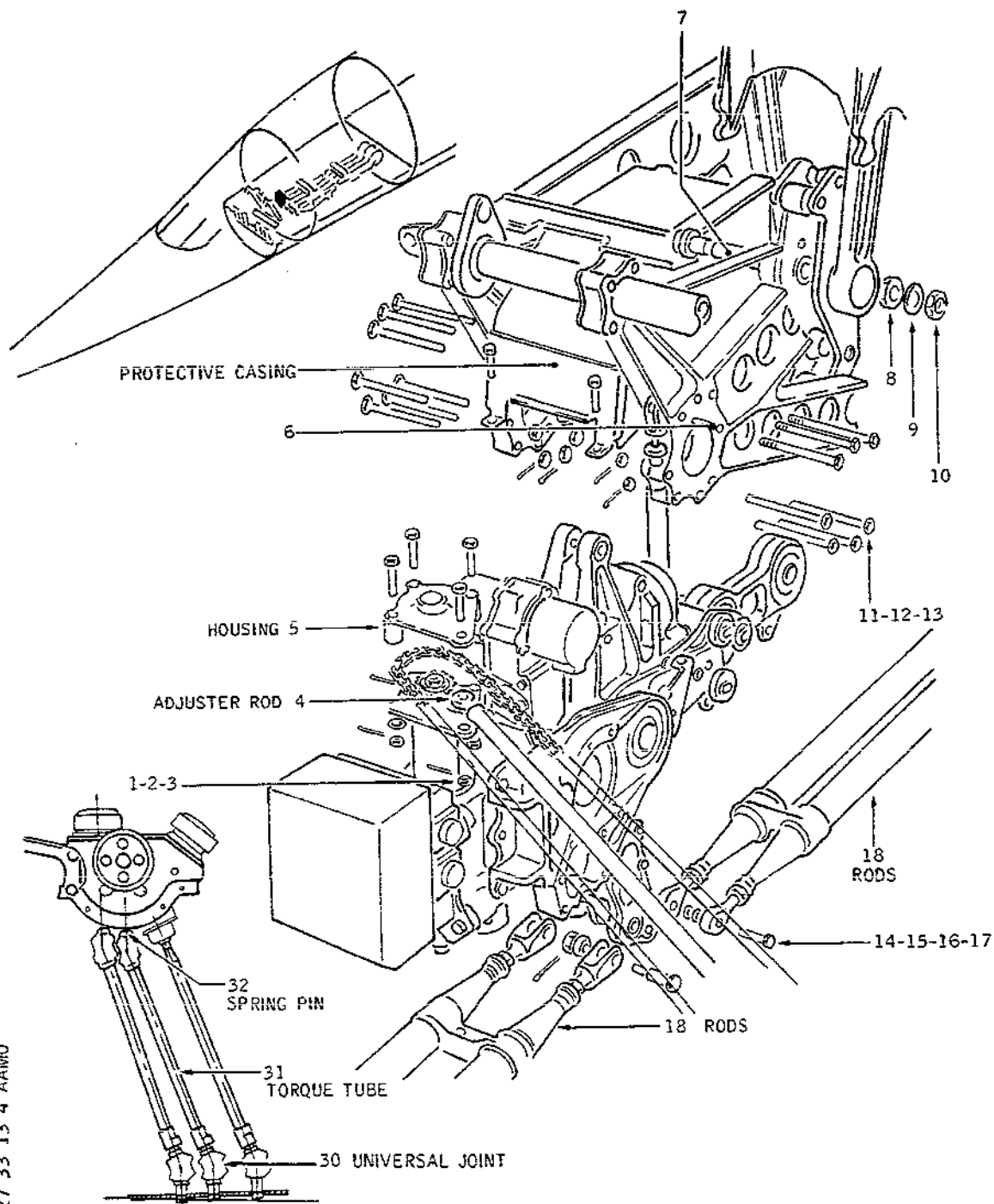
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CMA 27 33 13 4 AAWO

Integral Trim Assembly  
Figure 401

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- (8) Install tension adjuster rod (4) using bolt (3) washer (2) and nut (1). Tighten nut and safety with cotter.
- (9) Apply a load of 3 - 5 lbf (1.33 - 2.22 daN) to the middle of the chain and measure the deflection. It must be : 0.27 to 0.40 in. (6.5 mm to 10.1 mm)  
chain adjustment : Unsafety and loosen the tension adjuster rod locknut, lengthen or shorten the rod in order to obtain the required tension. Tighten locknuts and bend back the locking tabs.
- (10) In flight compartment
  - (a) Rotate pitch trim wheel until dial reads zero.
  - (b) Coat splines of tube and shaft with a light film of product No.51.
  - (c) Force fit torque tube (31) to universal point (30) splined shaft. If necessary align splines by rotating slightly torque tube (31).
  - (d) Install spring pin (32), safety with lockwire (Ref. 20-21-13).
- (11) Install equipment D921250000 on pitch integral trim assembly.
- (12) Connect rods (18), install bolts (17), washers (15) and (16) and tighten nuts (14).  
Torque to between 0.3 and 0.35 m.daN (27 and 32 lbf.in.).

NOTE : If rods (18) cannot be easily connected to integral trim assembly lever, adjust length of these rods as follows :

- (a) Rods between torque tube and integral trim assembly lower lever :
  - (a1) Remove cotter pins and rod coupling clamps.
  - (a2) Remove rod assigned to Captain's side and install it on First Officer's side.  
Adjust and tighten rod to length enabling pin to be easily removed and inserted on mixing cam.  
Safety ends of rod with lockwire (Ref. 20-21-13).

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- (a3) Remove this rod and finally install it on Captain's side. Install bolt, special washer, flat washer, nut on eye end fittings. Torque to between 27 and 32 lbf.in. (0.30 0.36 m.daN). Safety with cotter pin.
- (a4) Install rod assigned to First Officer's side. Adjust and tighten rod to length enabling pin to be easily removed and inserted on mixing cam.  
Safety rod ends with lockwire (Ref. 20-21-13). Install bolt, special washer, flat washer, nut on eye end fittings. Apply the same tightening torque as for Captain's side rod.  
Safety with cotter pin.
- (a5) Install safety attachments and coupling clamps.  
Torque to between 12 and 15 lbf.in. (0.15 and 0.18 m.daN).  
Safety with cotter pin.
- (b) Rods between integral trim assembly lower lever and synchro pack.
  - (b1) Remove cotter pins and rod coupling clamps.
  - (b2) Adjust length of rods so that attachment bolts can be inserted freely. Tighten and safety rod ends ; install bolt, special washer, flat washer, nut on eye end fittings. Torque to between 12 and 15 lbf.in. (0.15 and 0.18 m.daN). Safety with cotter pin.
- (13) Connect the pitch feel force sensor control rod and tighten bolt (6).  
Torque to between 0.35 and 0.40 m.daN (30 and 35 lbf.in.). Safety with lockwire (Ref. 20-21-13).
- (14) Connect electrical connectors and tighten electrical bundle attachment clamps.
- (15) Install spring rod (Ref. 27-32-12, Removal/Installation) and protective casing.
- (16) Remove warning notices.
- (17) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).

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- (18) Remove items of equipment E925019012, E925019010, D921250000 and rigging pins D925367000, D921277000, D925252001 and D925252003.
- (19) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).

### F. Test

- (1) Proceed with trim actuator tests (Ref. 22-23-61, Adjustment/Test) and pitch feel sensor tests (Ref. 22-23-81, Adjustment/Test).
- (2) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (3) Carry out an operational test (Ref. 27-33-00, Adjustment/Test).
- (4) With trim controls set to zero, immobilize pitch and roll resolvers with rigging pins D925252001 and D925252003.
- (5) Make certain that rigging pins D921277000 and D925367000 can be easily inserted or removed. If not, repeat removal/installation adjustments.
- (6) Remove rigging pins D925367000, D921277000, D925252003 and D925252001.
- (7) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
- (8) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access doors and panels 121FB, 121GB, 151DB, 121AB, 113DB, 121DB, 211CS.
- (3) Remove safety clips and tags and set the following circuit breakers :

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
TRIM 1 CONT	1-213	1C 161	Q11
TRIM 2 CONT	5-213	2C 161	B13
TRIM COMP 1 SUP	13-215	1C 162	C 5
TRIM SYNCHRO SYS 1 SUP		1C 163	E 5
TRIM SYNCHRO SYS 2 SUP	13-216	2C 163	A16
TRIM COMP 2 SUP		2C 162	E16
HYD GRND CHECK OUT SEL VALVE OUT	15-213	M 626	F22

(4) Remove access platforms.

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## MAINTENANCE MANUAL

### HYDRAULIC SYSTEM - DESCRIPTION AND OPERATION

#### 1. General (Ref. Fig. 001 )

The flight controls use the three aircraft hydraulic systems ; Blue, Green and Yellow.

The power flight control units (PFCU) and relay jacks (RJ) are supplied in normal operation by the Blue and Green hydraulic systems.

The Yellow hydraulic system is used in emergency only to replace the Blue or Green systems in the event of a pressure drop.

R The supply is achieved through eight servo control selector  
R valves, four for the PFCU's and four for the RJ's.

R The two normally operating (Blue and Green) selector valves of  
R the RJ's are equipped with pressure maintaining valves.

R Four low pressure switches are included in the system between  
the selector valves and the PFCU's.

The two artificial feel (AF) jacks are supplied one by the Blue system and the other by the Green system.

A monitoring system enables possible hydraulic faults to be determined (Ref. 27-37-00) and the necessary remedial action to be taken.

EFFECTIVITY: ALL

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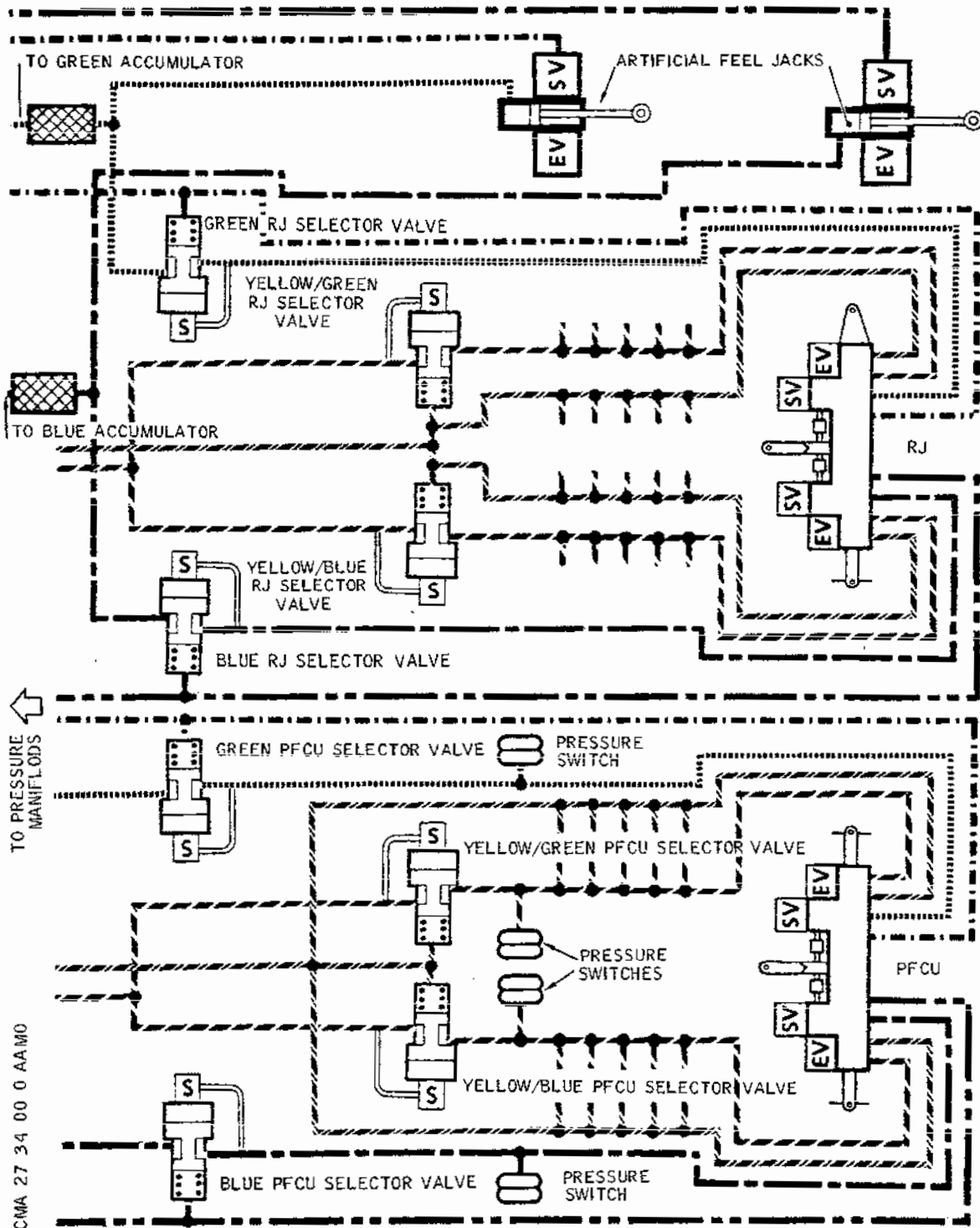
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## MAINTENANCE MANUAL



Hydraulic Supply  
Figure 001

R

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## MAINTENANCE MANUAL

### R 2. Selector Valves - PFCU Electro-Hydraulic

R The PFCU selector valves ensure hydraulic pressure supply to the  
R PFCU and the return to the tank. Each is a three-way, two-position selector valve.

R A. Normal Selector Valve, (Blue or Green)  
(Ref. Fig. 002 )

R In the normal position, the solenoid is not energized. Pressure acts on the annular section of spool valve (D) which opens the supply port (A) to the system port (C).

R Energizing the solenoid causes spool valve (E) to displace, the hydraulic pressure and the spring thus displace spool valve (D) which opens the system port (C) to the tank return (B).

EFFECTIVITY: ALL

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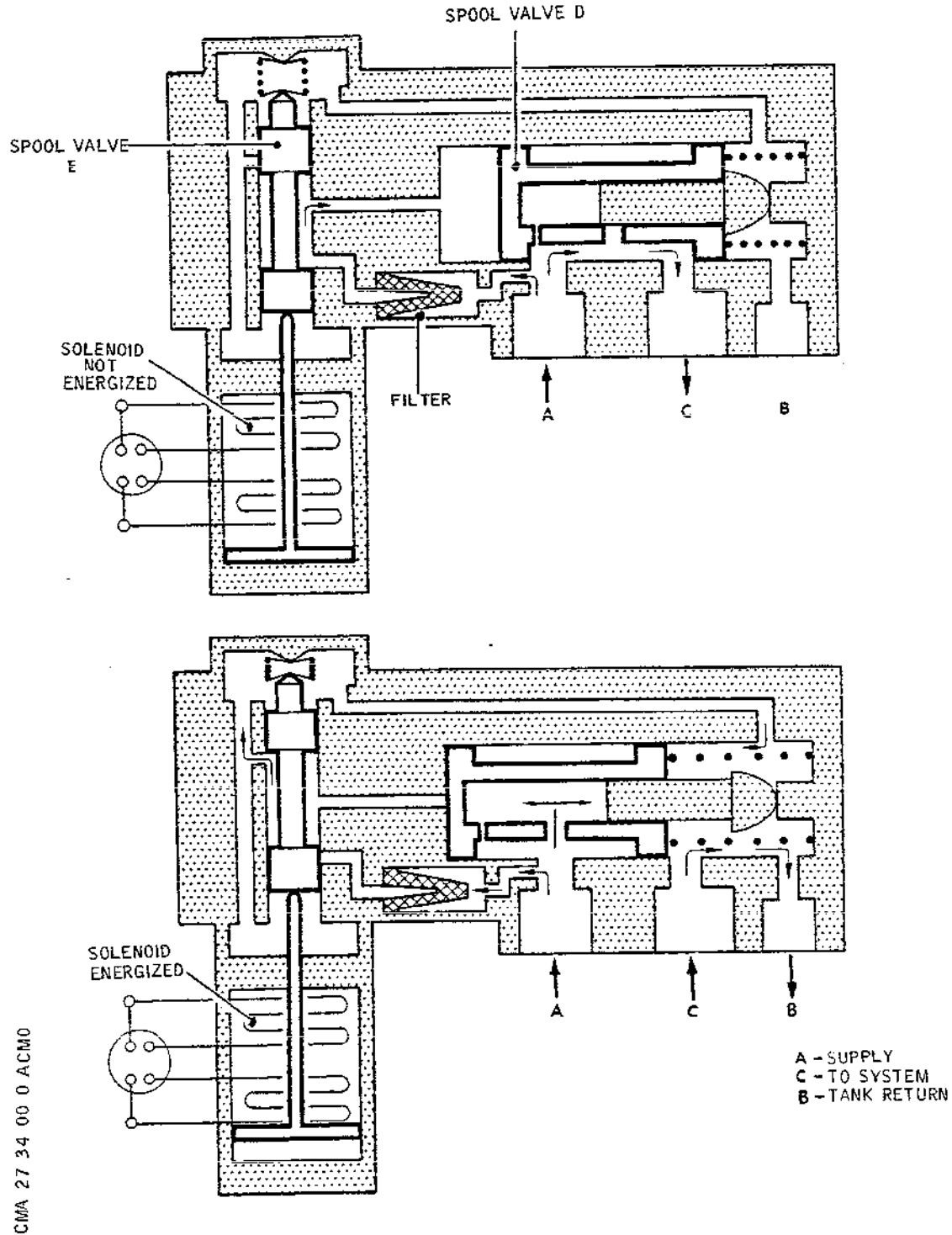
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## MAINTENANCE MANUAL



PFCU Selector Valve  
Figure 002

R

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## MAINTENANCE MANUAL

R        B.    Standby Selector Valve, (Yellow/Blue or Yellow/Green)  
              (Ref. Fig. 003 )

              In the normal position the solenoid is not energized.  
R        Spool valve (D) closes supply port (A) ; the system port  
R        (C) is open to the tank return (B).

              When the solenoid is energized, it causes spool valve (E)  
R        to displace and opens supply port (A) to the system port  
              (C).

EFFECTIVITY: ALL

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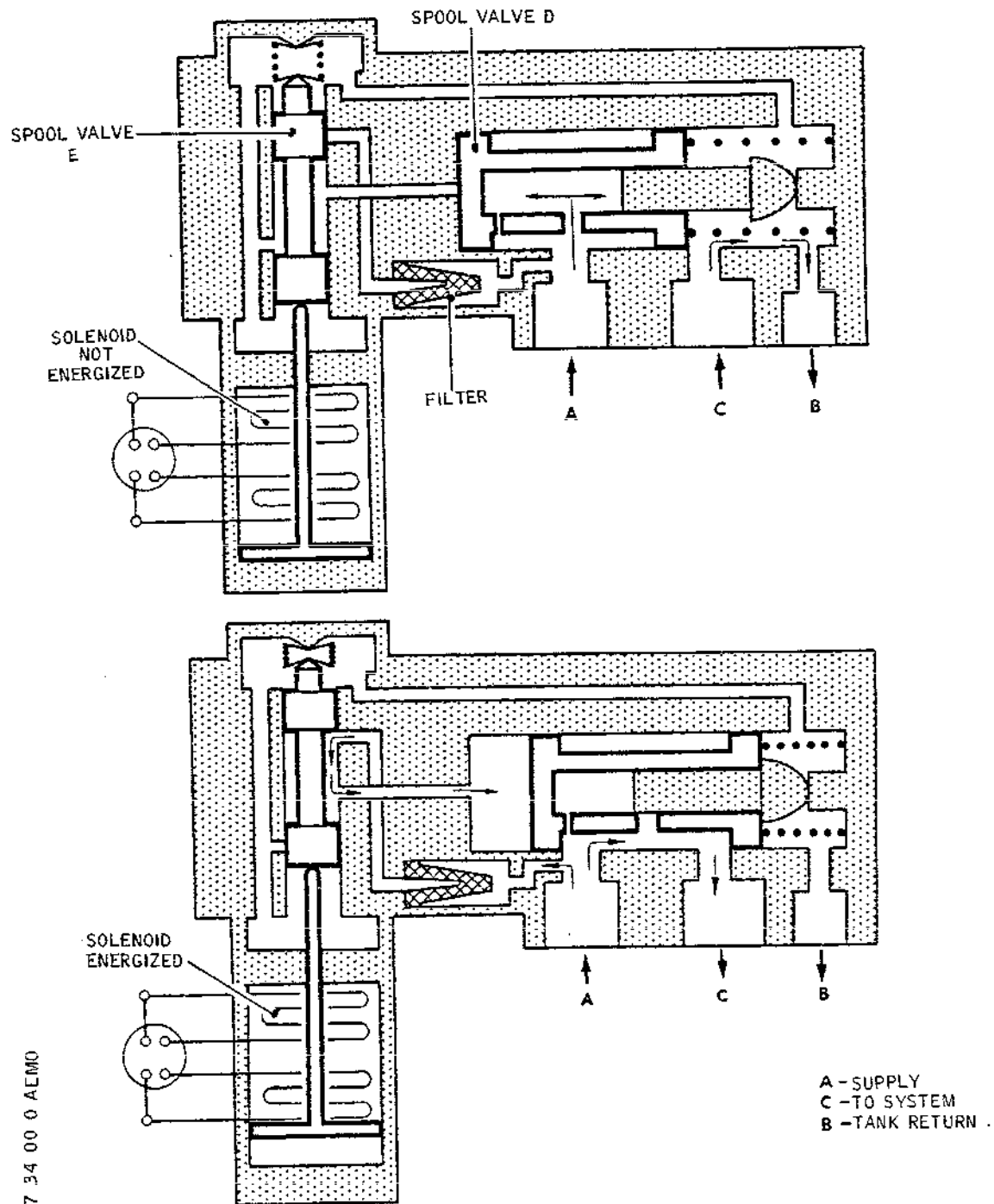
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## MAINTENANCE MANUAL



CMA 27 34 00 0 AEMO

PFCU Standby Selector Valve  
Figure 003

R

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## MAINTENANCE MANUAL

### R 3. Selector Valves - Relay Jack Electro-Hydraulic

R The RJ selector valves ensure hydraulic pressure supply to the  
R RJ's and the return to the system tank.

R Each is a three-way, two-position selector valve.

R A. Normal Selector, Valve (Blue or Green)  
(Ref. Fig. 004 )

R In normal operation the solenoid is not energized. Pres-  
sure acts on the annular section of spool valve (D) which  
opens the supply port (A) to the system port (C).

R When the solenoid is energized, it shuts off access to the  
R annular section of spool valve (D) and connects it to the  
R tank return. The spool valve is displaced, closing supply  
port (A) and opening system port (C) to the tank return  
(B).

EFFECTIVITY: ALL

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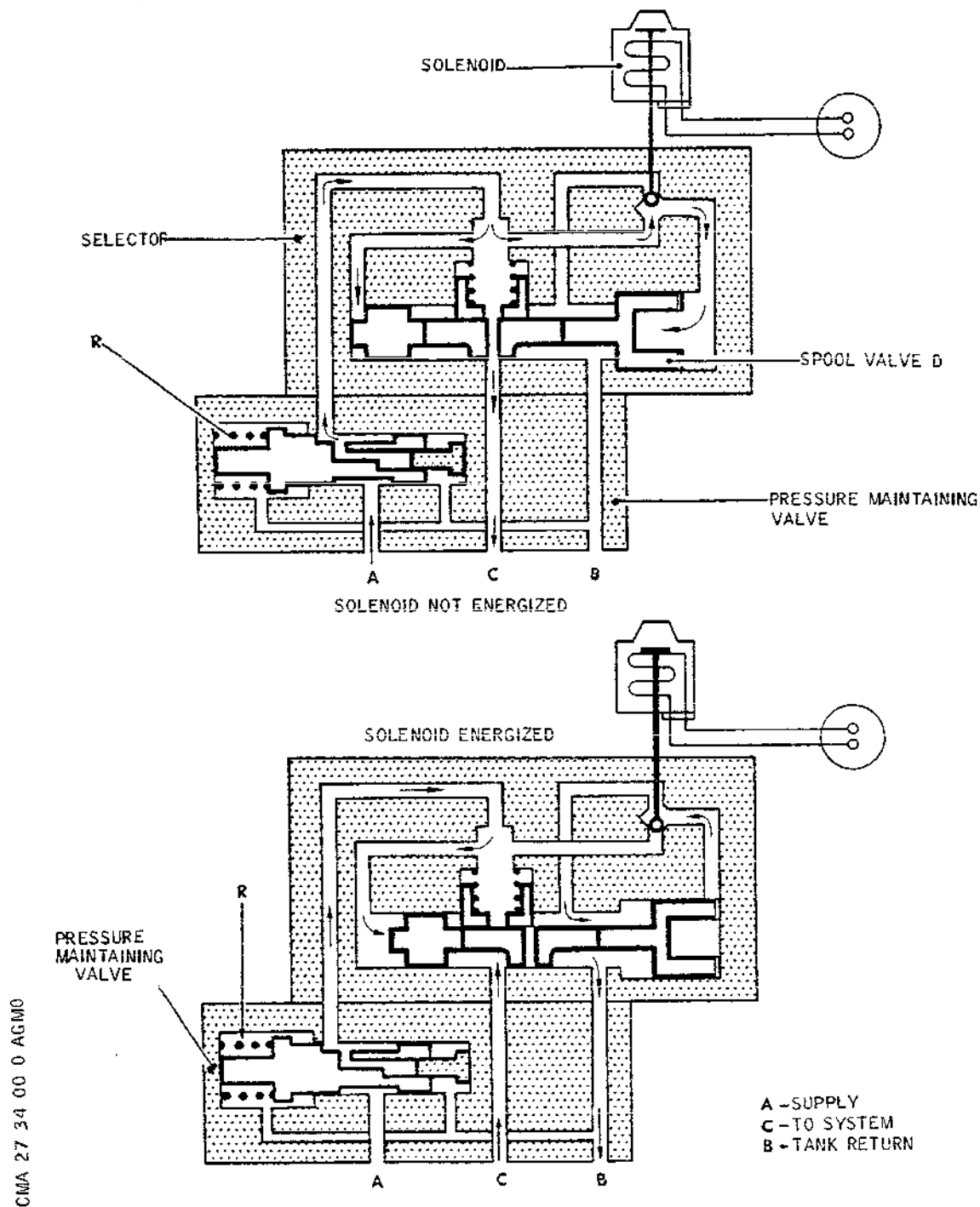
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RJ Selector Valve and Pressure Maintaining Valve  
Figure 004

R

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## MAINTENANCE MANUAL

- R B. Standby Selector Valve (Yellow/Blue - Yellow/Green)  
(Ref. Fig. 005 )

R In normal operation the solenoid is not energized, the pressure acts on the annular section of spool valve (D); system port (C) is open to the tank return (B)

R When the solenoid is energized, it shuts off access to the annular section of spool valve (D) and connects it with the tank return. The spool valve is displaced and opens supply port (A) to the system port (C).  
R

#### 4. Valve - Pressure Maintaining

R The pressure maintaining valves are mounted directly on the normal Blue and Green RJ selector valves.

R A calibrated spring holds the spool valve closed until the pressure reaches 100 bars. At this pressure, the spool valve is displaced and admits supply pressure to supply port (A) from the associated selector valve.  
R

EFFECTIVITY: ALL

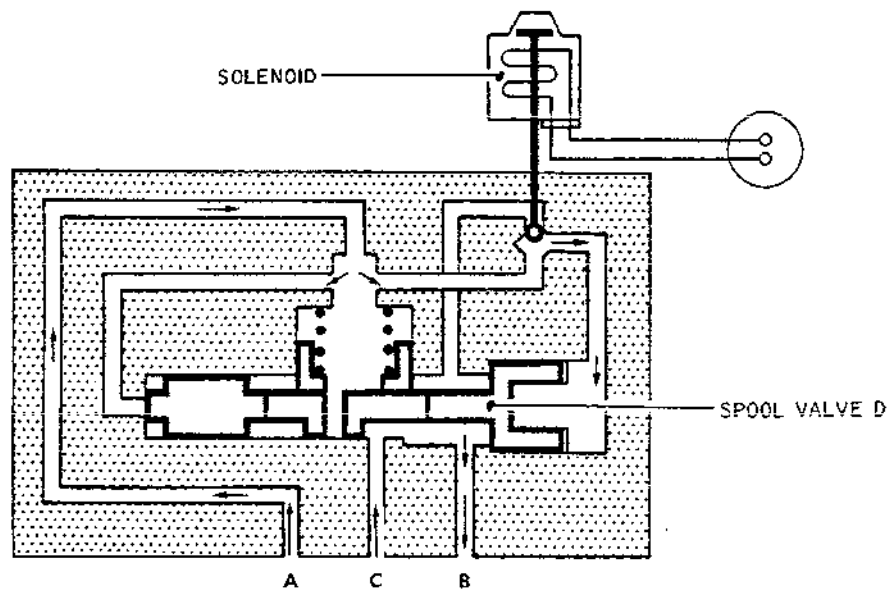
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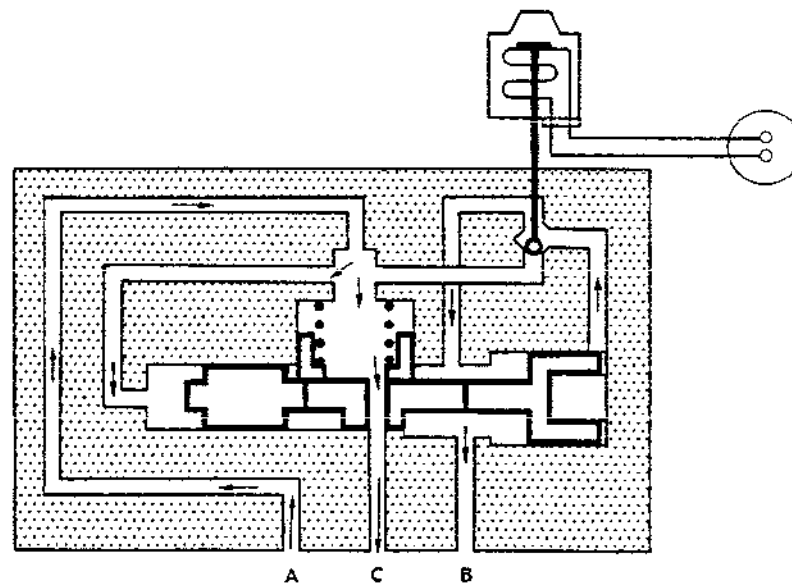
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## MAINTENANCE MANUAL



SOLENOID NOT ENERGIZED



SOLENOID ENERGIZED

A-SUPPLY  
C-TO SYSTEM  
B-TANK RETURN

CMA 27 34 00 0 AJM0

RJ Standby Selector Valve  
Figure 005

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### 5. Jack - Artificial Feel (Ref. Fig. 006, 007 and 008)

The artificial feel jack is part hydraulically and part electrically operated.

The hydraulic supply is achieved through two spool valves.

R A load detector on the jack piston rod transmits an electrical signal to a comparator, proportional to the load applied to the piston rod.

R A double servo-valve regulates the hydraulic pressure.

An electro-valve controlled by the monitoring channel of the artificial feel hydraulically supplies the servo-valve.

R When no signals are received at the electro-valve, there is no hydraulic pressure in the servo-valve and the two chambers of the jack are connected to tank return.

R When the electro-valve is energized, hydraulic pressure is admitted to the servo-valve. This pressure is regulated according to the electrical signal from the control channel.

R The regulated pressure admitted to the front chamber of the jack maintains a load corresponding to the control channel signal. The rear chamber of the jack remains connected to tank return.

R When a fault occurs, the electro-valve is no longer energized and cuts-off the hydraulic supply. With no pressure in the servo-valve the two chambers of the jack are opened to the tank return. The rocker arm pivots and the green jack takes over.

R Should both jacks fail, only the spring rod remains active. Its calibrated setting, calculated for approach conditions, permits rapid control surface movement which can be dangerous at high speeds. A reduction of speed is therefore necessary.

EFFECTIVITY: ALL

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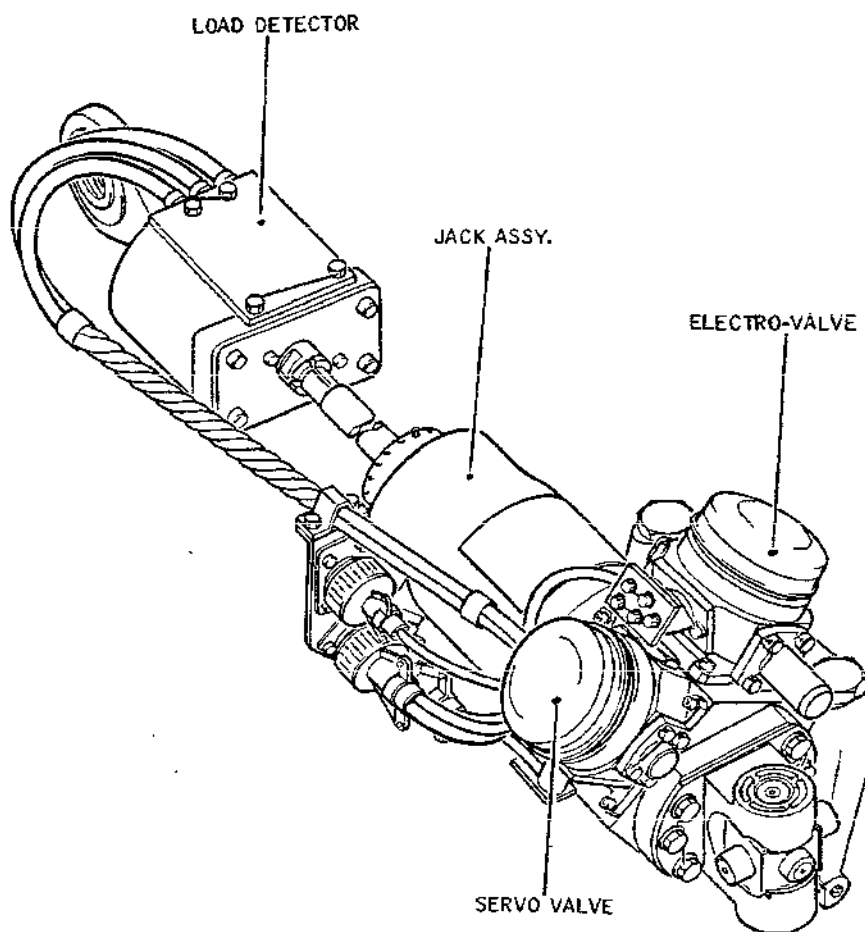
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## MAINTENANCE MANUAL



CMA 27 34 00 0 ALM0

Artificial Feel Jack  
Figure 006

EFFECTIVITY: ALL

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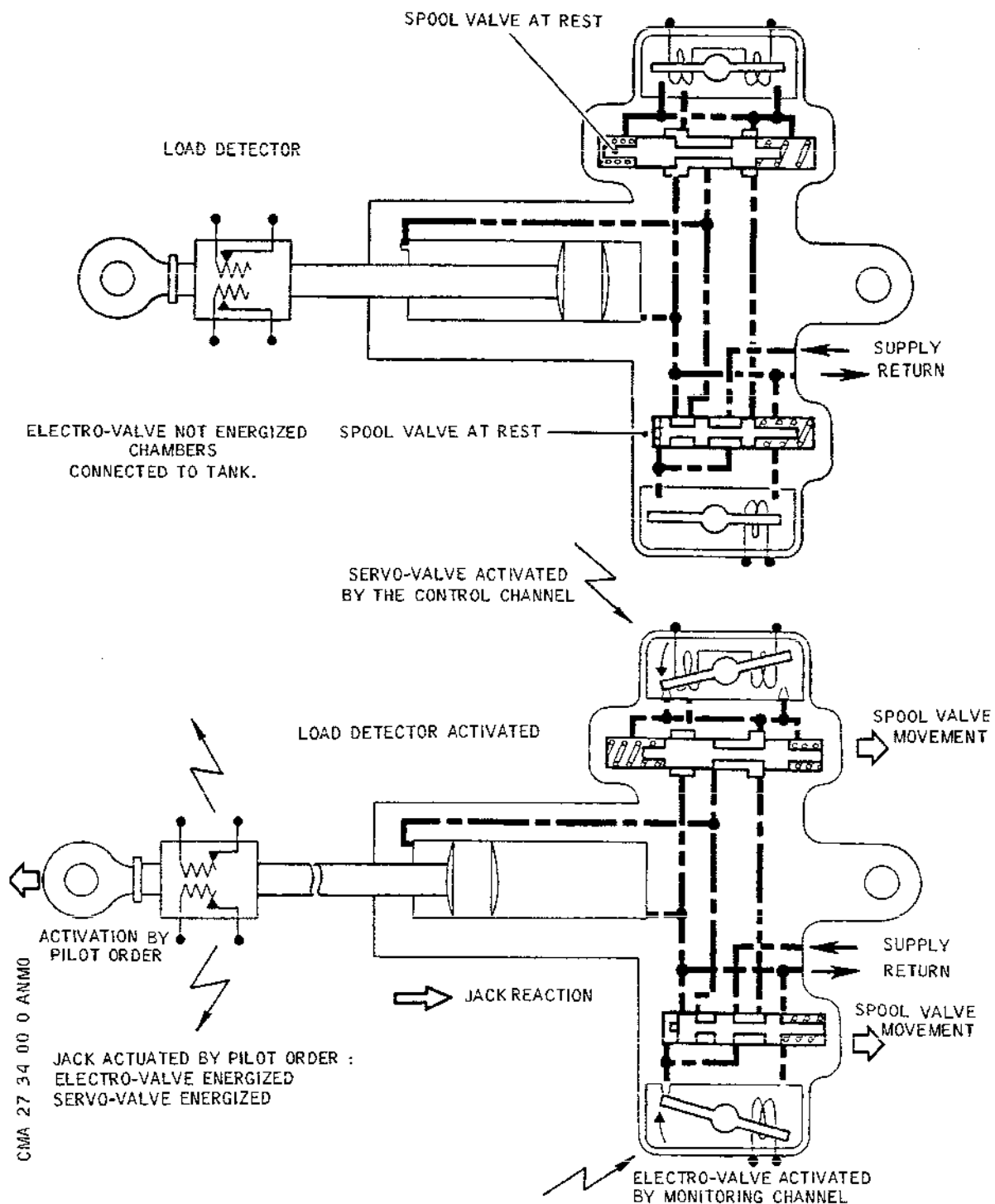
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## MAINTENANCE MANUAL



Artificial Feel Jack  
Figure 007

R

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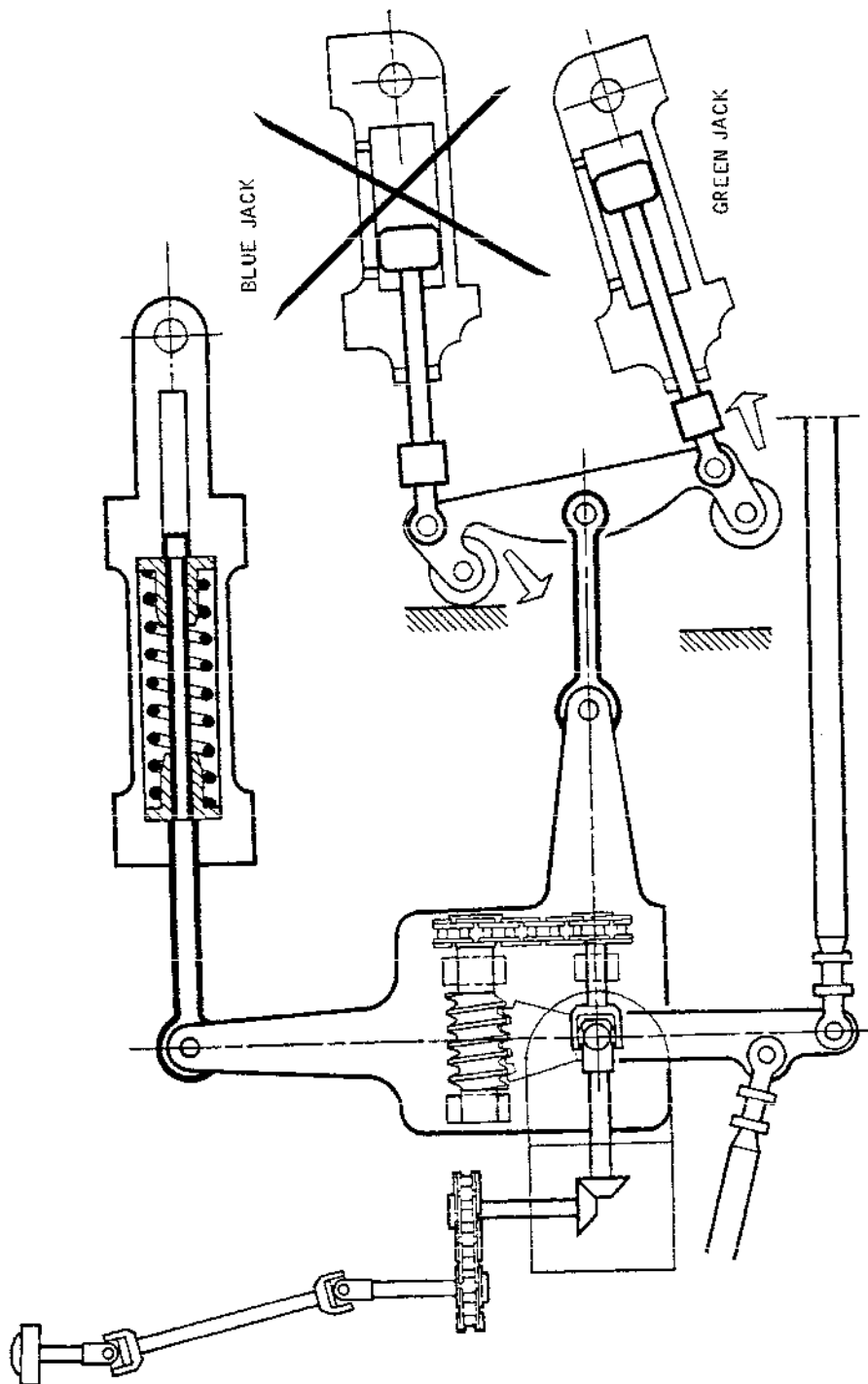
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CMA 27 34 00 0 AQM0

Artificial Feel - Blue Jack Failure  
Figure 008

R

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## MAINTENANCE MANUAL

### 6. Relay Jack (RJ) (Ref. Fig. 009 )

R The RJ consist of a mobile body, consisting of two cylinders,  
R moving on two pistons mounted in tandem.

The piston rod is connected to the structure and the RJ body to the control linkage.

The RJ transmit pilot orders :

In manual flight, to the mechanical control linkage.

In automatic flight to the mechanical control linkage and to the resolvers of the electrical controls.

In both cases, the displacement of the spool valves causes the the RJ body to be displaced on the piston rods.

EFFECTIVITY: ALL

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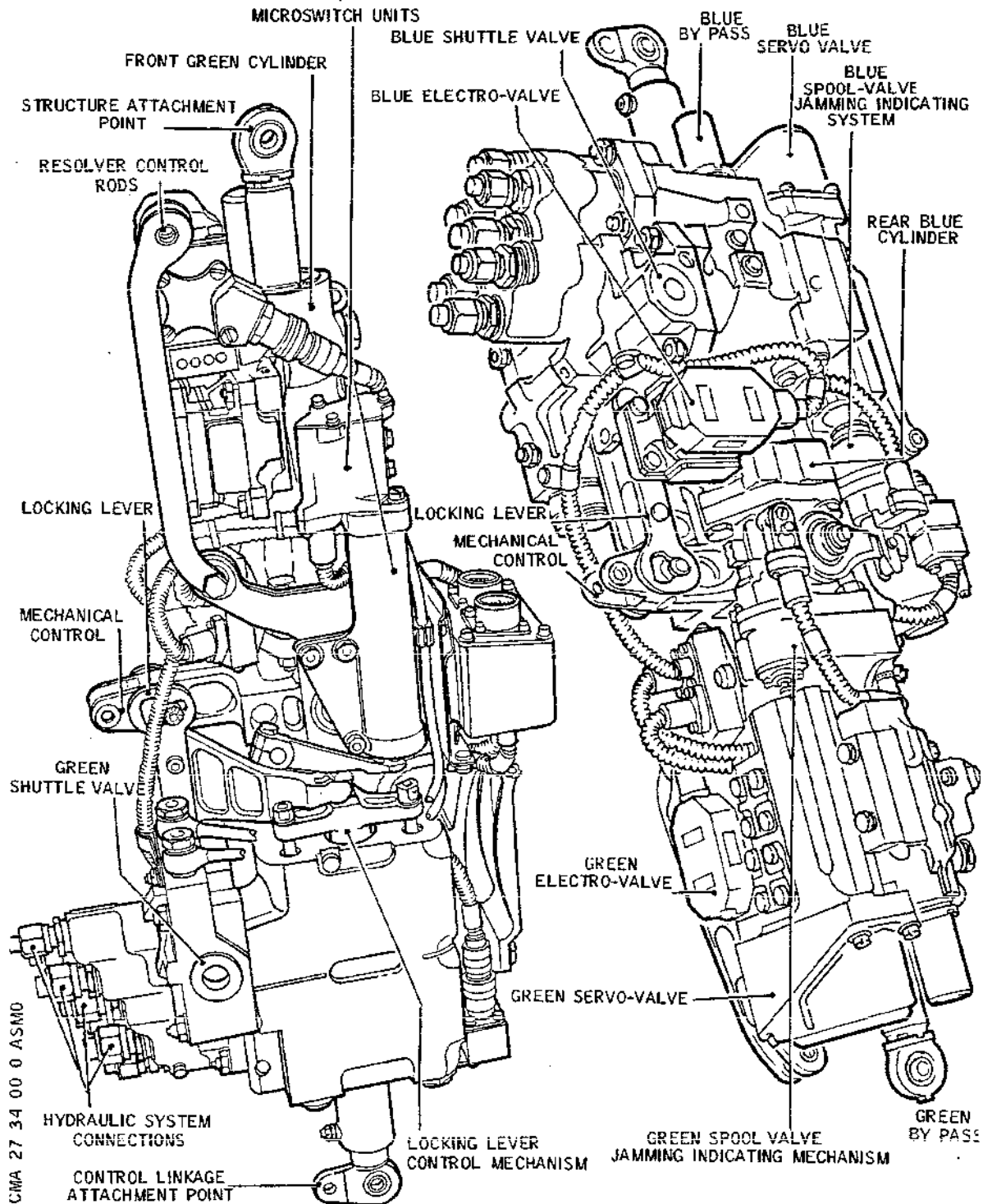
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## MAINTENANCE MANUAL



Relay Jack (RJ)  
Figure 009

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## MAINTENANCE MANUAL

### A. Mechanical Control (Ref. Fig. 010 )

In manual control, the input lever is locked to the spool valves.

R Any movement of the lever displaces the two spool valves and hydraulic pressure is admitted to each cylinder through a by-pass valve.

R Under hydraulic pressure, the relay jack body moves in the same direction as the spool valve. In moving, the body cuts-off the hydraulic supply and sets the spool valve to the neutral position, which corresponds to the new position of the system.

EFFECTIVITY: ALL

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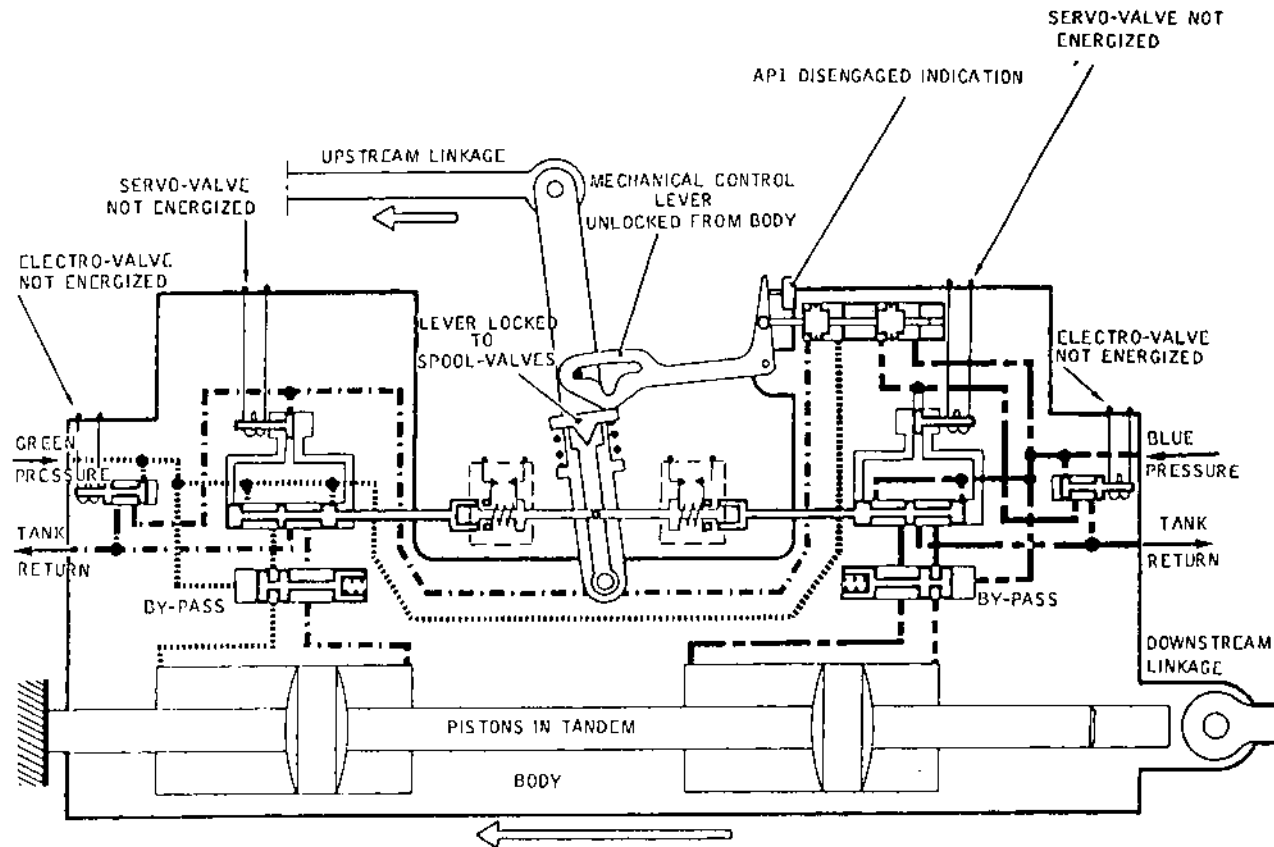
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# Concorde

## MAINTENANCE MANUAL

CMA 27 34 00 0 AUM0



R

RJ Mechanical Control  
Figure 010

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### B. Electrical Control (Ref. Fig. 011 )

The electrical control is used by the auto-pilot system.

In this configuration the input lever is disconnected from the spool valves and locked to the relay jack body.

The No.1 A.P. commands are addressed to the blue system servo-valve and the No.2 A.P. commands to the green system servo-valve. With only one auto-pilot being active at any one time, only one servo-valve operates.

The monitoring system ensures the electrical supply to the electro-valve.

The electro-valve hydraulic pressure locks the input lever to the relay jack body and supplies the servo-valve.

R The relay jack body displaces driving the downstream linkage  
R and the upstream linkage linkage via the input lever.

R The displacement of the upstream linkage rotates the Cap-  
tain's and First Officer's control column handwheels and  
drives the resolvers.

The downstream Linkage operates the PFCU input lever. (The input lever being un-locked from the spool valves in AP or in electrical mode).

EFFECTIVITY: ALL

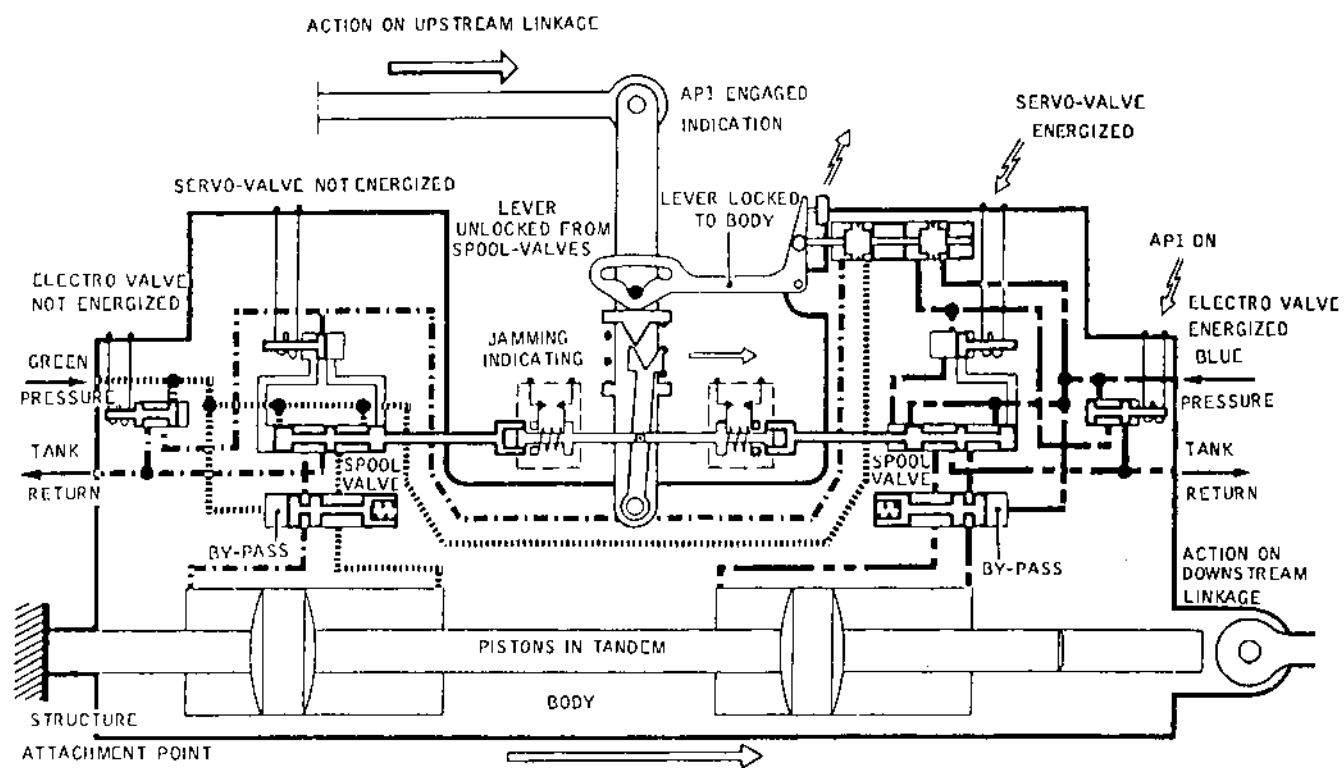
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CMA 27 34 00 0 AWM0



R

RJ Electrical Control  
Figure 011

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### R 7. Power Flight Control Unit (PFCU) (Ref. Fig. 012 )

R The PFCU consists of a mobile body, consisting of two cylinders,  
R moving on two pistons mounted in tandem.

The piston rod is connected to the structure and the PFCU body to the control surface.

Displacement of the PFCU is achieved by hydraulic pressure admitted to the cylinders via the spool valves which move it to one side or other of the pistons.

The two spool valves are mechanically linked in order to synchronize the orders in the two cylinders.

The spool valves can be controlled in two ways :

- In mechanical mode
- In electrical mode

EFFECTIVITY: ALL

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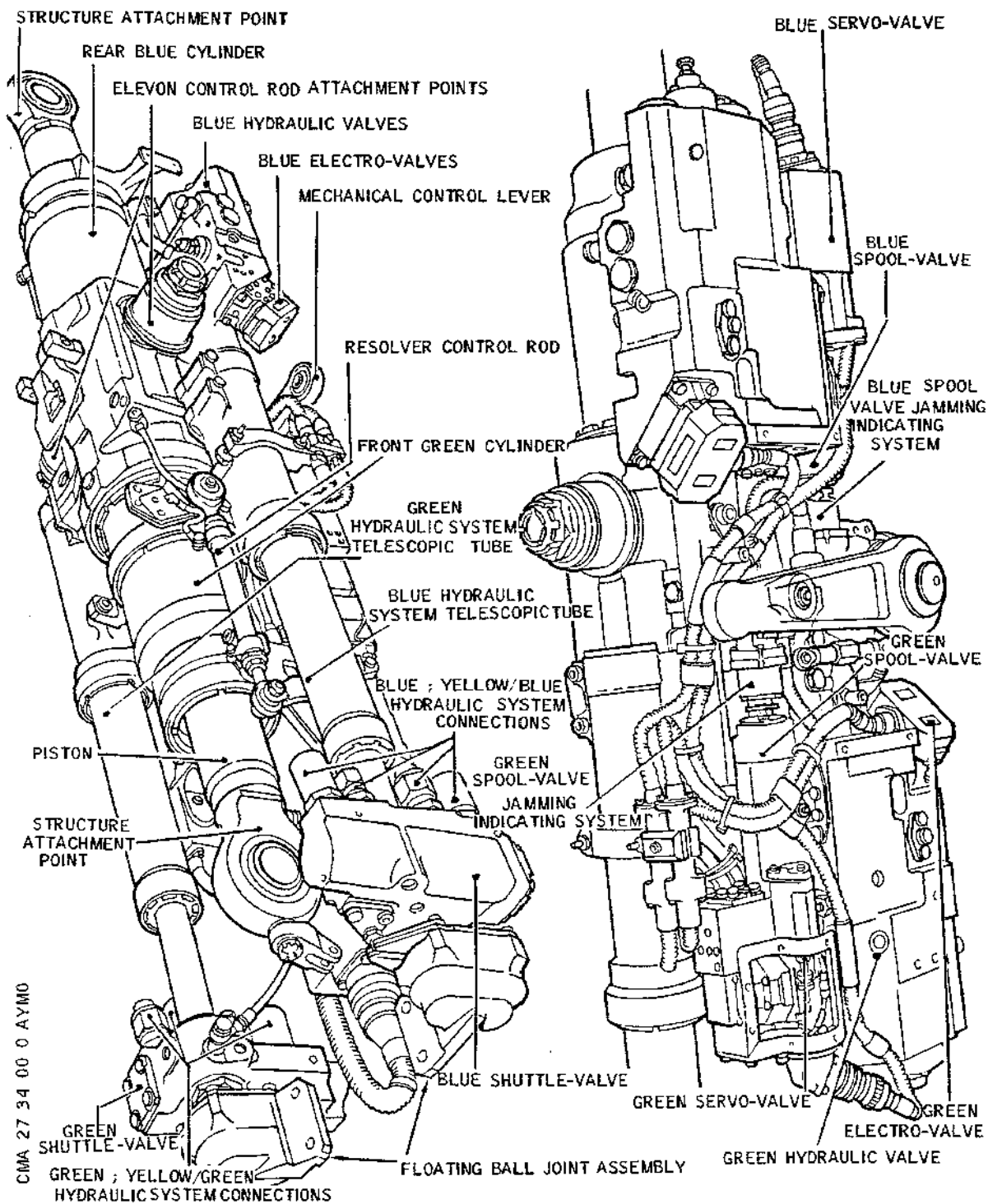
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# Concorde

## MAINTENANCE MANUAL



Power Flight Control Unit (PFCU)  
Figure 012

R

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## MAINTENANCE MANUAL

### A. Mechanical Mode (Ref. Fig. 013 )

- R From the moment of pressurizing, the PFCU input lever is mechanically linked to the two spool valves by a clutch.
- R Any movement of the lever displaces the two spool valves
- R and hydraulic pressure is admitted to each cylinder through
- R a by-pass valve which opens at the moment of pressurization.
- R Under the effect of the hydraulic pressure the PFCU body moves in the same direction as the spool valve. When displacing, the body cuts-off the hydraulic supply and sets the spool-valve to a neutral position which corresponds to a new position of the system.

EFFECTIVITY: ALL

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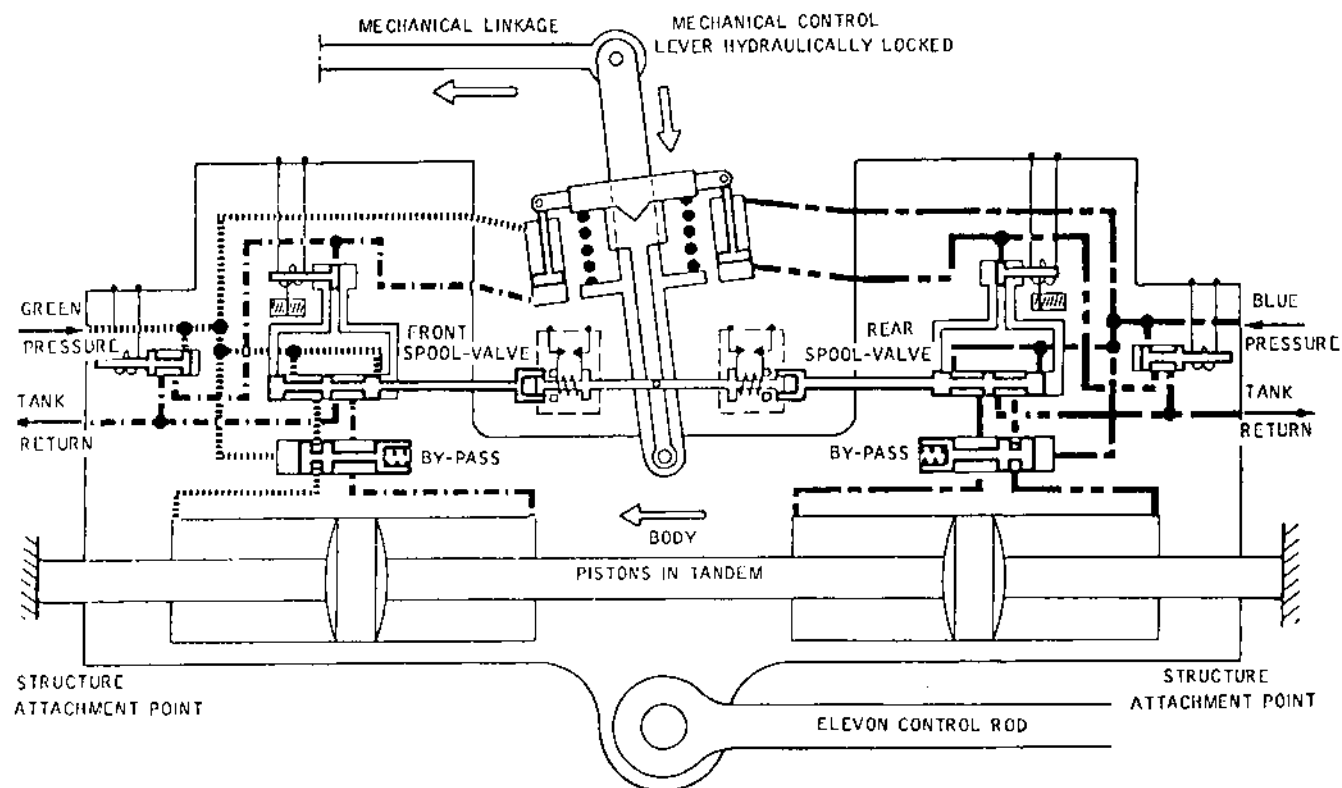
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## MAINTENANCE MANUAL

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PFCU Mechanical Control  
Figure 013

R

EFFECTIVITY: ALL

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# *Concorde*

## MAINTENANCE MANUAL

### B. Electrical Mode (Ref. Fig. 014 )

The PFCU has two servo-valves, one Blue and one Green which receive signals from the flight control electrical channels. Each servo-valve hydraulically controls the spool valve with which it is associated.

R Each servo valve is supplied by its associated electrovalve

In normal operation the Blue servo-valve receives the signal from the Blue electrical control channel and the Blue electro-valve is opened by the Blue monitoring channel. The servo-valve is hydraulically actuated and controls the spool valve with which it is associated. This spool valve mechanically drives the second spool valve, the whole assembly controlling the admission of pressure to the two cylinders.

Opening the electro-valve admits pressure to the mechanical lever locking actuator and unlocks the lever. This lever only follows the control orders for the spool valves without acting on them.

If the Blue channel fails the Blue electro-valve is closed by the Blue monitoring channel and the Blue servo-valve becomes inoperative. Reacting to the Green channel operation, the Green electro-valve is simultaneously opened activating the Green servo-valve.

If the Green electrical channel fails, the monitoring system closes the Green electro-valve. With the two electro-valves closed, hydraulic pressure locks the mechanical control lever and the operation continues in the mechanical mode.

EFFECTIVITY: ALL

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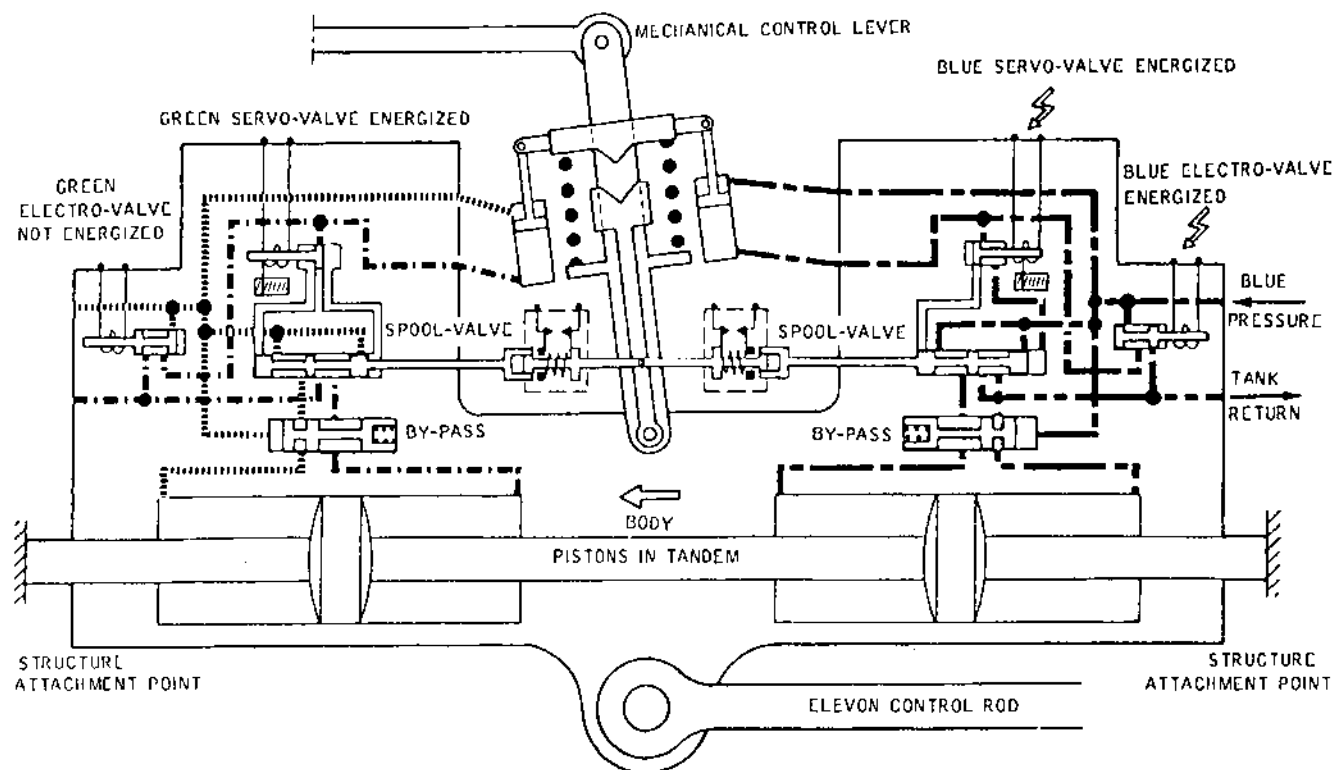
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## MAINTENANCE MANUAL

CMA 27 34 00 0 BCMO



PFCU Electrical Control  
Figure 014

R

EFFECTIVITY: ALL

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# *Concorde*

## MAINTENANCE MANUAL

### C. PFCU Control Mechanical Follow Mode

R During normal electrical control, the mechanical input  
R lever is disengaged but moves to follow the electrical  
R control orders. This prevents possible overloading of lin-  
kage resulting from positional variations between mechanical  
input and PFCU's.

These variations can arise from :

Normal difference in phase between mechanical linkage and  
the electrical control,

The auto-stabilization not cutting in except in the elec-  
trical mode,

A failure at servo-control level,

The effects of ground gusts (servo-controls unpressurized).

R On the ground, a spring device disengages the mechanical  
control lever in the absence of hydraulic pressure. The  
disengagement allows a deflection of  $9^{\circ}36'$  for the inner  
elevons and  $16^{\circ}$  for the middle and outer elevons each  
side of neutral. Beyond these deflections the linkage is  
R protected by the load limiting components.

On the ground, in the absence of hydraulic pressure, cham-  
bers in the same cylinder are connected by the by-pass val-  
ve whose construction is such that it creates a restriction  
and acts as a damper.

### 8. Monitoring and Indicating (Ref. Fig. 015 )

The indicators monitoring operation of the hydraulic system  
are mounted on the overhead panel.

The master warning system comprises :

- R - A PFC warning light for the servo controls,
- R - A FEEL warning light for the artificial feel jacks,
- R - A HYD warning light for the hydraulic supplies,
- R - A general aural warning gong

R The SERVO CONTROLS unit comprises :

- R - Two caption lights BLUE JAM and GREEN JAM (PFCU valve  
jamming),
- R - A three position selector, GREEN ONLY - NORMAL - BLUE ONLY,
- R - Four green indicator lights signalling the closing of the

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## MAINTENANCE MANUAL

- normal Green and Blue selector valves.
- Two low pressure caption lights : GREEN LOW PRESS and BLUE LOW PRESS
  - A three position selector YELLOW/GREEN - NORMAL - and YELLOW/BLUE,
  - Four green indicator lights signalling the opening of the standby selector valves Yellow/Blue and Yellow Green.
  - Four test push-buttons, each of which checks the master warnings (PFC and Gong) and the associated caption light.
  - A push-button YELLOW LEVEL TEST. This push-button is used to simulate a Yellow tank low 1st level warning and causes the standby electro-hydraulic selector valves (PFCU and RJ) to close.

The RELAY JACK unit comprises :

- A three position switch ; GREEN ONLY, NORM, BLUE ONLY
- Two test buttons BLUE and GREEN, each of which checks the master warnings (PFC and Gong) and the associated caption light.
- Two caption lights BLUE JAM and GREEN JAM signalling relay jack spool valve jamming.

R

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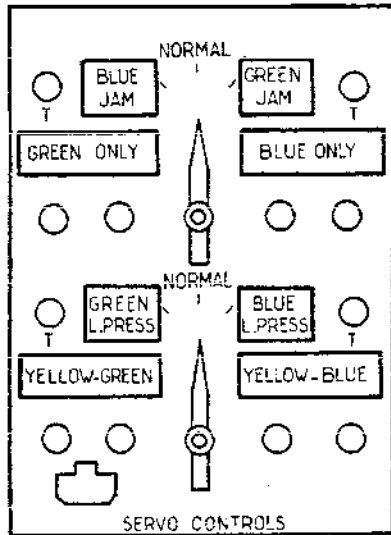
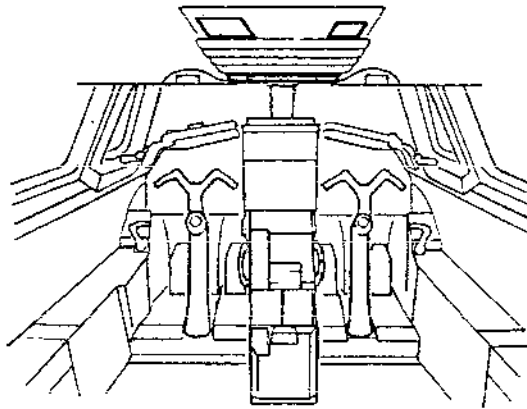
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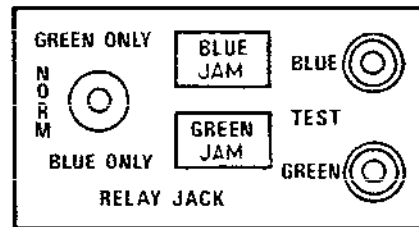
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## MAINTENANCE MANUAL

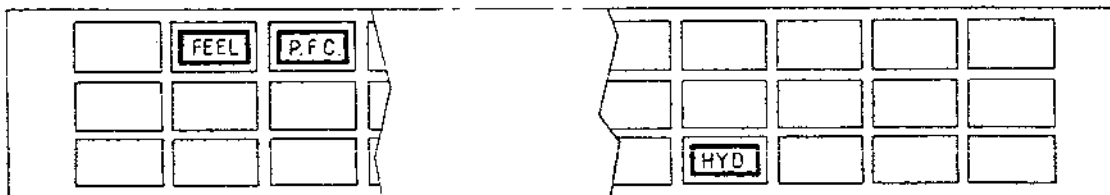


SERVO CONTROLS UNIT



RELAY JACKS UNIT

CMA 27 34 00 0 BEMO



MASTER WARNING PANEL

Monitoring and Indicating  
Figure 015

R

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## MAINTENANCE MANUAL

### 9. Operation

#### A. Normal Operation (Ref. Fig. 016 )

R On SERVO CONTROLS unit, place the selectors in NORMAL  
R position.

R On RELAY JACK unit, place switch in NORMAL position.

All warning indicators are extinguished.

R Blue and Green system hydraulic pressure supplies the  
various flight control components which react according  
to the pilot's movement of the controls.

EFFECTIVITY: ALL

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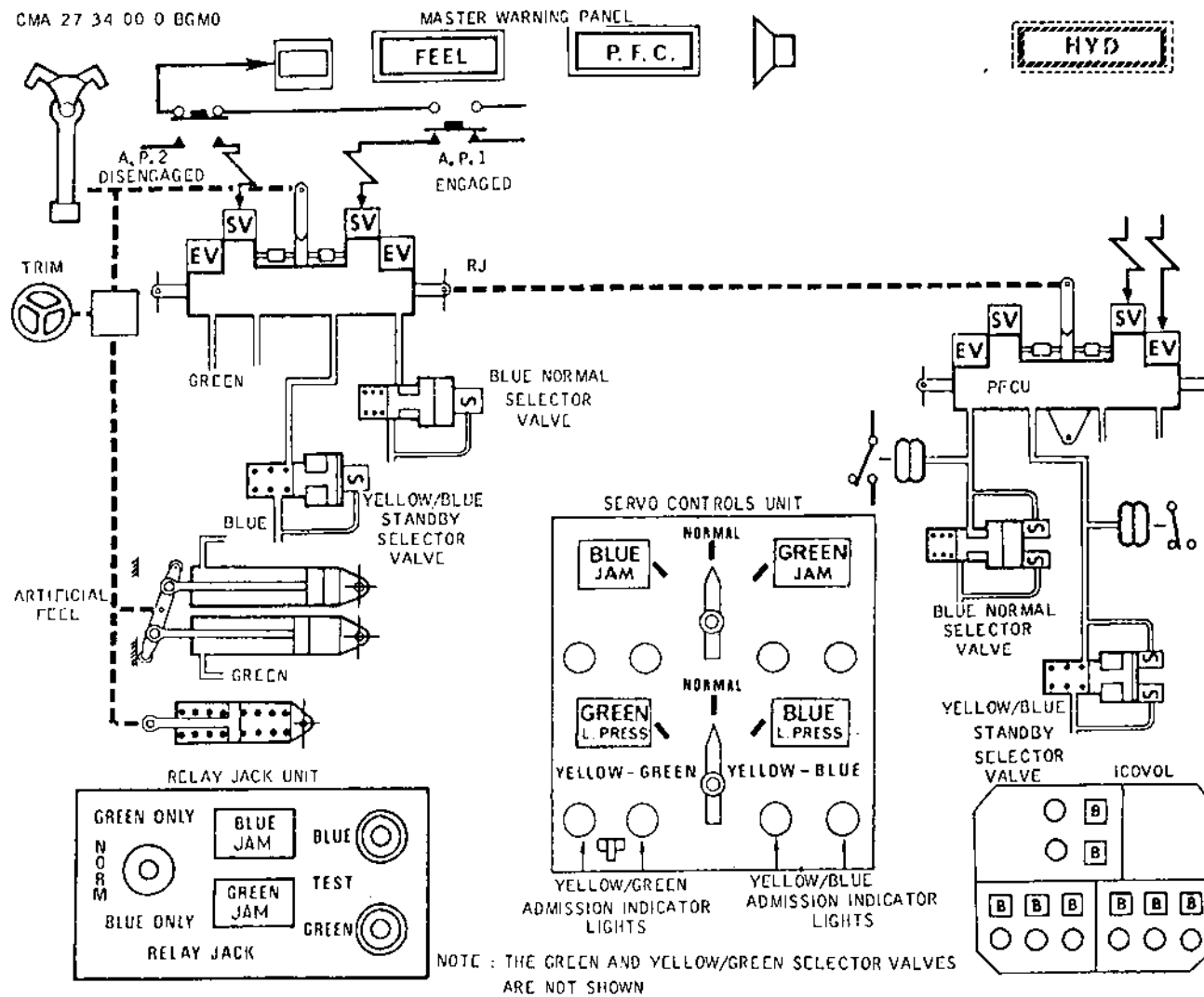
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# Concorde

## MAINTENANCE MANUAL

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Monitoring and Indicating, Normal Flight - Blue  
Electrical Mode

Figure 016

R

EFFECTIVITY: ALL

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# *Concorde*

## MAINTENANCE MANUAL

- B. Blue System Low Pressure, in Normal Flight in the Blue Electrical Mode (Ref. Fig. 017 )

Indications :

- R The BLUE LOW PRESS caption light illuminates on the SERVO  
R CONTROLS unit.
- R On the master warning panel the PFC and HYD warning lights  
R illuminate and the gong sounds. The flight control surface position indicator (ICOVOL) displays "G" as monitoring has caused the Blue electro-valve to close and the Green electro-valve to open.

Results :

- R The servo controls operate on one cylinder only (Green  
R system). If autopilot No.1 is engaged, it disengages. Only the Green jacks on the artificial feel are available.

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CMA 27 34 00 0 BJMO



EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

Corrective Action (Ref. Fig. 018 )

NOTE : The electrical selectors should always be turned towards the illuminated warning.

R Set YELLOW/BLUE on the SERVO CONTROLS unit.

R The BLUE LOW PRESS caption light extinguishes.

R The green indicator lights under GREEN ONLY illuminate signalling the closing of the Blue system selector valve.

R The green indicator lights YELLOW-BLUE illuminate signalling the opening of the Yellow/Blue system selector valve.

R Cancel the warnings by pressing the caption lights.

Results :

R The servo controls re-function on both cylinders.

Only the Green jacks on the artificial feel are available.

R The Green indicator lights on the SERVO CONTROLS unit remain illuminated indicating permanent standby Yellow/Blue hydraulic operation on one cylinder.

R Manually reselect the Blue electrical mode after resetting on the Flight Control Unit. (PFCU control and monitoring panel).

If required AP1 can be re-engaged.

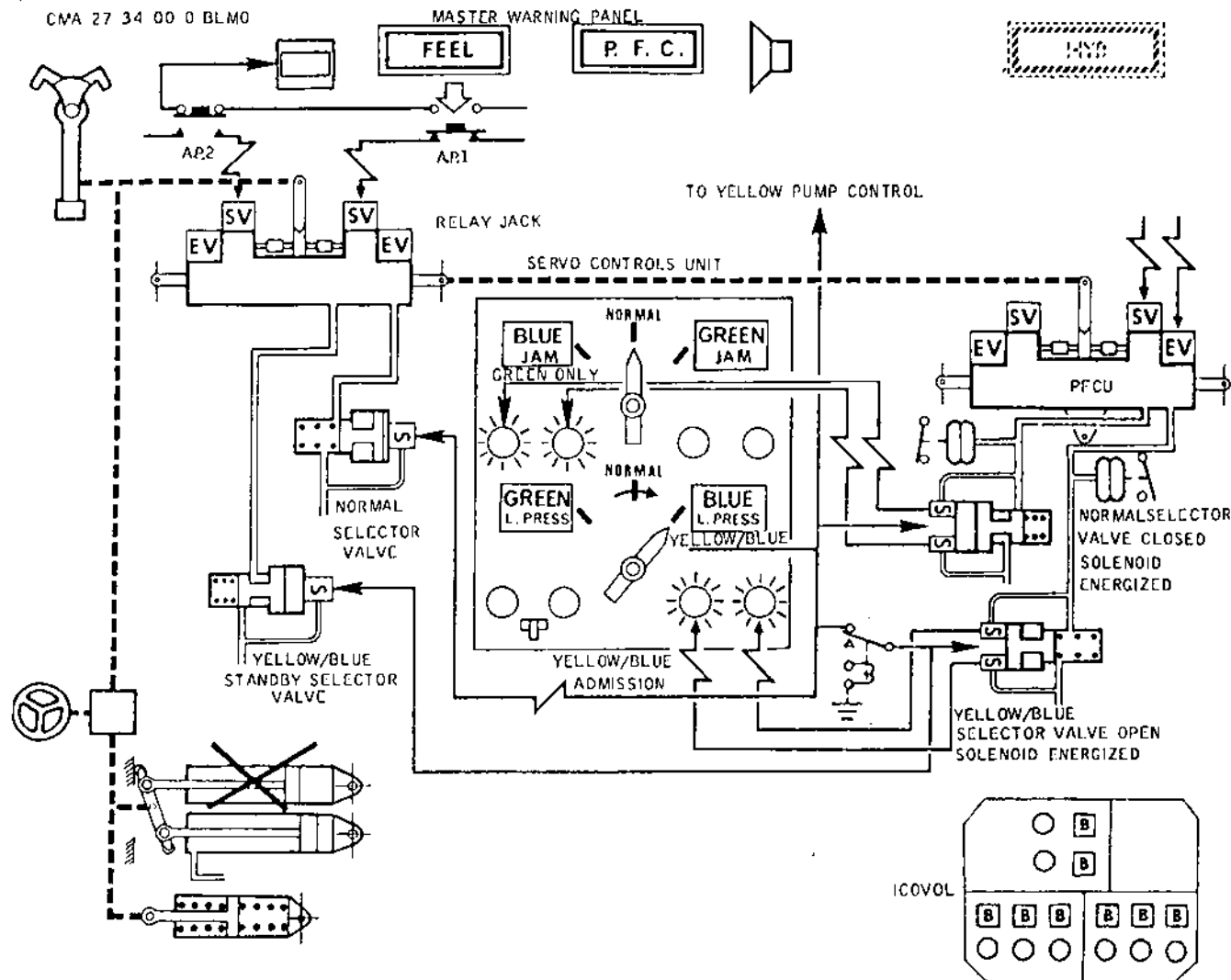
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Monitoring and Indicating - Blue Low Pressure/  
Corrective Action  
Figure 018

R

EFFECTIVITY: ALL

BA

# *Concorde*

## MAINTENANCE MANUAL

- R C. Green System Low Pressure, in Normal Flight with the Blue Electrical Mode (Ref. Fig. 019 )

Indications :

- R The GREEN LOW PRESS caption light on the SERVO CONTROLS unit illuminates.

- R On the master warning panel the PFC and HYD warning lights illuminate and the gong sounds.

Results :

- R The servo controls operate on one cylinder only (Blue system)

Only the Blue jacks on the artificial feel are available.

Corrective Action :

- R Set YELLOW/GREEN on the SERVO CONTROLS unit

- R The GREEN LOW PRESS caption light extinguishes.

The green indicator lights under BLUE ONLY illuminate signalling the closing of the Green system selector valve. The green lights under YELLOW-GREEN illuminate signalling the opening of the Yellow/Green system selector valves.

- R Cancel the warnings by pressing the caption lights.

Results :

- R The servo controls operate on both cylinders. Only the Blue jacks on the artificial feel are available.

- R The green indicator lights remain illuminated on the SERVO CONTROLS unit indicating permanent standby Yellow/Green hydraulic operation on one cylinder.

EFFECTIVITY: ALL

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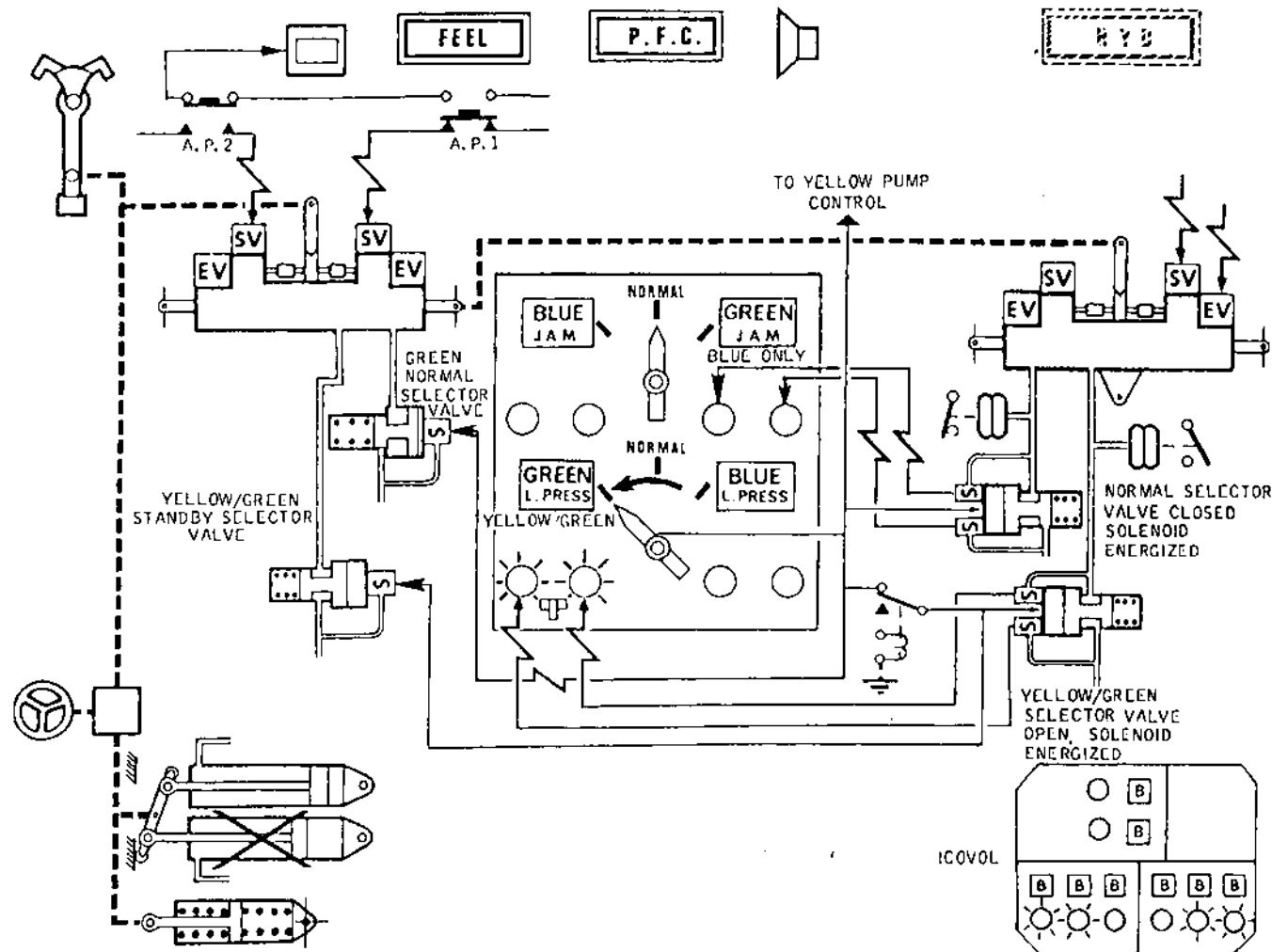
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## MAINTENANCE MANUAL

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Monitoring and Indicating - Green Low Pressure  
in The Blue Electrical Mode  
Figure 019

R

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- D. Yellow Tank Low 1st Level, Blue Electrical Mode,  
Yellow/Blue and Green Systems.  
(Ref. Fig. 020 )

### Indications :

The BLUE LOW PRESS caption on the SERVO CONTROLS unit illuminates, the two lower green indicator lights extinguish, as the 1st level relay has cut-off power to the Yellow/Blue selector valve.

The Flight Control Surface Position Indicator (ICOVOL) changes to "G" as monitoring has opened the Green electrovalve. On the master warning panel the PFC and HYD warning lights illuminate, the gong sounds and AP1 disengages if it was engaged.

### Results :

The servo controls operate on one cylinder only in the Green electrical mode.

### Corrective Action :

Cancel the warnings by pressing the caption lights.

### Results :

The servo controls operate on one cylinder only in the Green electrical mode.

The BLUE LOW PRESS and GREEN ONLY caption lights remain illuminated.

In the event of a pressure drop on remaining cylinder (green body) change-over to Yellow pressure on this cylinder is automatic.

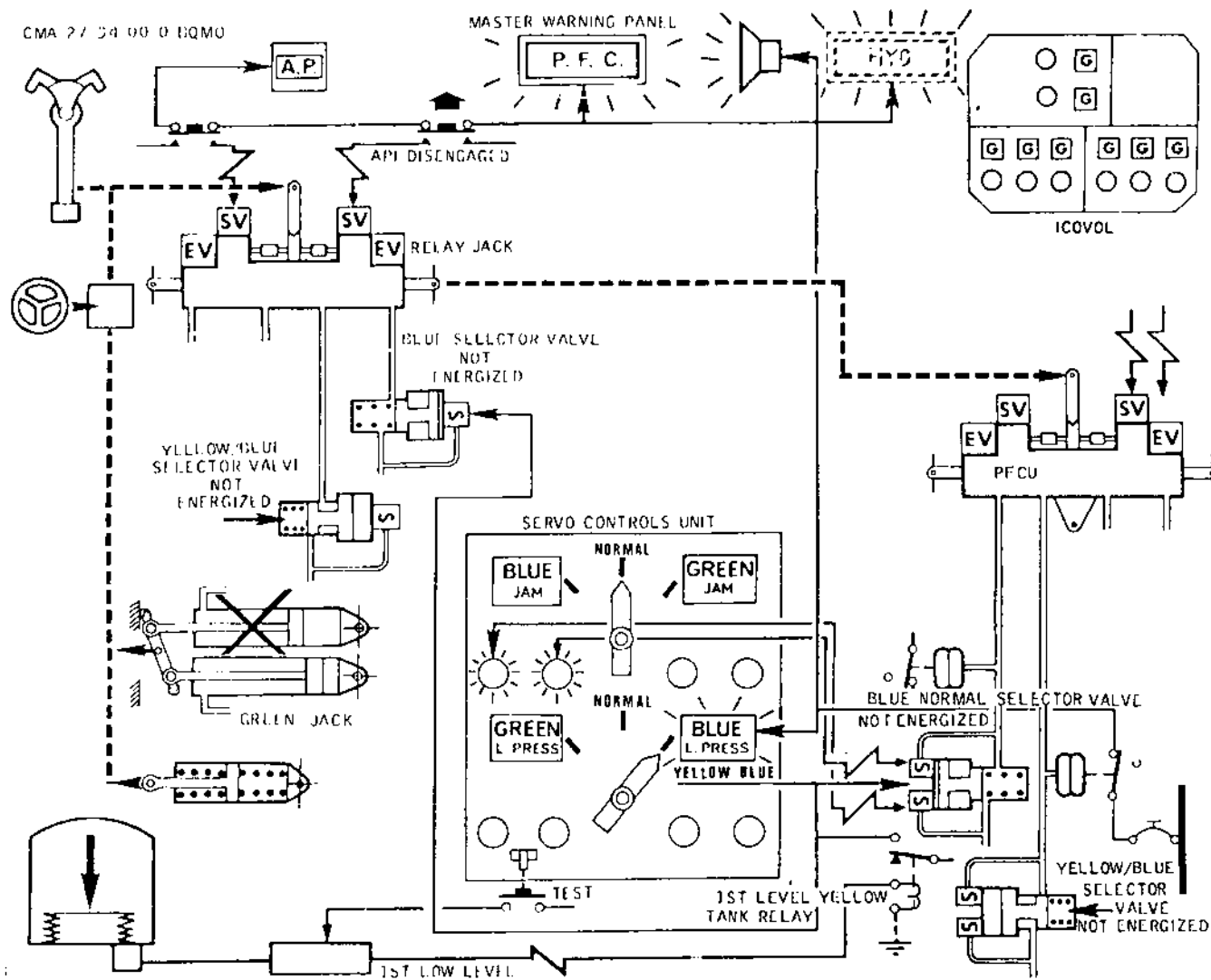
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Monitoring and Indicating - Yellow Tank Low  
1st Level  
Figure 020

R

EFFECTIVITY: ALL

BA

# *Concorde*

## MAINTENANCE MANUAL

R E. PFCU Blue System Spool Valve Jamming (Ref. Fig. 021 )

Indications :

R The BLUE JAM caption light on the SERVO-CONTROLS unit illuminates.

On the master warning panel the PFC warning light illuminates and the gong sounds.

R On ICOVOL indicator, the magnetic indicators for the elevon associated with the jammed PFCU changes over to "G" (Green) and the corresponding red warning lights illuminate.

Results :

The monitoring system detecting a desynchronization of the elevons, changes the control channel (from the Blue channel to the Green channel).

R The system is designed in such a way that in the case of jamming an automatic change over to the mechanical mode is impossible. The Green channel thus remains in service.

Corrective Action :

High speed flight

R Confirm the green mode for the elevons displaying "G" on the ICOVOL indicator, at the Flight Control Unit. (PFCU control and monitoring panel).

R Cancel the warnings, the BLUE JAM caption remains illuminated. The elevons affected by the fault operate in the green electrical mode using the blue and Green systems, but the elevons controlled by the jammed PFCU are uncontrollable ; the follow mode protects the linkage.

The other elevons operate normally in the blue electrical mode using the Blue and Green systems.

Approach Flight :

R Set GREEN ONLY and cancel the warnings by pressing the caption lights.

R The BLUE JAM caption light extinguishes and GREEN ONLY and BLUE LOW PRESS illuminate.

R All the servo controls operate on one cylinder only.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

R After this action, yellow pressure will automatically  
R supply the Green body, in the event of a Green pressure  
R drop. Pilot will confirm automatic selection by placing  
R selector switch in Yellow/Green position.

EFFECTIVITY: ALL

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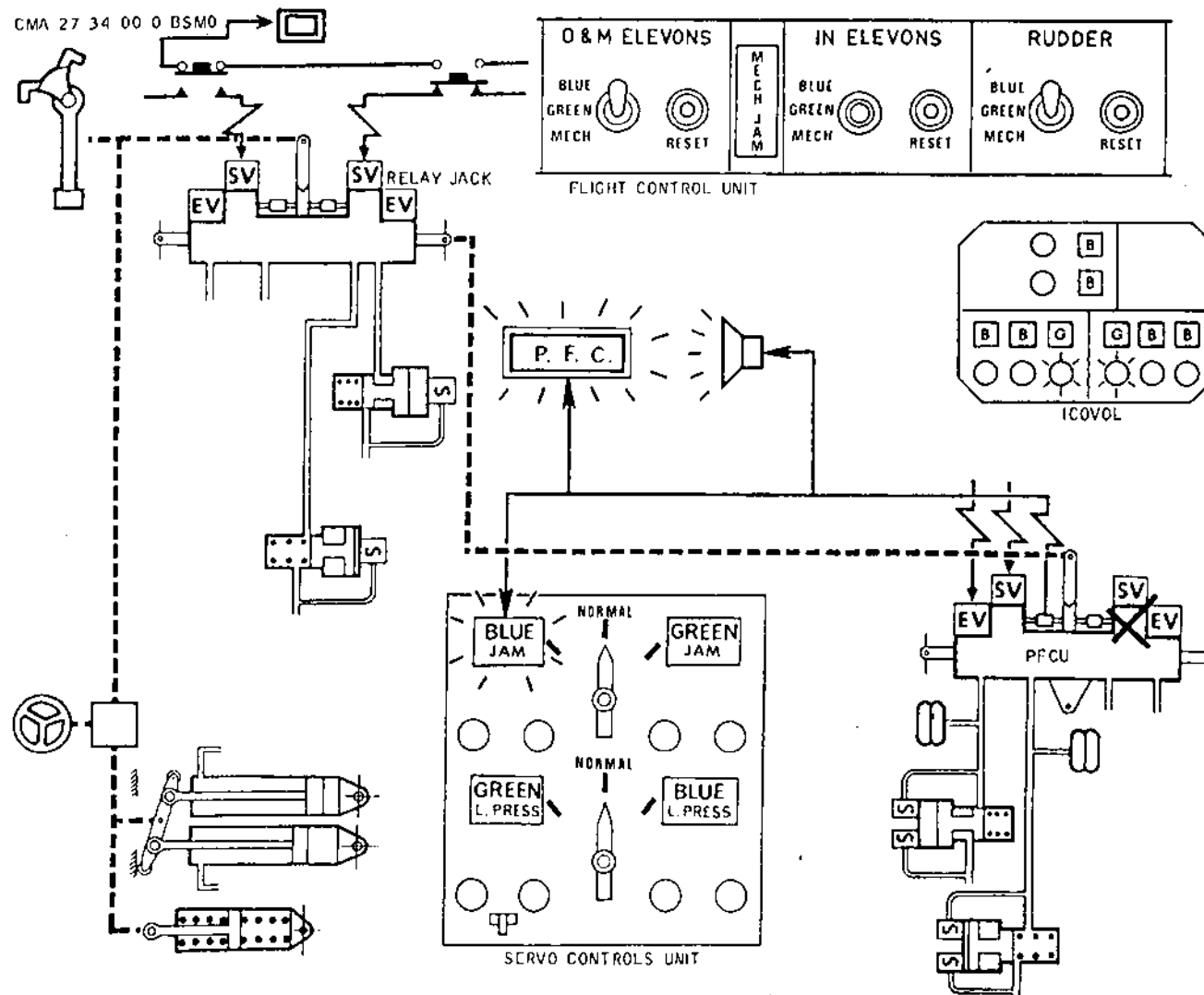
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## MAINTENANCE MANUAL



Monitoring and Indicating - Blue Spool Valve  
Jamming/Outer or Middle Elevons  
Figure 021

EFFECTIVITY: ALL

R

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## MAINTENANCE MANUAL

### F. Relay Jack Blue System Spool Valve Jamming (Ref. Fig. 022 )

#### (1) Manual control

##### Indications :

On the master warning panel the PFC warning light illuminates and the gong sounds.

On the RELAY JACK unit, the BLUE JAM caption light and the indicator incorporated in the switch illuminates.

##### Results :

The Blue cylinder hydraulically locks the relay jack.

An electrical signal closes the Blue hydraulic supply selector valve and prohibits opening of the Yellow/Blue selector valve.

Cutting off the Blue system enables the relay jack to operate on only one Green cylinder.

##### Corrective Action :

On RELAY JACK unit, set the switch to GREEN ONLY which confirms closure of the Blue hydraulic selector valve and prohibits the opening of the Yellow/Blue selector valve. The BLUE JAM caption and the indicator incorporated in the switch extinguish.

#### (2) Cruise flight with the switch in "NORM" position, AP1 engaged.

##### Indications :

The AP1 monitoring comparator causes the autopilot to trip out and change over to manual flight.

The AP warnings illuminates.

The result and corrective action are the same as for manual control.

It is possible to engage AP2.

#### (3) On approach flight, with switch in "NORM" position, AP1 and AP2 engaged.

##### Indications :

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

The monitoring comparator causes the AP1 to trip out.

The AP warnings illuminate.

Switchover to AP2.

The result and corrective action are the same as for manual control.

### 10. Electrical Power Supply

Hydraulic selection sytem control network is supplied from 28 VDC essential bus bars.

The following table gives the distribution of these bars in the various circuit breaker panels :

SERVICE	BUS BAR	C/B PANEL
Flight Control 1	28 VDC A ESS 3 P	1-213
Flight Control 2	28 VDC A ESS 4 P	3-213

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Figure 022

BA

← **Supervisors**

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## MAINTENANCE MANUAL

### HYDRAULIC SYSTEM - TROUBLE SHOOTING

#### 1. General

Power Flight Control Unit hydraulic supply is common to the elevon and rudder surface PFCUs.

Relay jack hydraulic supply is common to the pitch, roll and yaw relay jacks.

Trouble shooting shall be carried out by referring to topic 27-14-00, Trouble Shooting.

#### B2. Procedures (BA - Mod 27C083)

B In the event of a prolonged P.F.C.U. jam warning caused by  
B microswitch spring box stiction i.e. jam warning indication  
B with Flying controls operating in correct sense and no control  
B surface lag, with the incorporation of this modification it is  
B now possible for trouble shooter to identify which P.F.C.U. is  
B at fault. Identification of faulty P.F.C.U. is by use of an  
B additional test socket in the LEFT HAND REAR EQUIPMENT, RACKING  
B 7-244. To gain access to test socket the rear LEFT HAND facia  
B panel requires removal by means of 8 quick release fasteners.  
B An AVO or similar meter must then be used by inserting one pin  
B to earth (PIN V) and the other to any one of the following pins,  
B a reading in excess of 20 volts identifies faulty P.F.C.U. All  
B pins should be checked to ensure that problem is an isolated  
B case and defect is not present on any other P.F.C.U.

B	<u>P.F.C.U.</u>	<u>BLUE</u>	<u>GREEN</u>
B	R.H. OUTER ELEVON	PIN H	PIN S
B	R.H. MIDDLE ELEVON	PIN G	PIN R
B	R.H. INNER ELEVON	PIN F	PIN P
B	UPPER RUDDER	PIN D	PIN M
B	LOWER RUDDER	PIN E	PIN N
B	L.H. INNER ELEVON	PIN C	PIN L
RB	L.H. MIDDLE ELEVON	PIN B	PIN K
RB	L.H. OUTER ELEVON	PIN A	PIN J

B Following identification of faulty P.F.C.U. jam switch gain  
B access to it by removing appropriate fairings.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

B PANEL 553 JB giving access to P.F.C.U. L.H. OUTER ELEVON  
B PANEL 552 JB giving access to P.F.C.U. L.H. MIDDLE ELEVON  
B PANEL 551 JB giving access to P.F.C.U. L.H. INNER ELEVON  
B PANEL 651 JB giving access to P.F.C.U. R.H. INNER ELEVON  
B PANEL 652 JB giving access to P.F.C.U. R.H. MIDDLE ELEVON  
B PANEL 653 JB giving access to P.F.C.U. R.H. OUTER ELEVON  
B PANEL 352 CR giving access to P.F.C.U. UPPER RUDDER  
B PANEL 351 CR giving access to P.F.C.U. LOWER RUDDER

B Using tool ST4 P285-45-2 (HZAT 2740) on spring box and  
B microswitch assembly, exercise spring box in both directions  
B several times to ensure stiction is removed. In the unlikely  
B event of stiction not being removed refer to Concorde M.E.L.  
B 05-02-1 ref. No. 4 for alleviation. If exercising of spring box  
B is successful function flying controls I.A.W. 27-00-00 P/B 300  
B to confirm this.

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## MAINTENANCE MANUAL

### HYDRAULIC SYSTEM - ADJUSTMENT/TEST

#### 1. General

Adjustment/Tests concerning selection of hydraulic systems supplying elevon servo-controls are described in Chapter 27-14-00 - HYDRAULIC SYSTEM - Adjustment/Test.

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## MAINTENANCE MANUAL

### ARTIFICIAL FEEL JACK (BLUE, PITCH) - SERVICING

**WARNING:** MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

This procedure is to render an artificial feel jack inoperable following an electro-valve failure, servo valve failure or for other operational reasons.

#### 2. De-activation of Artificial Feel Jack (Blue)

##### A. Equipment and Materials

	DESCRIPTION	PART NO.
	Blanking Plug	C27-133
RB	Blanking Plugs	AN 929-4S
RB	Blanking Plugs	AN 929-5S
	Circuit Breaker Safety Clips	B24715
	Lockwire dia. 1 mm (0.041 in.)	
	Corrosion Resistant Steel	-
	Warning Notices	-

##### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (2) Trip, safety and tag the following circuit breakers:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
PITCH ART FEEL COMP 1 SUP	2-213	1C244	E4
HYD TANK COMPR CONT	15-215	M602	D8
HYD TANK AIR COMPR SUP	13-215	M601	G7
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M626	F22

- (3) Open access doors 151DB, and 153BB beneath the fuselage and depressurize the Green, Blue and Yellow hydraulic systems. Depressurize the Blue hydraulic tank. Close and safety tank depressurization valve with lockpin.

WARNING: DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS USED, DISPLAY A WARNING NOTICE ON THIS UNIT, PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (4) Open floor panel 213AF and remove access door 214BZ.

### C. Procedure A. (Ref. Fig. 001)

CAUTION: ENSURE THAT THE ARTIFICIAL FEEL JACK TO BE DE-ACTIVATED IS AGAINST MECHANICAL STOP.

NOTE: An alternative method for de-activation of artificial feel jack is shown in Procedure B.

- (1) Cut and remove wire locking. Disconnect artificial feel jack pressure pipe at hydraulic system manifold 5103.
- (2) Fit blanking plug C27-133 (located in the Flight Kit) to manifold. Connect the pressure pipe to blanking plug C27-133 and safety with lockwire.

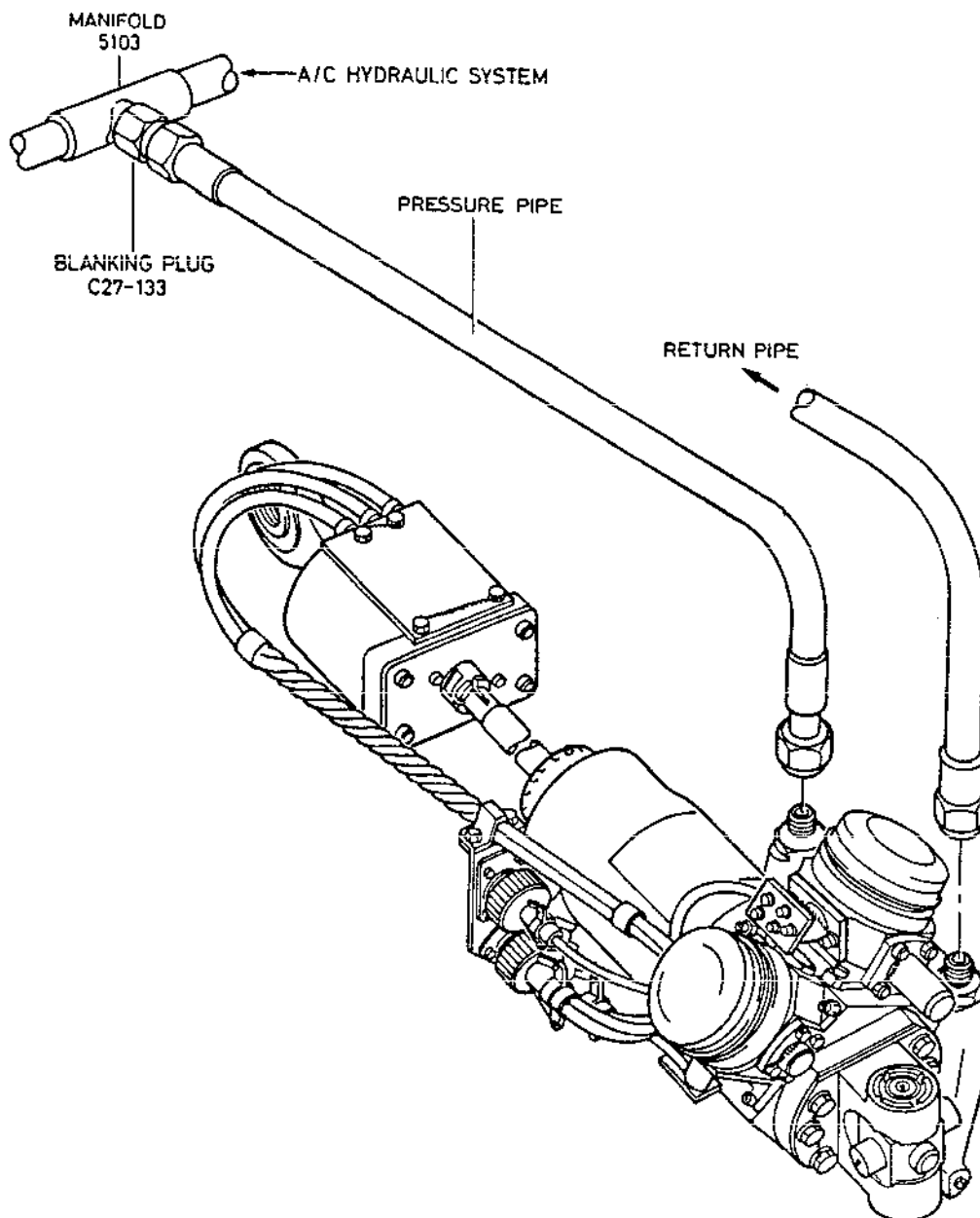
EFFECTIVITY: ALL

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## MAINTENANCE MANUAL



De-activation of Artificial  
Feel Jack  
Fig. 001

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

Procedure B. (Ref. Fig. 001)

**CAUTION:** ENSURE THAT THE ARTIFICIAL FEEL JACK TO BE  
DE-ACTIVATED IS AGAINST MECHANICAL STOP.

(1) Cut and remove wire locking. Disconnect pressure and return pipes from artificial feel jack and hydraulic system manifolds 5103 and 5104 respectively. Retain the hydraulic pipes removed.

(2) Fit blanking plugs AN 929-4S to artificial feel jack pressure port and manifold 5103. Fit blanking plugs AN 929-5S to artificial feel jack return port and manifold 5104. Wirelock all blanks.

### D. Test

- (1) Remove safety clips and tags, reset circuit breakers tripped in para. B.(2).
- (2) Establish interphone communication with ground crew.
- (3) Pressurize Blue hydraulic tank (Ref. 29-00-00, Servicing).
- (4) Set flight controls in mechanical mode (Ref. 27-00-00, Servicing).
- (5) At centre console, on ADC control panel:
  - (a) Place ADC1 switch in ON position.
  - (b) After approximately 30 seconds ADC1 blue TEST light is lit.
  - (c) Press and release ADC1 amber warning light:  
- the light must go off.

**NOTE:** During the test check for leaks around the blanking plug.

- (6) Operate the control column over the full range of movement. Check control surface deflection at the ICOVOL indicator.
- (7) On ADC control panel:
  - (a) Place ADC1 TEST selector switch in position 1.
  - (b) Press and release ADC1 amber warning light:  
- the light must go off.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (8) At overhead panel, on ARTIFICIAL FEEL engage switch unit, operate system 1 PITCH channel switch. Check that:
  - (a) The switch does not engage.
  - (b) The gong sounds.
  - (c) The FEEL or PCA light comes on.
- (9) Place ADC1 TEST selector switch in NORM position.
- (10) On ADC control panel place ADC1 switch in OFF position.

### E. Close-up

- (1) Carry out close-up operations detailed in procedure to set flight controls in mechanical mode (Ref. 27-00-00, Servicing).
- (2) Discontinue interphone communication with ground crew.
- (3) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.
- (4) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (5) Remove warning notices.
- (6) Close access doors and panels 151DB, 153BB, 213AF, 214BZ.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### ARTIFICIAL FEEL JACK - BLUE SYSTEM - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

- A. The Blue artificial feel jack applies a force to the mechanical control which is a function of the flight conditions.

#### 2. Artificial Feel Jack - Blue System

- A. Equipment and Materials

DESCRIPTION	PART NO.
Zero Rigging Device - Relay Chassis	E925019000
Rigging Pin - Synchro Pack	D925252000
General Lubricant (Ref. 20-30-00, No.51)	
Lockwire Dia. 1 mm (0.041 in.) Corrosion Resistant Steel	
Access Platform 3.672 m (12 ft.)	
Circuit Breaker Safety Clips	

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## MAINTENANCE MANUAL

DESCRIPTION	PART NO.
-------------	----------

Blanking Caps for Hydraulic Lines

### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PITCH ART FEEL COMP 1 SUP	13-216	1C 244	E 4
(3) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).			
(4) Make certain that trim controls are set to zero.			
(5) Remove access panel 121FB, and immobilize pitch resolvers with rigging pin D925252003.			
(6) Remove access panel 121GB, install equipment E925019010 and immobilize pitch mechanical control with equipment E925019012.			
(7) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing Procedure to set Flight Controls in mechanical mode).			

**WARNING :** DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

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## MAINTENANCE MANUAL

(8) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

(9) Open access doors 151DB and 153BB, depressurize Blue, Green and Yellow hydraulic systems. Depressurize Blue tank. Close and safety tank depressurization valve with lock pin.

(10) Open floor panel 213AF and remove access door 214BZ.

(11) Remove spring rod (Ref. 27-32-12, Removal/Installation).

### C. Remove

- (1) Disconnect electrical connectors (18) on electrical connector mounting (4).
- (2) Cut lockwire, unscrew and remove screw (5) with washer (6).
- (3) Remove cotter pins, unscrew nuts (1), remove washers (2) bolts (3) and remove spring rod bracket (7) with mounting (4) of electrical connectors.
- (4) Remove cotter pin (20), unscrew and remove nut (19).
- (5) Remove washer (21) and bolt (10).
- (6) Disconnect hydraulic lines (12) and (13) and cap their ends.
- (7) Unsafety and remove bolts (16) attaching LH pivot support (17).
- (8) Support jack, unsafety and remove bolts (15) attaching RH pivot support (14).
- (9) Remove Artificial Feel Jack (11).
- (10) Remove RH and LH pivot supports (14) and (17).

### D. Preparation of Replacement Component

EFFECTIVITY: ALL

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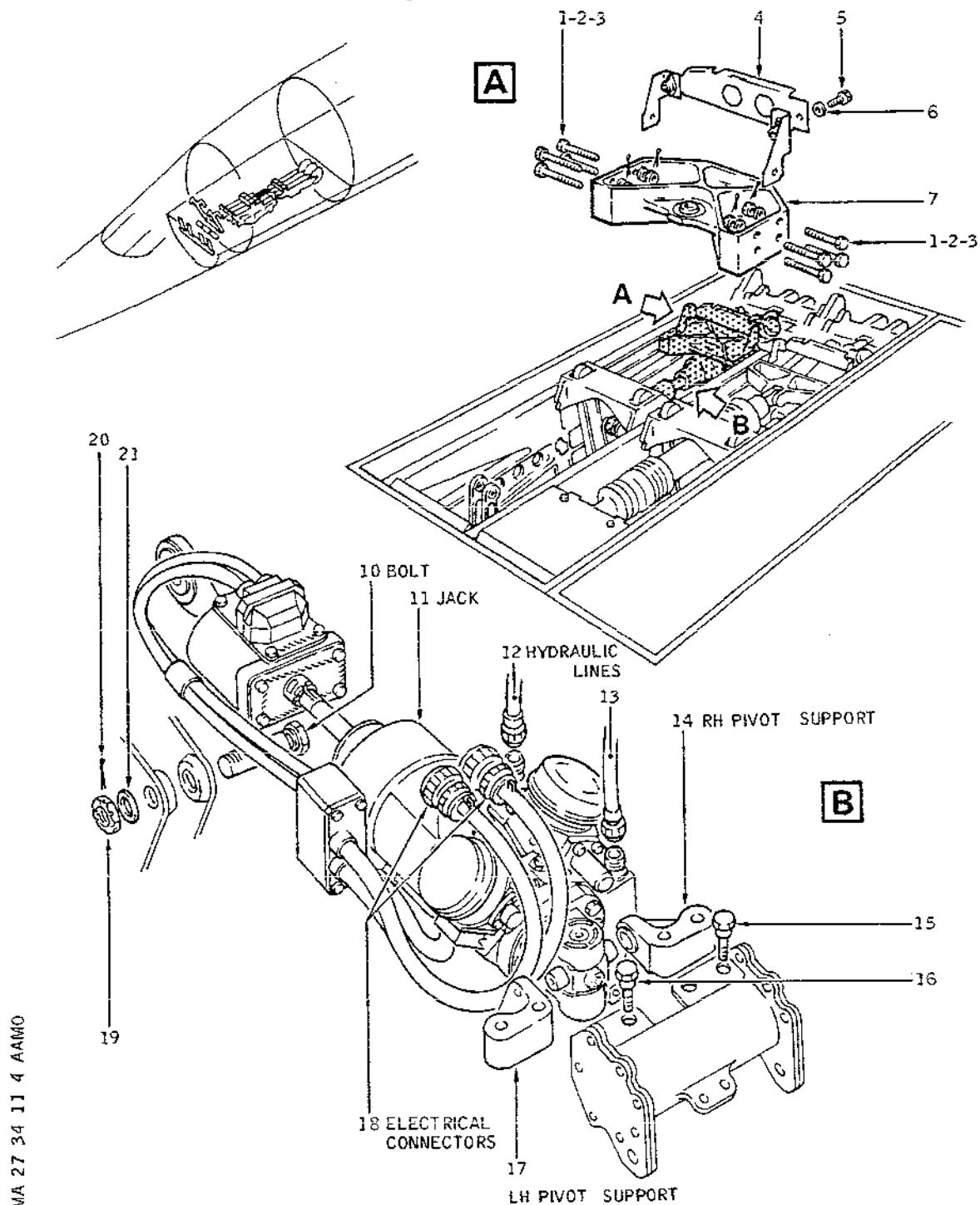
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Blue Artificial Feel Jack  
Figure 401

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

**WARNING :** HOLD JACK BY BODY : CAREFULLY AVOID TO DAMAGE EYE END FITTING OR TRANSDUCER HOUSING.

DO NOT HOLD JACK BY : EYE END FITTING.  
FORCE TRANSDUCER HOUSING, TRANSDUCER CABLE BUNDLE,  
JACK PISTON ROD, SERVO VALVES.

### E. Install

- (1) Position and install rear section of jack (11) with RH and LH pivot supports (14) and (17) on beam attachment fittings.

**NOTE :** During installation, lubricate bearing housings (14) and (17) with Product No.51.

- (2) Attach jack (11) to beam attachment fittings using screws (15) and (16).  
Torque to between 125 and 140 lbf.in. (1.412 and 1.581 m.daN). Safety with lockwire as per 20-21-13.
- (3) Connect hydraulic supply lines (12) and (13) to jack hydraulic supply block. Jack must be left free to move in order to avoid imposing force (due to tightening) on transducer.
- (4) Install eye-end fitting on rocker arm ; attach with bolt (10), washer (21), nut (19).  
Torque to between 140 and 155 lbf.in. (1.581 and 1.751 m.daN). Safety with cotter pin (20).
- (5) Position spring rod, momentarily attach front end.
- (6) Position and install spring rod bracket (7) with electrical connector mounting (4).
  - (a) Install bolts (3), washers (2), nuts (1).  
Safety with cotter pin.
  - (b) Install screw (5) with washer (6). Safety with lockwire as per 20-21-13.
- (7) Finally install spring rod.  
(Ref. 27-32-12, Removal/Installation).
- (8) Connect electrical connectors (18).
- (9) Remove warning notices.
- (10) Remove safety clips and tags and set the following

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## MAINTENANCE MANUAL

circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PITCH ART FEEL COMP 1 SUP	13-216	1C 244	E 4
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

- (11) Set Flight Controls in mechanical mode.  
(Ref. 27-00-00, Servicing).
- (12) Remove items of equipment E925019012 and E925019010.
- (13) Remove rigging pin D925252003 from resolvers.
- (14) Shut down pressurization of hydraulic systems  
(Ref. 27-00-00, Servicing, Procedure to set Flight  
Controls in mechanical mode).

### F. Test

- (1) Carry out an operational test (Ref. 27-34-11,  
Adjustment/Test).
- (2) Before closing access doors and panels, carry out a  
double inspection of work performed and area affected  
as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Clean artificial feel jack and adjacent area, making  
certain that no trace of hydraulic fluid remains.
- (2) Make certain that working area is clean and clear of  
tools and miscellaneous items of equipment.
- (3) Close access doors and panels 151DB, 153BB, 121FB,  
121GB and 214BZ and floor panel 213AF.
- (4) Remove access platforms.

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## MAINTENANCE MANUAL

### ARTIFICIAL FEEL JACK - BLUE SYSTEM - ADJUSTMENT/TEST

R \*\*ON A/C 001-006,

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

R \*\*ON A/C 007-007,

WARNING : MAKE CERTAIN THAT THE POSITION OF NOSE AND MAIN GEAR DOORS CORRESPONDS WITH THE ACTUAL POSITION OF THE OPERATING HANDLE LOCATED ON LH MAIN GEAR LEG.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

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## MAINTENANCE MANUAL

### 1. General

The purpose of the following test is to check the operation of the artificial feel jack electrovalve (Blue system) on the pitch axis.

### 2. Test

#### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Electrical Ground Power Unit	
------------------------------	--

Circuit Breaker Safety Clips	
------------------------------	--

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Aircraft must be on the ground ; shock absorbers compressed.
- (3) On ADC control panel (centre console) check that ADC1 and ADC2 switches are in OFF position and ADC1 and ADC2 TEST selector switches are in NORM position.
- (4) Trip, safety and tag the following circuit breaker :

---

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
STICK SHAKER SUP	1-213	W 513	P15

---

- (5) Check that the following circuit breakers are set :

---

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ADC 1 28 V SUP	1-213	1F 74	P12
ADC 1 26 V SUP	2-213	1F 78	A 2
1ST PLT ADC INST SUP		1F 75	B 3
PITCH ART FEEL COMP 1 SUP		1C 244	E 4
ADC 1 115 V SUP		1F 73	F 3

---

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## MAINTENANCE MANUAL

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RH UC WEIGHT SW B SYS SUP	3-213	G 294	B 9
(6) Remove safety clips and tags and set the following circuit breakers :			

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT & NAV BUS 14XS	2-213	X 355	H 2
NAV INST BUS 13XS	13-216	X 345	G 4
(7) Carry out prepare paragraph operations detailed in procedure to set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).			
<u>NOTE</u> : During the following test do not take into account aural and visual warnings which are not mentioned.			

### C. Test

- (1) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (2) Set pitch trim wheel (centre console) to between 0 and 1° nose down.
- (3) At centre console, on ADC control panel.
  - (a) Place ADC1 switch in ON position.
  - (b) Place ADC1 TEST selector switch in position 1.
    - (b1) Amber ADC1 warning light must illuminate.
    - (b2) After approximately 30 seconds, ADC1 blue TEST indicator light must illuminate.
  - (c) Press and release ADC1 warning light : this light must go off.
- (4) Operate control column in nose up and nose down direc-

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

tions, from stop to stop, and note load required to carry out this operation.

- (5) At overhead panel, on ARTIFICIAL FEEL No.1 engage switch unit, engage PITCH switch :  
this switch must remain engaged.

- R (6) Operate control column in nose up and nose down directions, from stop to stop, and check that load applied is greater than that exerted in (4) above.

- R (7) Place control column midway between neutral and full  
R nose down position (or full nose up position) and hold  
R in this position;

(a) Hold PITCH switch engaged.

(b) Press and hold ARTIFICIAL FEEL TEST 1 push-button (at Flight Engineer's station, panel 29-214). As soon as TEST push-button is pressed, pulsations (approximately 20Hz frequency) must be felt at control column. Duration of pulsation test must not exceed 3 seconds to avoid unnecessary stress on linkage.

- (8) Release PITCH switch while holding TEST 1 push-button pressed.  
PITCH switch must disengage and indicate OFF.

- (9) At Flight Engineer's panel 29-214, release ARTIFICIAL FEEL TEST 1 push-button.

### D. Close-Up

- (1) At centre console, on ADC control panel :

(a) Place ADC 1 TEST selector switch in NORM position.

(b) Place ADC 1 switch in OFF position.

- (2) Carry out Close-Up operations detailed in Procedure to set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).

- (3) Remove safety clip and tag and reset circuit breaker W 513.

- (4) Trip, safety and tag the following circuit breakers :

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## MAINTENANCE MANUAL

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT & NAV BUS 14XS	2-213	X 355	H 2
NAV INST BUS 13XS	13-216	X 345	G 4

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## MAINTENANCE MANUAL

### ARTIFICIAL FEEL JACK (GREEN, PITCH) - SERVICING

**WARNING:** MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

This procedure is to render an artificial feel jack inoperable following an electro-valve failure, servo valve failure or for other operational reasons.

#### 2. De-activation of Artificial Feel Jack (Green)

##### A. Equipment and Materials

	DESCRIPTION	PART NO.
	Blanking Plug	C27-133
RB	Blanking Plugs	AN 929-4S
RB	Blanking Plugs	AN 929-5S
	Circuit Breaker Safety Clips	B24715
	Lockwire Dia. 1 mm (0.041 in.)	
	Corrosion Resistant Steel	-
	Warning Notices	-

##### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.

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## MAINTENANCE MANUAL

- (2) Trip, safety and tag the following circuit breakers:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
PITCH ART FEEL COMP 2 SUP	13-216	2C244	G18
HYD TANK COMPR CONT	15-215	M602	D8
HYD TANK AIR COMPR SUP	13-215	M601	G7
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M626	F22

- (3) Open access doors 151DB, and 153BB beneath the fuselage and depressurize the Green, Blue and Yellow hydraulic systems. Depressurize the Green hydraulic tank. Close and safety tank depressurization valve with lockpin.

WARNING: DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS USED, DISPLAY A WARNING NOTICE ON THIS UNIT, PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (4) Remove access panels 121FB and 121DB.

### C. Procedure A. (Ref. Fig. 001)

CAUTION: ENSURE THAT THE ARTIFICIAL FEEL JACK TO BE DE-ACTIVATED IS AGAINST MECHANICAL STOP.

NOTE: An alternative method for de-activation of artificial feel jack is shown in Procedure B.

- (1) Cut and remove wire locking. Disconnect artificial feel jack pressure pipe at hydraulic system manifold 5105.
- (2) Fit blanking plug C27-133 (located in the Flight Kit) to manifold. Connect the pressure pipe to blanking plug C27-133 and safety with lockwire.

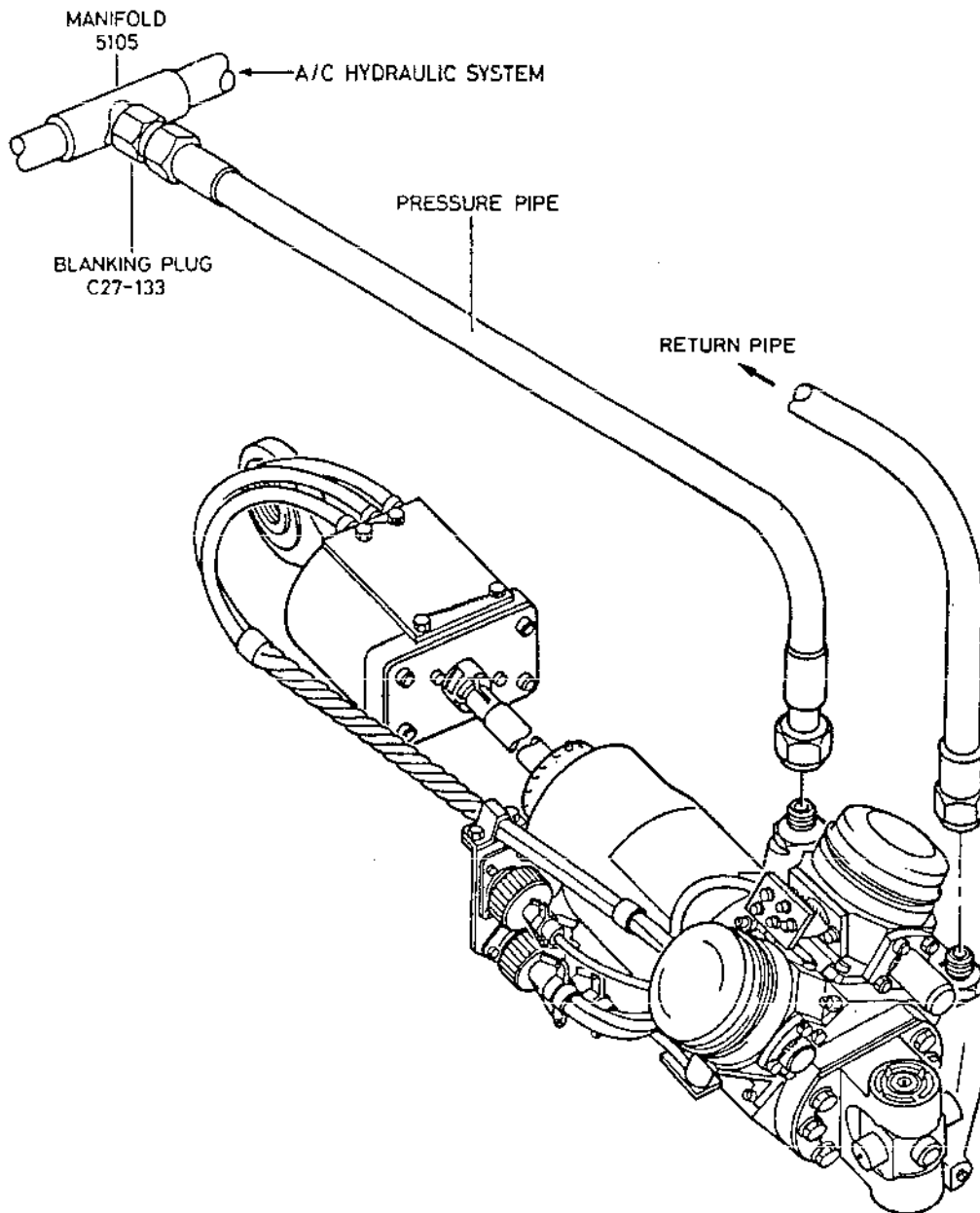
EFFECTIVITY: ALL

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## MAINTENANCE MANUAL



De-activation of Artificial  
Feel Jack  
Fig. 001

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

Procedure B. (Ref. Fig. 001)

CAUTION: ENSURE THAT THE ARTIFICIAL FEEL JACK TO BE  
DE-ACTIVATED IS AGAINST MECHANICAL STOP.

- (1) Cut and remove wire locking. Disconnect pressure and return pipes from artificial feel jack and hydraulic system manifolds 5105 and 5106 respectively. Retain the hydraulic pipes removed.

RB

- (2) Fit blanking plugs AN 929-4S to artificial feel jack pressure port and manifold 5105. Fit blanking plugs AN 929-5S to artificial feel jack return port and manifold 5106. Wirelock all blanks.

RB

### D. Test

- (1) Remove safety clips and tags, reset circuit breakers tripped in para. B.(2).
- (2) Establish interphone communication with ground crew.
- (3) Pressurize Green hydraulic tank (Ref. 29-00-00, Servicing).
- (4) Set flight controls in mechanical mode (Ref. 27-00-00, Servicing).
- (5) At centre console, on ADC control panel:
  - (a) Place ADC2 switch in ON position.
  - (b) After approximately 30 seconds ADC2 blue TEST light is lit.
  - (c) Press and release ADC2 amber warning light:  
- the light must go off.

NOTE: During the test check for leaks around the blanking plug.

- (6) Operate the control column over the full range of movement. Check control surface deflection at the ICOVOL indicator.
- (7) On ADC control panel:
  - (a) Place ADC2 TEST selector switch in position 1.
  - (b) Press and release ADC2 amber warning light:  
- the light must go off.

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- (8) At overhead panel, on ARTIFICIAL FEEL engage switch unit, operate system 2 PITCH channel switch. Check that:
  - (a) The switch does not engage.
  - (b) The gong sounds.
  - (c) The FEEL or PCA light comes on.
- (9) Place ADC2 TEST selector switch in NORM position.
- (10) On ADC control panel place ADC2 switch in OFF position.

### E. Close-up

- (1) Carry out close-up operations detailed in procedure to set flight controls in mechanical mode (Ref. 27-00-00, Servicing).
- (2) Discontinue interphone communication with ground crew.
- (3) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.
- (4) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (5) Remove warning notices.
- (6) Close access doors and panels 151DB, 153BB, 121FB, and 121DB.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### ARTIFICIAL FEEL JACK - GREEN SYSTEM - REMOVAL/INSTALLATION

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The Green artificial feel jack applies a force to the mechanical control which is a function of the flight conditions.

#### 2. Artificial Feel Jack - Green System

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Zero Rigging Device - Relay Chassis	E925019000
Rigging Pins - Synchro Pack	D925252000
Lockwire Dia. 1 mm (0.041 in.) Corrosion-Resistant Steel	
General Lubricant (Ref. 20-30-00, No.51)	
Access Platform 3.672 m (12 ft.)	
Circuit Breaker Safety Clips	

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

DESCRIPTION

PART NO.

Blanking Caps for Hydraulic Lines

B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
---------	-------	--------------------	-------------

PITCH ART FEEL COMP 2 SUP	13-216	2C 244	G18
---------------------------	--------	--------	-----

- (3) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (4) Make certain that trim controls are set to zero.
- (5) Remove access panels 121DB and 121FB, immobilize pitch resolvers with rigging pin D925252003.
- (6) Remove access panel 121GB, install equipment E925019010 and immobilize pitch mechanical control with equipment E925019012.
- (7) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in mechanical mode).

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (8) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

- (9) Open access doors 151DB, and 153BB, depressurize Blue, Green and Yellow hydraulic systems. Depressurize Green tank, close and safety depressurization valve with lock pin.
- (10) Remove rods between Artificial feel levers and synchro pack of Pitch mechanical control. Do not change length of these rods.

NOTE : For installing or removing attachment bolts it is necessary to press plunger on head of bolt in order to free the locking system balls.

### C. Remove.

- (1) Disconnect electrical connectors (11) on mounting (18)
- (2) Remove electrical connector mounting (18)
- (a) Remove cotter pins, unscrew nuts (15), remove washers (16) and bolts (17).
- (b) Remove cotter pins (20) and tube (19)
- (c) Remove mounting (18)
- (3) Remove cotter pin (1), unscrew nut (2)
- (4) Remove washer (3), and bolt (4)
- (5) Disconnect hydraulic lines (9) (10) and cap their ends
- (6) Unsafety and unscrew bolts (6) attaching LH pivot support (5)
- (7) Support jack, unsafety and unscrew bolts (7) attaching RH pivot support (8)
- (8) Remove artificial feel jack (12).
- (9) Remove RH and LH pivot supports (8) and (5).

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### D. Preparation of Replacement Component.

WARNING : HOLD JACK BY BODY : CAREFULLY AVOID TO DAMAGE EYE  
END FITTING OR TRANSDUCER HOUSING.

DO NOT HOLD JACK BY : EYE END FITTING, FORCE  
TRANSDUCER HOUSING, TRANSDUCER CABLE BUNDLE, JACK  
PISTON ROD, SERVO VALVES.

### E. Install

- (1) Position and install rear section of jack with RH and LH pivot supports (8) and (5) on beam attachment fittings.

NOTE : During installation, lubricate bearing housings of pivots (5) and (8) with product No.51.

- (2) Attach jack (12) to beam attachment fittings using bolts (7) and (6), Torque to between 125 and 140 lbf. in (1.412 and 1.581 m.daN.) Safety with lockwire as per 20-21-13.
- (3) Connect hydraulic lines (9) and (10) to hydraulic supply block. Jack must be left free to move in order to avoid imposing force (due to tightening) on transducer.
- (4) Install eye end fitting on rocker arm ; attach with bolt (4), washer (3), nut (2). Torque to between 140 and 155 lbf. in. (1.581 and 1.751 m.daN.) Safety with cotter pin.
- (5) Install electrical connector mounting (18) on chassis.
  - (a) Install tube (19) attach with cotter pins (20)
  - (b) Install bolts (17) washers (16), nuts (15). Torque to between 12 and 15 lbf. in. (0.135 and 0.169 m.daN).
- (6) Connect electrical connectors (11).
- (7) Install rods between artificial feel levers and synchro packs.  
Bolt, special washer, flat washer, nut.  
Torque to between 27 and 32 lbf. in (0.30 and 0.35 m.daN). Safety with cotter pins.
- (8) Remove warning notices.
- (9) Remove safety clips and tags and set the following

EFFECTIVITY: ALL

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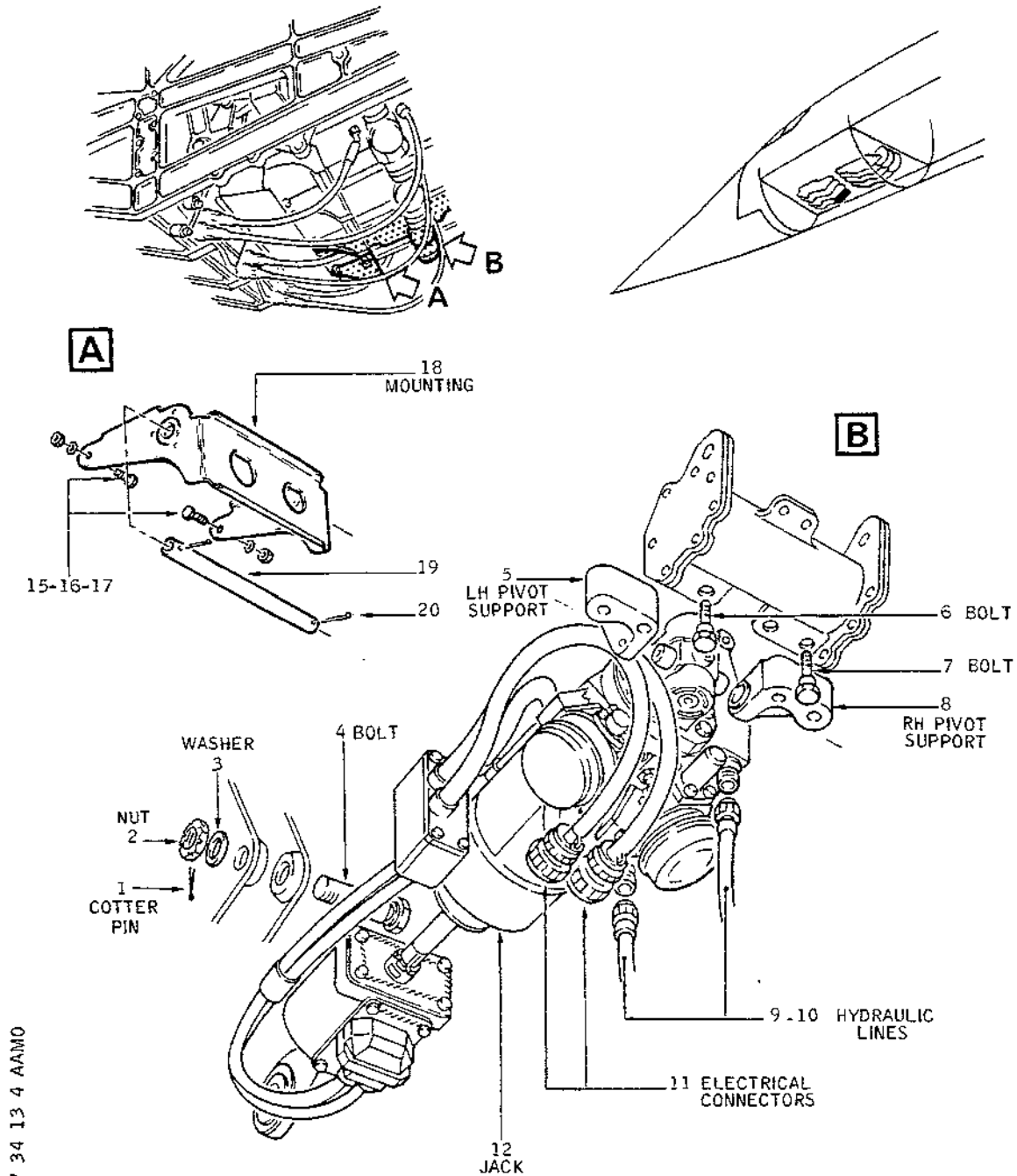
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Green Artificial Feel Jack  
Figure 401

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EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PITCH ART FEEL COMP 2 SUP	13-216	2C 244	G18
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22
(10) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).			
(11) Remove items of equipment E925019012 and E925019010.			
(12) Remove rigging pin D925252003 from resolvers.			
(13) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).			

### F. Test

- (1) Carry out an operational test (Ref. 27-34-13,  
Adjustment/Test).
- (2) Before closing access doors and panels, carry out a  
double inspection of work performed and area affected  
as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Clean artificial feel jack and adjacent area, making  
certain that no trace of hydraulic fluid remains.
- (2) Make certain that working area is clean and clear of  
tools and miscellaneous items of equipment.
- (3) Close access doors and panels 121DB, 121GB, 151DB and  
153BB.
- (4) Remove access platforms.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### ARTIFICIAL FEEL JACK - GREEN SYSTEM - ADJUSTMENT/TEST

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The purpose of the following test is to check the operation of the artificial feel jack electrovalve (Green system) on the pitch axis.

#### 2. Test

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Circuit Breaker Safety Clips	

##### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Aircraft must be on the ground ; shock absorbers compressed.

EFFECTIVITY: ALL

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(3) On ADC control panel (centre console) check that ADC1 and ADC2 switches are in OFF position and ADC1 and ADC2 TEST selector switches are in NORM position.

(4) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
STICK SHAKER SUP	1-213	W 513	P15

(5) Check that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW A SYS SUP	1-213	G 292	M17
ADC 2 28 V SUP	5-213	2F 74	F12
2ND PLT ADC INST SUP	13-216	2F 75	A14
ADC 2 26 V SUP		2F 78	F14
ADC 2 115 V SUP		2F 73	F15
PITCH ART FEEL COMP 2 SUP		2C 244	G18

(6) Remove safety clips and tags and set the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT & NAV BUS 14XS	2-213	K 355	H 2
NAV INST BUS 3XS	13-216	X 345	G 4

(7) Carry out Prepare paragraph operations detailed in Procedure to set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).

NOTE : During the following test, do not take into account visual and aural warnings which are not mentioned.

C. Test

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## MAINTENANCE MANUAL

- (1) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (2) Set pitch trim wheel (centre console) to between 0 and 1° nose down.
- (3) At centre console, on ADC control panel.
  - (a) Place ADC2 switch in ON position.
  - (b) Place ADC2 TEST selector switch in position 1.
    - (b1) Amber ADC2 warning light must illuminate.
    - (b2) After approximately 30 seconds, ADC2 blue TEST indicator light must illuminate.
  - (c) Press and release ADC2 warning light ; this light must go off.
- (4) Operate control column in nose up and nose down directions, from stop to stop, and note load required to carry out this operation.
- (5) At overhead panel, on ARTIFICIAL FEEL No.2 engage switch unit, engage PITCH switch : this switch must remain engaged.
- (6) Operate control column in nose up and nose down directions, from stop to stop, and check that load applied is greater than that exerted in (4) above.
- (7) Place control column midway between neutral and full nose up position (or full nose down position), and hold in this position.
  - (a) Hold PITCH switch engaged.
  - (b) Press and hold ARTIFICIAL FEEL TEST 2 push-button (at Flight Engineer's station, panel 29-214). As soon as TEST push-button is pressed, pulsations (approximately 20 Hz frequency) must be felt at control column.  
Duration of pulsation test must not exceed 3 seconds to avoid unnecessary stress on linkage.
- (8) Release PITCH switch, while holding TEST 2 push-button pressed.  
PITCH switch must disengage and indicate OFF.
- (9) At Flight Engineer's panel 29-214, release ARTIFICIAL

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## MAINTENANCE MANUAL

FEEL TEST 2 push-button.

### D. Close-Up

- (1) At centre console, on ADC control panel :
  - (a) Place ADC 2 TEST selector switch in NORM position.
  - (b) Place ADC 2 switch in OFF position.
- (2) Carry out Close-Up operations detailed in Procedure to set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (3) Remove safety clip and tag and reset circuit breaker W513.
- (4) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT & NAV BUS 14XS	2-213	X 355	H 2
NAV INST BUS BXS	13-216	X 345	G 4

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**END OF THIS  
SECTION**

**NEXT**



# *Concorde*

## MAINTENANCE MANUAL

### RELAY JACK - REMOVAL/INSTALLATION

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The relay jack is mounted on a chassis located between frames 5 and 7. Access is obtained through panel 121FB. Its purpose is to transmit flight control orders :

- In autopilot mode, to mechanical linkage and to the electrical control resolvers.
- In manual flight to the mechanical linkage.

#### 2. Relay Jack Removal

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Zero Rigging Device - Relay Chassis	E925019000
Rigging Pins - Synchro Pack	D925252000
Access Platform 3.672 m (12 ft.)	
Circuit Breaker Safety Clips	
Lockwire Dia. 0.032 in. (0.8 mm)	

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## MAINTENANCE MANUAL

DESCRIPTION

PART NO.

Corrosion Resistant Steel

### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RELAY JACK HYD SEL IND & SUP	1-213	C 281	N17
AP/FD SYS 1 SUP	2-213	1C 20	C 5
AP/FD SYS1 CONT	5-213	2C 17	A11
AP/FD COMP1 SUP	13-215	1C 18	A 5
AP/FD SYS2 SUP	13-216	2C 20	A17
AP/FD COMP2 SUP		2C 18	F18

**WARNING :** DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (3) Remove panels 121FB and 121GB.
- (4) Turn pitch trim control to full nose down position. Make small displacements of control column in nose down direction to disconnect jam detection strut on load limiting mechanism side.

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## MAINTENANCE MANUAL

- (5) Open doors 151DB, depressurize Green, Blue and Yellow hydraulic systems.
- (6) Open door 153BB depressurize Green Blue and Yellow hydraulic tanks.
- (7) Close the Green, Blue and Yellow hydraulic tank depressurization valves and safety with lockpin.
- (8) Open floor panel 213DF.

C. Remove  
(Ref. Fig. 401 )

NOTE : To remove or install attachment bolts it is necessary to press the plunger located on head of bolt in order to free the locking balls.

- (1) On relay chassis, remove mounting base of equipment E925019000.
- (2) Remove AP force limiter (1) (Ref. 27-31-17, Removal/Installation).
- (3) Disconnect bonding strips from relay jack.
- (4) Disconnect hydraulic lines from the relay jack as follows :
  - (a) Maintain adapter screwed in Relay jack using appropriate wrench.
  - (b) Unscrew hydraulic line union nut and disconnect the line.
  - (c) Cap open line ends.

WARNING : WHEN A HOSE WITH A BEND RADIUS IS REMOVED FROM AN INSTALLATION, CARE SHALL BE TAKEN NOT TO STRAIGHTEN THE HOSE FROM ITS ACQUIRED SHAPE.  
IF REQUIRED FOR RE-INSTALLATION IT SHALL BE FITTED AS NEAR AS POSSIBLE TO THIS SHAPE WITHOUT ANY UNDUE FORMING.

- (5) Disconnect electrical connectors from the relay jack.
- (6) Remove pin and loosen nut (3), remove washers (4 and 5), attaching bolt of the link rod (2).
- (7) Remove screws (12), retain washers, lift up attach

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## MAINTENANCE MANUAL

bracket (13).

- (8) Remove and loosen nut (15) on aft attachment point of relay jack. Remove washers (16 and 17).
- (9) Remove pin and loosen nut (10) on forward attachment point ; remove washers (8 and 9).
- (10) Support relay jack, disengage the special bolts (7) and (18) from the attachment points.
- (11) Pivot and disengage relay jack from its mounting.

WARNING : HANDLE RELAY JACK WITH CARE AND BY ITS ATTACHMENT POINTS ONLY.

WEIGHT = 18.1 Kg (40 lb.).

### D. Preparation of Replacement Component

- (1) Measure distance between the two attachment points of the removed relay jack.
- (2) Adjust the new relay jack at the same length as the removed relay jack, by pulling or pushing piston.

### E. Install

- (1) Lift up attach bracket (13), carefully position relay jack.
- (2) Insert bolts (7 and 18), install washers (8 and 9).
  - (a) Tighten nut (10).  
Torque to between 45 and 50 lbf.in. (0.50 and 0.55 m.daN). Safety with cotter.
  - (b) Install washers (16 and 17), tighten nut (15), and safety with cotter.
- (3) Lower attach bracket (13), install washers (11), tighten screws (12).  
Torque to between 75 and 85 lbf.in. (0.85 and 0.96 m.daN). Wirelock (Ref. 20-21-13).
- (4) Connect link rod (2) install bolt (6), washers (4) and (5), tighten nut (3).  
Torque to between 12 and 15 lbf.in. (0.13 and 0.16 m.daN).  
Safety with cotter.

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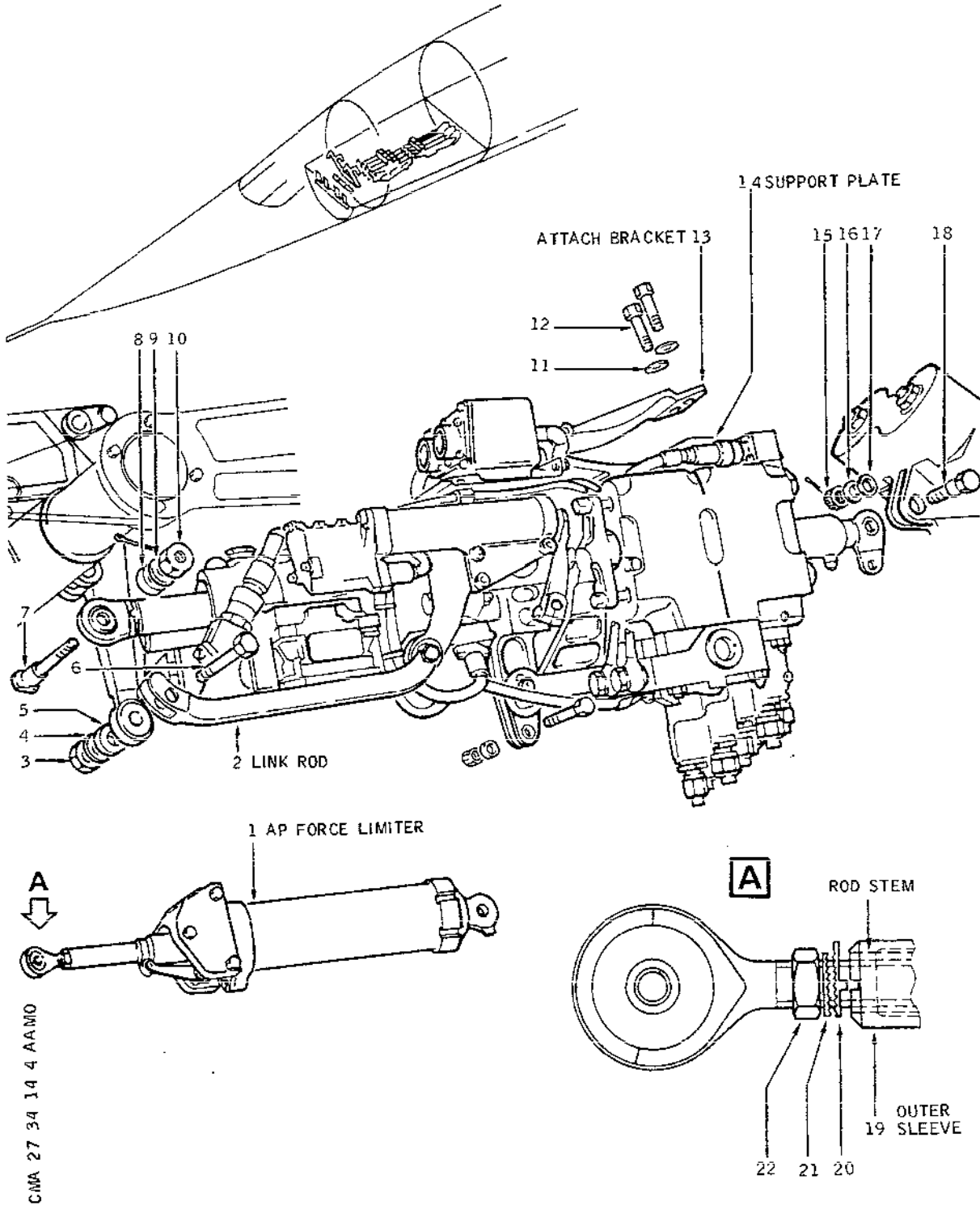
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Relay Jack  
Figure 401

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## MAINTENANCE MANUAL

(5) Connect hydraulic lines to relay jack as follows :

(a) Maintain adapters screwed in relay jack using appropriate wrench.

(b) Torque hydraulic line union nuts to the following values :

Blue pressure : 1.51 to 1.63 m.daN (11.1372 to 12.0223 lbf.ft.)

Blue return : 1.92 to 2.15 m.daN (14.1612 to 15.8576 lbf.ft.)

Green pressure : 1.51 to 1.63 m.daN (11.1372 to 12.0223 lbf.ft.)

Green return : 1.92 to 2.15 m.daN (14.1612 to 15.8576 lbf.ft.)

Yell/Green pressure : 2.43 to 2.76 m.daN (17.9228 to 20.3567 lbf.ft.)

Yellow return : 2.43 to 2.76 m.daN (17.9228 to 20.3567 lbf.ft.)

Yell/Blue pressure : 2.43 to 2.76 m.daN (17.9228 to 20.3567 lbf.ft.)

RB  
RB  
RB

(6) Connect electrical connectors. Connect bonding strips to relay jack and carry out bonding check-resistance to be not greater than 50 milli-ohms.

(7) Install AP force limiter (Ref. 27-31-17, Removal/Installation).

(8) On relay chassis, install mounting base of equipment E925019000.

(9) Remove warning notices.

(10) Connect jam detection strut to load limiting mechanism :

To do this, make small displacements of control column in nose down direction.

Torque to between 45 and 50 lbf.in. (0.50 and 0.55 m.daN). Install cotter pin.

(11) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).

(12) Set trim controls to zero and immobilize pitch resolvers with rigging pin D925252003.

(13) Install equipment E925019010.

Place equipment E925019012 on equipment E925019010 and on jam detection strut by means of pins E925019105. Make certain that pins can be inserted easily.

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If not, adjust length of AP force limiter as follows :

- (a) Cut and remove lockwire, loosen nut (22), disengage washers (21) (20).
  - (b) Manually turn stem of rod (19) to lengthen or shorten AP force limiter, until pin E925019105 can be inserted or removed easily.
  - (c) Engage lock washer (20), tab in groove on front face of rod (19) stem.
  - (d) Engage the second lock washer (21).
  - (e) Tighten nut (22).  
Torque to between 170 and 180 lbf.in. (1.8 and 2 m.daN). Wirelock.
- (14) Remove items of equipment E925019012, E925019010 and pin D925252003 from synchro pack.
- (15) Shut down pressurization of hydraulic system (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
- (16) Check adjustment of relay jack sensor (Ref. 22-12-61, Adjustment/Test).

### F. Tests

- (1) Carry out an operational test (Ref. 27-31-00, Adjustment/Test) and visually check for free operation of the relay jack throughout full travel.  
Make certain that clearance between the relay jack body and chassis beams is within the following limits :

Nominal clearance : 3 mm (0.1181 in.)

Minimum clearance : 1 mm (0.394 in.)

Check assembly for absence of leaks.

- (2) Carry out a test in AP ; NOSE UP, NOSE DOWN switch on AFCS DATUM ADJUST UNIT (Ref. 22-12-00, Adjustment/Test).
- (3) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

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- (1) Clean adjacent area and make certain that no trace of hydraulic fluid remains.
- (2) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (3) Close access doors and panels 121FB, 121GB, 153BB and 151DB and floor panel 213DF.
- (4) Remove safety clips and tags and reset the following circuit breakers

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RELAY JACK HYD SEL IND & SUP	1-213	C 281	N17
AP/FD SYS 1 SUP	2-213	1C 20	C 5
AP/FD SYS 1 CONT	5-213	2C 17	A11
AP/FD COMP 1 SUP	13-215	1C 18	A 5
AP/FD SYS 2 SUP	13-216	2C 20	A17
AP/FD COMP 2 SUP		2C 18	F18

- (5) Remove access platforms.

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# Concorde

## MAINTENANCE MANUAL

### 3. Green or Blue Electrovalve Removal

NOTE : Only the Green electrovalve can be removed "in situ" ;  
due to difficulty of access the Blue electrovalve removal  
cannot be performed.

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 3.672 m (12 ft.)	
Lockwire Dia. 0.5 mm (0.020 in.)	
Corrosion Resistant Steel	
Warning Notices	

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Open door 151DB, depressurize Green, Blue and Yellow hydraulic systems (Ref. 29-11-00, 29-12-00 and 29-21-00, Servicing).
- (3) Open door 153BB, depressurize Green, Blue and Yellow hydraulic tanks (Ref. 29-13-00, Servicing).
- (4) On centre glareshield, on AFCS control unit, make certain that AP1 and AP2 switches are not engaged.
- (5) Remove access panels 121FB, 121GB.

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3  
PROHIBITING PRESSURIZATION OF BLUE, GREEN AND  
YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND  
POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S  
STATION PROHIBITING USE OF GROUND PRESSU-  
RIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED  
DISPLAY A WARNING NOTICE ON THIS UNIT PROHI-  
BITING PRESSURIZATION OF THE AIRCRAFT HYDRAU-  
LIC SYSTEMS.

#### C. Remove (Ref. Fig. 402 )

- (1) Disconnect electrical connector

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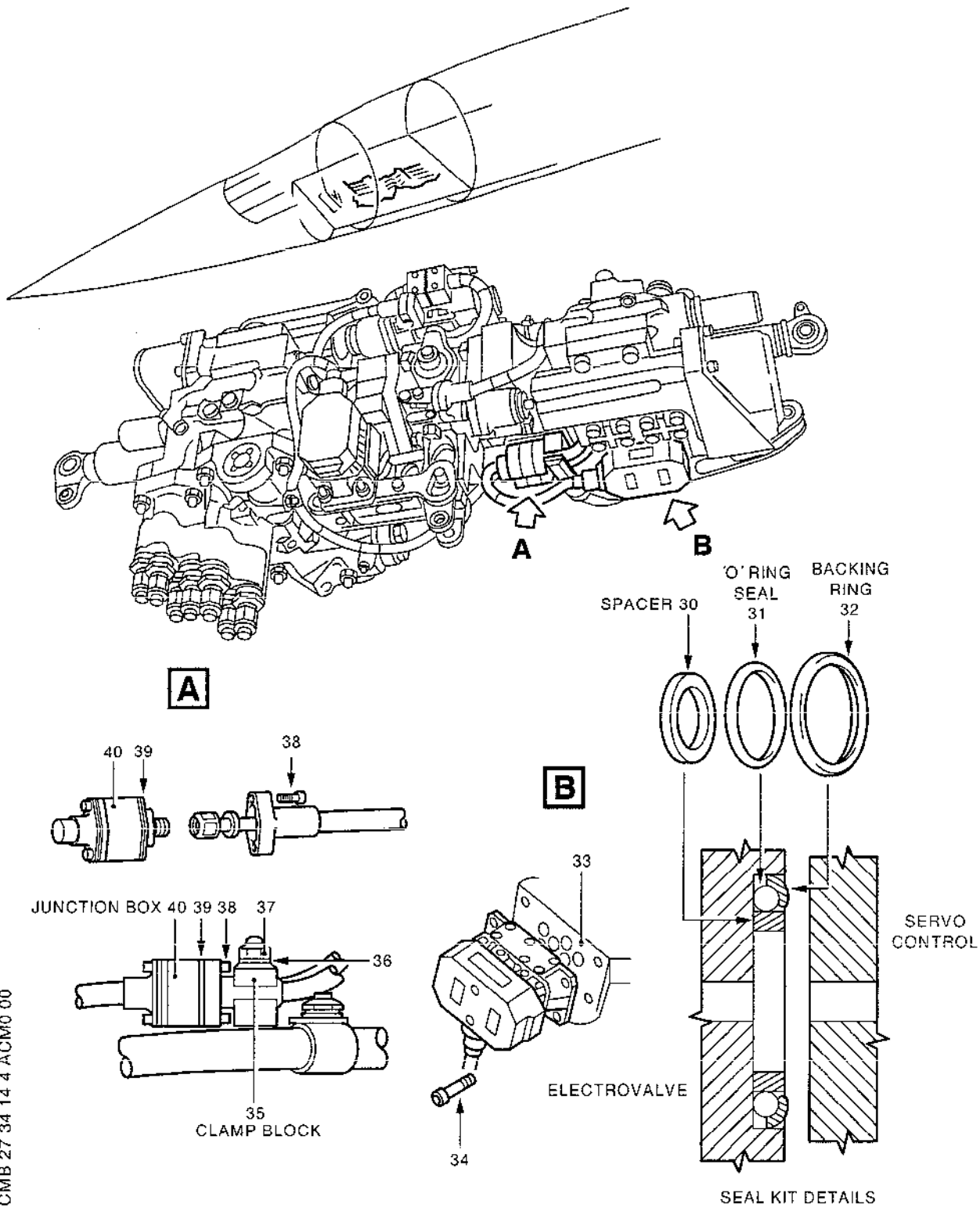
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Electrovalve  
Figure 402

EFFECTIVITY: ALL

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- (a) Remove straps and clamps attaching electrical leads.
  - (b) Remove clamp block (35) securing junction box (40), nut (37), washer (36).
  - (c) Remove lockwire and screws (38), separate the two sections of the junction box (40), then disconnect plug connector. Discard gasket (39).
- (2) Cut and remove lockwire, remove screws (34) then electrovalve with seal kit (33) or coaxial seals.

CAUTION: TAKE ALL NECESSARY PRECAUTIONS TO AVOID CONTAMINATION OF HYDRAULIC FLUID.

### D. Preparation of Replacement Component

- RB (1) If fitted, the transit protective plate is to be  
RB removed from the electrovalve seal face.
- RB (2) Check that the four replacement seal kits are  
RB correctly installed. Before fitting the seal  
RB assemblies into the electrovalve counterbore, a trial  
RB installation of the copper backing rings should be  
RB accomplished. If they do not fit into the counterbore  
RB the copper backing rings should be lightly dressed  
RB using a fine file until they do.
- RB (3) The order of assembly is O ring (31) first, then  
RB copper backing ring (32) with the concave surface  
RB facing the seal and finally the alloy spacer (30).  
RB Under pressure the O ring would distort, the light  
RB alloy spacer retains it concentrically in the  
RB counterbore and ensures seal loading is face to face,  
RB the copper backing ring precludes feathering of the O  
RB ring during its service life.

### E. Install

- R (1) Position electrovalve and secure with screws (34).  
R

CAUTION: WHEN POSITIONING ELECTROVALVE, TAKE CARE THAT SEALS ARE NOT DISTURBED FROM COUNTERBORES.

Torque screws to between 20 and 22 lbf in (0.23 and 0.25 mdaN).

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Safety screws in pairs with lockwire (Ref. 20-21-13).

- R
- (2) Connect electrical connector.
    - (a) Install a new gasket (39).
    - (b) Connect the two halves of connector then the two sections of junction box.  
Secure the two sections of junction box with screws (38). Safety screws with lockwire (Ref. 20-21-13).
    - (c) Attach junction box with clamp block (35), washer (36), nut (37).
    - (d) Tighten electrical lead clamps and replace straps.
  - (3) Pressurize Green, Blue and Yellow hydraulic tanks (Ref. 29-13-00, Servicing).

### F. Tests

- (1) Proceed with an Operational Test (Ref. 27-31-00, Adjustment/Test).
- (2) Carry out a test in AP: NOSE UP, NOSE DOWN switch on AFCS DATUM ADJUST UNIT (Ref. 22-12-00, Adjustment/Test).
- (3) Upon completion of tests, carefully check electrovalve for external leaks.
- (4) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access doors and panels.
- (3) Remove warning notices and access platform.

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## MAINTENANCE MANUAL

### RELAY JACK - ADJUSTMENT/TEST

#### 1. Functional Test of Jamming microswitches

##### A. Equipment and Materials

R

DESCRIPTION

PART NO.

TOOL - jamming detector

CT1 P 28945002

Ground Service Telephone

##### B. Prepare

- (1) This test is carried out without hydraulic pressure. Depressurize Blue, Green and Yellow hydraulic systems (Ref. 29-12-00, Servicing ; 29-11-00, Servicing ; 29-21-00, Servicing).
- (2) To gain access to jamming microswitch, Green side, open access door 121FB.
- (3) To gain access to jamming microswitch, Blue side, open floor panel 213DF.
- (4) On overhead panel :
  - (a) On Flight Control Unit, make certain that BLUE INVERTER and GREEN INVERTER switches are in PWR OFF position and that O & M ELEVONS, IN ELEVONS and RUDDER switches are in MECH position.
  - (b) On SERVO CONTROLS unit, make certain that both switches are in NORMAL position.
  - (c) On RELAY JACK unit, make certain that control switch is in NORM position.
- (5) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
AUDIO WARN SYS SUP 1	1-213	W 371	M21
RELAY JACK HYD SEL IND & SUP		C 281	N17

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
MWS SUP 1		W 252	N21
AUDIO WARN SYS SUP 2	5-213	W 372	C17
MWS SUP 2		W 251	D15
ROOF PNL LT TEST SUP	15-216	L1002	D13
(6) At centre section of glare shield, on AFCS control unit, make certain that AP1 and AP2 switches are not in engaged position.			
(7) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).			
- Gong must sound			
- On overhead panel, PFC warning light must illuminate on master warning panel			
<u>NOTE</u> : Do not take visual or aural warnings that are not mentioned into account.			
(8) Press and release PFC warning light ;			
- it must go off.			
(9) On RELAY JACK unit, press and release BLUE JAM-TEST push button			
- Gong must sound			
- On RELAY JACK unit, BLUE JAM caption light must illuminate then go off.			
- On overhead panel, on master warning panel, PFC warning light must illuminate.			
(10) Press and release PFC warning light ;			
- it must go off.			
(11) On RELAY JACK unit, press and release GREEN JAM-TEST push button.			
- Gong must sound			
- On RELAY JACK unit, GREEN JAM caption light must illuminate then go off.			
- On overhead panel, on master warning panel, PFC warning light must illuminate			
(12) Press and release PFC warning light ;			
- It must go off.			

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### R C. Test

- (1) For carrying out jamming test of the Blue spool valve, install jamming detector tool on spring box of Relay jack C6. Access to the latter is gained in Flight Compartment.
- (2) Fully compress handles of tool, and maintain in this position.
  - Gong must sound.
  - On overhead panel, on RELAY JACK unit BLUE JAM caption light must illuminate.
  - On master warning panel, PFC warning light must illuminate.
- (3) On RELAY JACK unit, place control switch in GREEN ONLY position
  - BLUE JAM caption light must go off.
- (4) Press and release PFC warning light
  - It must go off.
- (5) On RELAY JACK unit, place control switch in NORM position
  - Same results as in (2) above
- (6) Release handles of tool and remove tool.
  - No change in indications described in (2) above.
- (7) On RELAY JACK unit, place control switch in GREEN ONLY position then in NORM position.
  - BLUE JAM caption light must go off and remain off.
- (8) Press and release PFC warning light
  - It must go off.
- (9) For carrying out test of Green spool valve, install jamming detector tool on spring box of RH Relay jack (C6). Access to the latter is gained in zone 121.
- (10) Repeat steps (2) (3) (4) (5) (6) (7) and (8) placing switch in BLUE ONLY position instead of GREEN ONLY.
  - Results must be identical except that GREEN JAM caption light must illuminate on RELAY JACK unit instead of BLUE JAM caption light.

### D. Close-up

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- (1) De-energize the aircraft electrical network and disconnect electrical ground power unit.
- (2) Install floor panel 213DF.
- (3) Close access door 121FB.

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## MAINTENANCE MANUAL

### RELAY JACK - INSPECTION/CHECK

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The purpose of the procedure described in this topic is to check :

- Relay jacks for external hydraulic leakage
- Relay jacks for internal hydraulic leakage between chambers
- Permissible load on end of input lever to initiate relay jack forward and rearward movement
- General condition of relay jack components and attachments by visual inspection
- Fail safe springbox, on relay jack locking system.

#### 2. Relay jack external hydraulic leakage

##### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Warning Notice

Access Platform 12 ft. (3.67 m)

##### B. Prepare

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- (1) Open access doors 121FB and 121GB.
- (2) Take the precautions described in the previous WARNING paragraph.
- (3) Set Flight Controls in Blue electrical mode.  
(Ref. 27-00-00, Servicing)
- (4) Check that pitch, roll and yaw trim controls are set to zero.

### C. Check

- (1) Check on Flight Engineer's HYDRAULIC MANAGEMENT panel that hydraulic fluid temperature is in 30°C to 70°C range (86°F and 158°F).  
To attain required temperature, operate elevons several times, as required.
- (2) Engage autopilot No.1 (Ref. 22-10-00, Servicing, para.2).
- (3) Place a warning notice in flight compartment prohibiting operation of flight controls.
- (4) Wait 3 minutes for any external leakage to stabilize and proceed to measure it.
- (5) Permissible leakage from the relay jack is 4 drops per minute.
- (6) Disengage AP1 and engage AP2 (Ref. 22-10-00, Servicing, para.4, and measure amount of leakage, as for AP1).

### D. Close-Up

- (1) Disengage AP2 (Ref. 22-10-00, Servicing).
- (2) Shut down pressurization of Blue and Green hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set flight controls in electrical mode).
- (3) Close access doors 121FB and 121GB.
- (4) Remove warning notice.
- (5) Remove access platform.

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### 3. Internal Hydraulic Leakage Between Relay Jack Chambers

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 12 ft. (3.67 m)	
Rigging Pins, Synchro Pack	D925252000
Ground Power Unit, Hydraulic Power and Preliminary Testing (2 units)	EMH39HE
Flowmeters, 1 per Hydraulic System (2 meters)	
These flowmeters must have the following characteristics : Flow rate range 0 to 25 litres/min. 96% precision in flow rate range 0.4 to 1 litre/min.	

#### B. Prepare

- (1) Open access doors 121FB and 121GB.
- (2) Take the precautions described in the previous WARNING paragraph.
- (3) Set flight controls in electrical mode (Ref. 27-00-00, Servicing).

NOTE : Fit flowmeters described in the Equipment and Materials paragraph to ground power unit.

- (4) Check that pitch roll and yaw trim controls are set to zero.

#### C. Check

- (1) Check on Flight Engineer's HYDRAULIC MANAGEMENT panel that hydraulic fluid temperature is within range 30°C to 70°C (86°F and 158°F).  
To attain required temperature operate elevons several times as required.
- (2) Immobilize roll, pitch, and yaw resolvers with rigging pins D925252001, D925252002, D925252003.

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- (3) Disconnect link rod connecting load limiting mechanism to roll cable tension regulator.

NOTE : To remove attachment bolts it is necessary to press plunger located on bolt head in order to release locking balls.

- (4) Wait 2 minutes then note flow rate per minute on flow-meters QB and QG.
- (5) Disconnect A.P. force limiter from pitch relay jack input lever.
- (6) Manually move relay jack input lever slowly towards front of aircraft. With relay jack at stop position, maintain control lever in fully open position.
- (7) Note QB1 and QG1 flow rate.
- (8) The difference in flow rate between QB1 - QB and QG1 - QG must be less than 1 litre per minute.
- (9) Connect AP force limiter to relay jack input lever. Install bolt, washers, nut. Torque to between 0.30 and 0.36 mdaN (27 and 32 lbf. in.). Safety with cotter pin.
- (10) Connect link rod between load limiting mechanism and cable tension regulator. Install bolt, washers, nut. Torque to between 0.50 and 0.55 mdaN (45 and 50 lbf. in.). Safety with cotter pin.
- (11) Remove rigging pins D925252001, D925252002, D925252003, from resolvers.

### D. Close-Up

- (1) Shut down pressurization of Blue and Green hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set flight controls in electrical mode).
- (2) Close access doors 121FB and 121GB.
- (3) Remove access platform.

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### 4. Permissible Load Applied to End of Relay Jack Input Lever

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Spring Scales, 0 to 20N (0 to 4.48 lbf.)	
Access Platform, 12 ft. (3.67 m)	
Rigging Pins - Synchro Pack	D925252000

#### B. Prepare

- (1) Open access door 121FB.
- (2) Take the precautions described in the previous WARNING paragraph.
- (3) Set flight controls in electrical mode (Ref. 27-00-00, Servicing).
- (4) Check that pitch, roll and yaw trim controls are set to zero.

#### C. Force Measurement

- (1) Operate elevons several times.
- (2) Immobilize roll, pitch and yaw resolvers with rigging pins D925252001, D925252002, D925252003.
- (3) Disconnect AP force limiter rod from pitch relay pack input lever.

NOTE : To remove attachment bolts it is necessary to press plunger on bolt head in order to release locking balls.

- (4) Proceed to take measurements, under the following conditions :
  - Hydraulic fluid temperature :  
40°C ± 10°C (104°F ± 18°F)
  - Ambient temperature :  
20°C ± 15°C (68°F ± 27°F)
  - Force applied to end of lever, measured on spring scale :  
Less than 7.7N (1.73 lbf.) - Permissible

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More than 13N (2.92 lbf.) - not permissible  
If the force is equal to or greater than 7.7N  
(1.73 lbf.) and equal to or less than 13N (2.92 lbf.)  
measure force again under the following conditions :  
- Hydraulic fluid temperature :  
     $90^{\circ}\text{C} \pm 5^{\circ}\text{C}$  ( $194^{\circ}\text{F} \pm 9^{\circ}\text{F}$ )  
- Ambient temperature :  
     $20^{\circ}\text{C} \pm 10^{\circ}\text{C}$  ( $56^{\circ}\text{F} \pm 18^{\circ}\text{F}$ )  
- Force at end of lever :  
    Equal to or less than 10N (2.25 lbf.) - permissible  
    Greater than 10N (2.25 lbf.) - not permissible.

- (5) Connect AP force limiter rod to relay jack input lever.  
Install bolt, washers, nut.  
Torque to between 0.30 and 0.36 mdaN (27 and 32 lbf.  
in.).  
Safety with cotter pin.
- (6) Remove rigging pins : D925252001, D925252002,  
D925252003 from resolvers.

### D. Close-Up

- (1) Shut down pressurization of Blue and Green hydraulic  
systems (Ref. 27-00-00, Servicing, Procedure to set  
flight controls in electrical mode).
- (2) Close access door 121FB.
- (3) Remove access platform

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## MAINTENANCE MANUAL

### 5. Visual Check of Relay Jacks

#### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Access Platform 12 ft. (3.67 m)

#### B. Prepare

(1) Remove floor panel 213EF.

(2) Open access doors 121FB and 121GB.

#### C. Check

(1) Relay jack and attachment points.

(a) Apply force to both front and rear ends of jack to make certain that it is in working condition.

(b) Visually inspect and check, by means of an inspection mirror, that the following items bear no trace of breakage, corrosion or cracks :

- Fork end-fitting on structure (front relay jack attachment)
- End-fitting and body (front section of relay jack)
- End-fitting and body (rear section of relay jack)
- Fork end-fitting on load limiting mechanism.

(c) Check by rotating body of jack that it is able to pivot through several degrees.

(d) Check through floor panel that relay jack fail safe bracket is not resting on transverse bar of structure.

(e) Check safetying of :  
Relay jack front and rear attachments (self locking nut present and cotter pin fitted).

(2) Feedback linkage

(a) Visually inspect and check by means of inspection mirror that the following items bear no trace of breakage, corrosion or cracks :

- Front and rear sections of lever linking relay

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- jack sensor to link rod
- Lower and upper part of link rod
- Forward and aft sections of link rod attachment on relay jack.
- (b) Check safetying of :
  - Attachment on relay jack
  - Link rod
  - Lever linked to relay jack sensor.
- (3) Cable looms
  - (a) Make certain that bonding strips are present and secured between :
    - Front section of jack and aircraft structure (accessible through floor panel)
    - Rear section of jack and aircraft structure.
  - (b) Make certain that electrical connectors are correctly locked :
    - Connectors C8A, C8B, H and C.
  - (c) Make certain that cable loom is in correct condition (No trace of rubbing, and correctly secured).
- (4) Control and Locking Lever
  - (a) Check locking lever fork end fitting and make certain that it shows no trace of damage, corrosion or cracks.
  - (b) Check mechanical locking centering pin (nut and cotter pin).
  - (c) Make certain that locking lever shows no trace of cracks or corrosion, and check that nut on central horizontal section of lever is present, and safetied.
- (5) Hydraulic system
  - (a) Check flexible hose and unions for leakage, and for absence of any trace of cuts, breaks, rubbing or distortion.
  - (b) Check exposed surfaces of relay jack piston (for cracks, peening, corrosion).
  - (c) Check hydraulic pipe connections for leakage.

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- (d) Check that safety disc located on side casing of each electrovalve is not out of position or has not been ejected. (The disc is a lighter colour than the electrovalve casing).

### D. Close-Up

- (1) Close floor panel 213EF.
- (2) Close access doors 121FB and 121GB.
- (3) Remove access platform.

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## MAINTENANCE MANUAL

### 6. Check of Relay Jack Locking Mechanism Safety Springbox

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 12 ft. (3.67 m)	
Fail Safe Spring Box	
Checking Tool - Relay Jack	CT3P289450002

#### B. Prepare

- (1) Open access door 121FB.

#### C. Check

- (1) Make certain that relay jacks are in mechanical mode.
- (2) Make certain that fail safe springbox is in correct operating condition, by :  
Positioning tool CT3 P289 45 0002 on lower part of springbox, and exerting and alternately releasing an upward vertical thrust several times. This operation enables the extension and compression of springbox to be checked.

#### D. Close-Up

- (1) Close access door 121FB.
- (2) Remove access platform.

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## MAINTENANCE MANUAL

### RELAY JACK SELECTOR VALVE - REMOVAL/INSTALLATION

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

This topic deals with removal/installation of Green, Blue, Y/G and Y/B relay jack selector valves.

The Y/G, Y/B selector valves are directly installed on a manifold and Green and Blue selector valves are installed on pressure maintaining valves. Removal/Installation procedures being identical, removal/installation of only one selector valve is described.

#### 2. Relay Jack Selector Valve

##### A. Equipment and Materials

---

DESCRIPTION	PART NO.
Hydraulic Fluid Container	
Access Platform 3.672 m (12 ft)	
Blanking Plugs	
Lockwire (Dia. 1 mm (0.041 in.))	

---

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DESCRIPTION

PART NO.

Corrosion Resistant Steel

### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Open access door 151DB and depressurize the Green, Blue and Yellow hydraulic systems.
- (3) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22
RELAY JACK HYD SEL IND & SUP	1-213	C 281	N17

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (4) Open access door 121FB allowing access to the relay jack selector valves.
- (5) Open access door 153BB, and depressurize the Green, Blue and Yellow hydraulic tanks (Ref. 29-13-00, Servicing).

### C. Remove

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- (1) Disconnect electrical connector (1) from solenoid (2).
- (2) Unsafety and unscrew bolts (4) attaching selector valve (8) to manifold (9).
- (3) Recover washers (3).

NOTE: - Support (7) and stiffener (5) must be removed before the Yellow/Green (3383) and Yellow/Blue selector valves can be removed.  
- When removing the selector valve (Green (3386) or Blue (3384)) avoid even slightly moving pressure maintaining valve (8).

- (4) Remove selector valve (8).
- (5) Remove sealing spools (14).
- (6) Install blanking plates.

### D. Preparation of Replacement Component

### E. Install

- (1) Remove blanking plates.
- (2) Clean the contact surfaces of the manifold and the selector valve.
- R (3) Replace seals (12) and back-up rings (13) and (15) of sealing spools (14).

R NOTE: The thickest back-up ring (13) is installed at the spool-end identified by a groove (11).

- (4) Install sealing spools.

NOTE: Spool end identified by a groove (11) must be installed on manifold (9) for Y/G and Y/B selector valves, and on pressure maintaining valve (10) for Green and Blue selector valves.

- (5) Install selector valve (8).
- (6) For Yellow/Green and Yellow/Blue selector valves, install lower support (7) and stiffener (5). Wirelock screws (6).
- (7) Attach selector (8) to manifold (9) using bolts (4).

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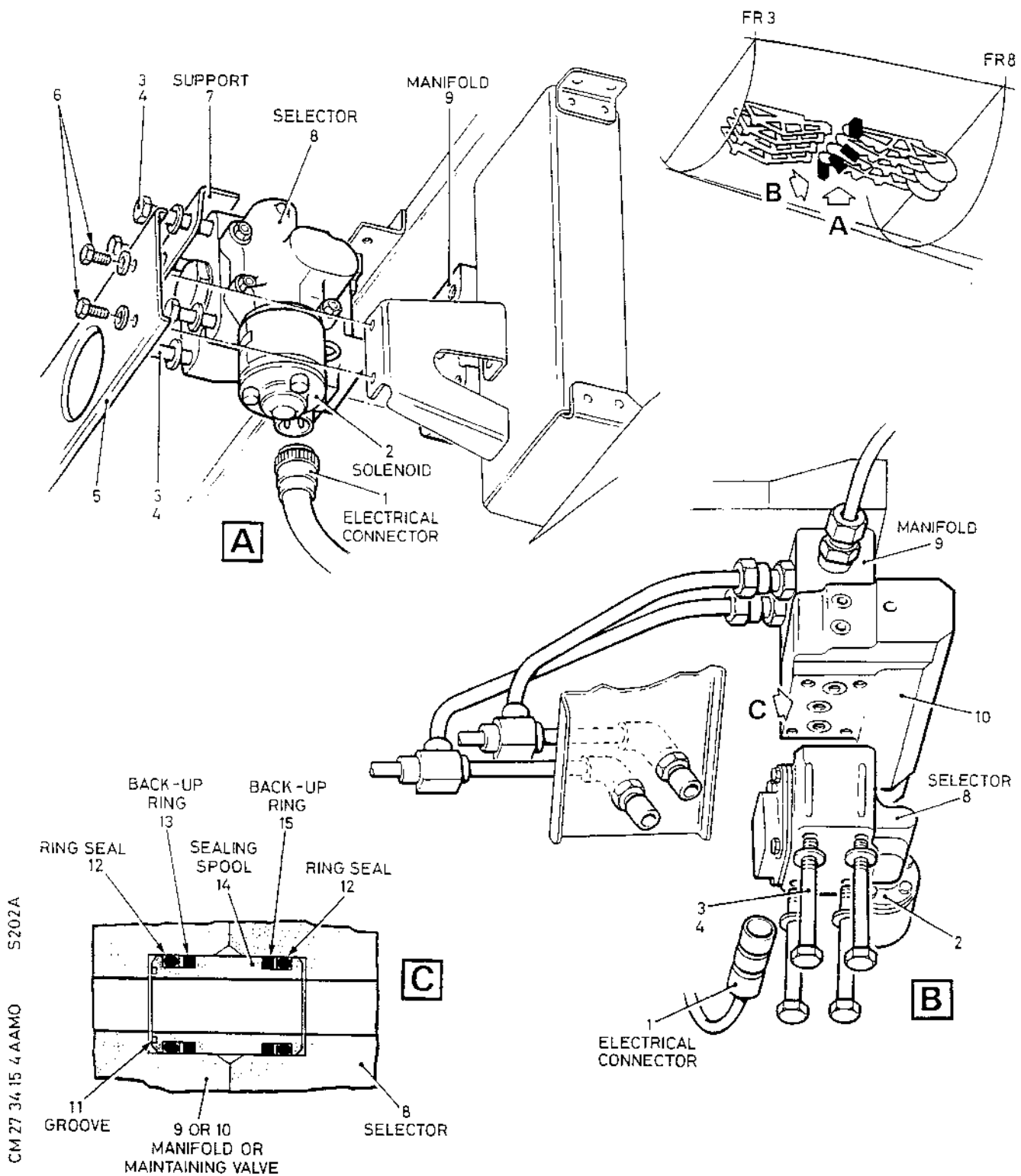
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Relay Jack Selector Valve  
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equipped with washers (3).

Torque to between 0.50 and 0.55 m.daN (55 and 62 lbf.in.).

- (8) Safety bolts (4) with lockwire.
- (9) Connect up electrical connector (1).
- (10) Carefully clean the selector valve and adjacent area making certain that no traces of hydraulic fluid remain.
- (11) Close the Green, Blue and Yellow hydraulic tank depressurization valves and safety with lockpin.
- (12) Remove safety clips and tags and set the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22
RELAY JACK HYD SEL IND & SUP	1-213	C 281	N17

### F. Tests

- (1) Carry out an operational test (Ref. 27-34-15, Adjustment/Test).
- (2) Upon completion of test, check that no trace of hydraulic fluid remains.
- (3) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access doors 151DB, 121FB, 153BB.
- (3) Remove access platform.
- (4) Remove warning notices.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### RELAY JACK SELECTOR VALVE - ADJUSTMENT/TEST

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The purpose of this test is to check the correct operation of the Relay Jack selector valves.

#### 2. Green (or Blue) Selector Valve Tests

##### A. Equipment and Materials

---

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Electrical Ground Power Unit	
Ground Power Unit - Hydraulic - Power and Preliminary Testing	EMH398E

---

##### B. Prepare

(1) Take the precautions described in the previous WARNING paragraph.

(2) On overhead panel :

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- (a) On Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in OFF.INV position and the three O & M ELEVONS, IN ELEVONS and RUDDER switches in MECH position.
  - (b) On SERVO CONTROLS unit, place both selector switches in NORMAL position.
  - (c) On RELAY JACK unit, place BLUE ONLY - NORM - GREEN ONLY switch in NORM position.
- (3) Make certain that trim controls are set to zero.
- (4) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RELAY JACK HYD SEL IND & SUP	1-213	C 281	N17
PFC IND		C 287	N18
YELL/GRN GRN FAIL )PFC &		C 285	P16
YELL/BLUE BLUE FAIL)RELAY		C 286	P17
YELL L.L. )JACK"A"		C 288	P18
)SYS CONT			
FLT CONT POSN IND CONT		C 83	R11
FLT CONT POSN IND 26V	2-213	C 84	B 4
400 Hz SUP			
FLT CONT & NAV BUS 14XS		X 355	H 2
YELL L/LEVEL )PFC &	3-213	C 282	A 8
YELL/GRN GRN FAIL )RELAY		C 283	A 9
YELL/BLUE BLUE FAIL)JACK"B"		C 284	A10
)SYS CONT			

- (5) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).
- (a) On overhead panel, on SERVO CONTROLS unit
    - BLUE L/PRESS and GREEN L/PRESS caption lights must illuminate.
    - Indicator lights under YELLOW-GREEN and YELLOW BLUE are off.
  - (b) On First Officer's instrument panel, on ICOVOL indicator (Flight Control Surface Position

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## MAINTENANCE MANUAL

Indicator) the 8 magnetic indicators must display M.

- (6) Connect hydraulic ground power unit :  
To Blue hydraulic system (Ref. 29-12-00, Servicing)  
if the Blue relay jack selector valve is to be checked.  
To Green hydraulic system (Ref. 29-11-00, Servicing)  
if the Green relay jack selector valve is to be checked.

### C. Test

NOTE : Do not take caption or indicator lights which are not mentioned into account.

- (1) Pressurize Green or Blue hydraulic system  
(Ref. 29-11-00 or 29-12-00, Servicing)
  - On SERVO CONTROLS unit, GREEN L/PRESS (or BLUE L/PRESS) caption light must go off.
  - Elevons must deflect upwards (check on ICOVOL indicator).
- (2) Move control column slightly
  - Elevons must deflect accordingly.
- (3) On RELAY JACK unit :
  - (a) If the Blue Relay Jack selector valve is to be checked :
    - (a1) Place switch in GREEN ONLY position.
    - (a2) Try to move control column
      - A heavy resistance is met (Do not try to overcome this resistance)
      - Elevons must not deflect.
    - (a3) Place switch in NORM position.
    - (a4) Move control column
      - Elevons must deflect accordingly.
  - (b) If the Green Relay Jack selector valve is to be checked;
    - (b1) Place switch in BLUE ONLY position.
    - (b2) Try to move control column
      - A heavy resistance is met (Do not try to overcome this resistance).

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(b3) Place switch in NORM position.

(b4) Move control column  
- Elevons must deflect accordingly.

### D. Close-Up

- (1) Shut down pressurization of hydraulic systems and disconnect hydraulic ground power unit (Ref. 29-11-00 or 29-12-00, Servicing).
- (2) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).
- (3) On overhead panel, on Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position.
- (4) Trip, safety and tag circuit breaker X355 FLT CONT & NAV BUS 14XS on panel 2-213 Map Ref. H2.

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## MAINTENANCE MANUAL

### 3. Yellow/Blue (or Yellow/Green) Selector Valve Tests

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Electrical Ground Power Unit	
Ground Power Unit - Hydraulic - Power and Preliminary Testing	EMH398E

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) On overhead panel
  - (a) On Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in OFF-INV position and the three O & M ELEVONS, IN ELEVONS and RUDDER switches in MECH position.
  - (b) On SERVO CONTROLS unit, place both selector switches in NORMAL position.
  - (c) On RELAY JACK unit, place BLUE ONLY - NORM - GREEN ONLY switch in NORM position.
- (3) Make certain that trim controls are set to zero.
- (4) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RELAY JACK HYD SEL IND & SUP	1-213	C 281	N17
PFC IND		C 287	N18
YELL/GRN GRN FAIL )PFC&		C 285	P16
YELL/BLUE BLUE FAIL)RELAY		C 286	P17
YELL L.L )JACK"A"		C 288	P18
)SYS CONT			
FLT CONT POSN IND CONT		C 83	R11

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT POSN IND 26V 400 Hz SUP	2-213	C 84	B 4
FLT CONT & NAV BUS 14XS		X 355	H 2
YELL L/LEVEL )PFC &	3-213	C 282	A 8
YELL/GRN GRN FAIL )RELAY		C 283	A 9
YELL/BLUE BLUE FAIL)JACK"B"		C 284	A10
)SYS CONT			

(5) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

- (a) On overhead panel, on SERVO CONTROLS unit
- BLUE L/PRESS and GREEN L/PRESS caption lights must illuminate.
  - Indicator lights under YELLOW-GREEN and YELLOW BLUE are OFF.

- (b) On First Officer's instrument panel, on ICOVOL indicator (Flight Control Surface Position indicator) the eight magnetic indicators must display M.

(6) Connect hydraulic ground power unit to Yellow hydraulic system (Ref. 29-21-00, Servicing).

### C. Test

NOTE : Do not take caption or indicator lights which are not mentioned into account.

- (1) Pressurize Yellow hydraulic system (Ref. 29-21-00, Servicing)
- On SERVO CONTROLS unit, BLUE L PRESS (or GREEN L/PRESS) caption light remains off.
  - Elevons do not deflect.
- (2) On SERVO CONTROLS unit
- Place lower selector switch in YELLOW-BLUE (or YELLOW-GREEN) position.
- Indicator lights under YELLOW-BLUE (or YELLOW-GREEN) must illuminate.
  - BLUE L/PRESS (or GREEN L/PRESS) caption light must go off. Elevons must deflect upwards. (Check on

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ICOVOL indicator).

- (3) Move control column  
- Elevons must deflect accordingly.
- (4) On SERVO CONTROLS unit  
Place lower selector switch in NORMAL position  
- Indicator lights under YELLOW-BLUE (or YELLOW-GREEN) must go off.  
- BLUE L/PRESS (or GREEN L/PRESS) caption light must illuminate. Elevons must deflect downwards (check on ICOVOL indicator).

### D. Close-Up

- (1) Shut down pressurization of hydraulic systems and disconnect hydraulic ground power unit (Ref. 29-21-00, Servicing).
- (2) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).
- (3) On overhead panel, on Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position.
- (4) Trip, safety and tag circuit breaker :  
X355 FLT CONT & NAV BUS 14XS on panel 2-213 Map Ref. H2.

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## MAINTENANCE MANUAL

### PRESSURE MAINTAINING VALVE - REMOVAL/INSTALLATION

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The Removal/Installation of the pressure maintaining valves installed on Blue and Green relay jack selector valves being identical, only the Removal/Installation of the Blue selector valve pressure maintaining valve will be described.

#### 2. Pressure Maintaining Valve

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Hydraulic Fluid Container	
Access Platform 3.672 m (12 ft.)	
Blanking Plates	
Lockwire (Dia. 1 mm (0.041 in.) Corrosion-Resistant Steel	

##### B. Prepare

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- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Open door 151DB, depressurize Green and Blue hydraulic systems.
- (3) Open access door 153BB and depressurize Green and Blue hydraulic tanks.
- (4) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22
RELAY JACK HYD SEL IND & SUP	1-213	C 281	N17

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS USED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (5) Remove panel 121FB, giving access to selectors and pressure maintaining valves of the relay jacks.

### C. Remove

- (1) Disconnect electrical connector (12) from solenoid.
- (2) Cut and remove lockwire, loosen screws (5) attaching selector valve and pressure maintaining valve, remove washers (4).
- (3) Remove selector valve (3) and pressure maintaining valve (2).
- (4) Separate pressure maintaining valve from selector valve

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(5) Remove sealing spools (8).

(6) Install blanking plates.

### D. Preparation of Replacement Component

### E. Install

(1) Remove blanking plates.

(2) Clean component mating surfaces.

R (3) Replace ring seals (6) back-up rings (7 and 9) of sealing spools.

R NOTE : The thicker back-up ring (9) must be fitted on the spool end bearing a mark (annular groove 10).

(4) Install sealing spools on manifold (1) (Spool end bearing groove must be installed on manifold (1) side).

(5) Install pressure maintaining valve on manifold (1).

(6) Install sealing spools on pressure maintaining valve (Spool end bearing groove must be installed on pressure maintaining valve (2) side).

(7) Install selector valve (3) on pressure maintaining valve (2).

(8) Mount the selector-pressure maintaining valve assembly on manifold (1) with screws (5) and washers (4). Torque to between 0.55 and 0.62 m.daN (50 and 55 lbf in.). Wirelock screws as per 20-21-13.

R (9) Connect electrical connector (11).

(10) Carefully clean selector valve and adjacent area; make certain that no trace of hydraulic fluid remains.

(11) Remove safety clips and tags and set the following circuit breakers:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F 22

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RELAY JACK HYD SEL IND & SUP	1-213	C 281	N17

### F. Tests

- (1) Carry out a test (Ref. 27-34-15, Adjustment/Test, Green or Blue Selector Valve Tests).
- (2) Upon completion of tests check that no trace of hydraulic fluid remains.
- (3) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Remove safety clips and tags and reset circuit breaker.
- (3) Close access doors and panels 151DB, 153BB and 121FB.
- (4) Remove access platform.
- (5) Remove warning notices.

EFFECTIVITY: ALL

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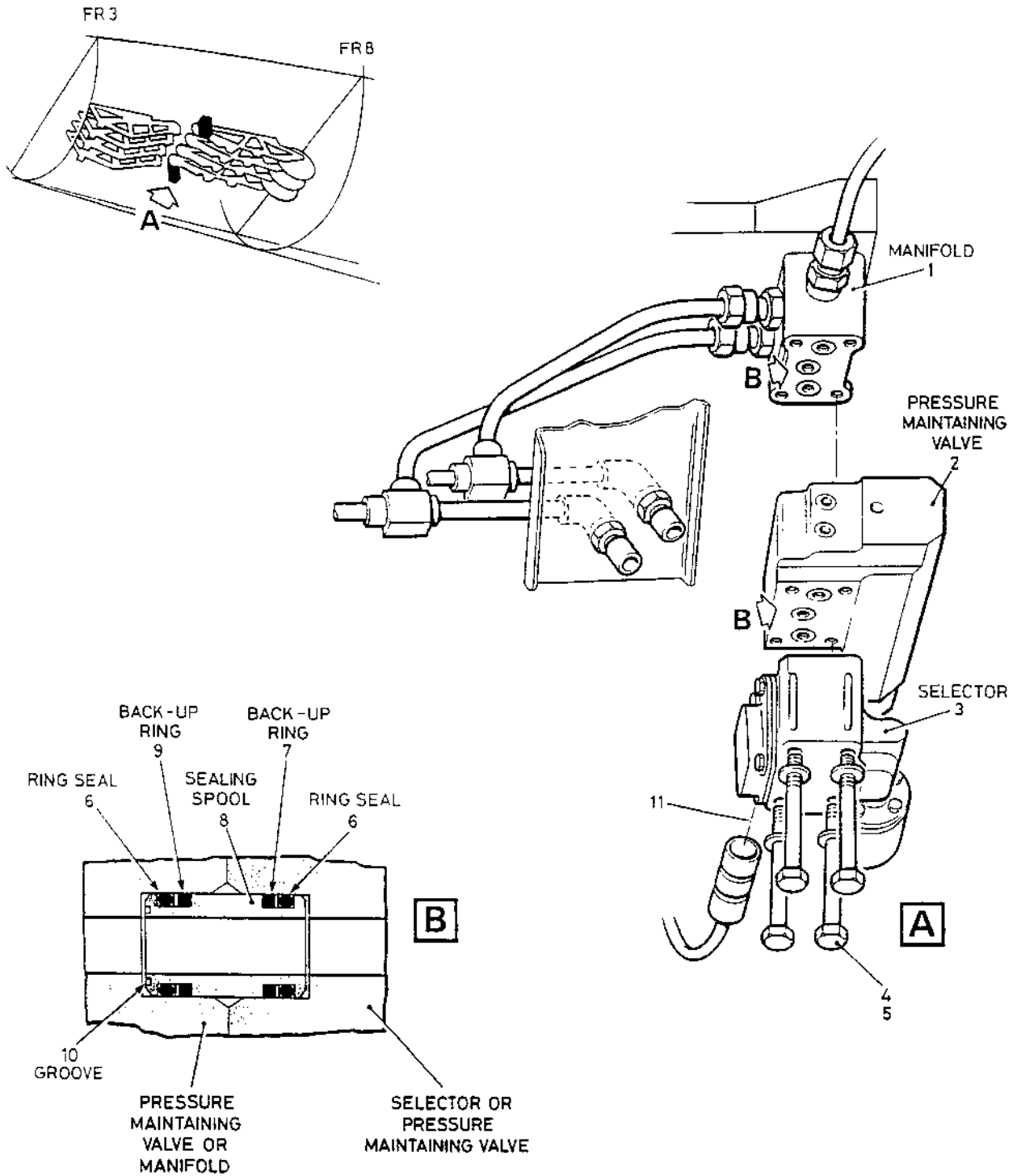
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Pressure Maintaining Valve  
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## MAINTENANCE MANUAL

### POWER FLIGHT CONTROL UNIT NORMAL SELECTOR VALVE REMOVAL/INSTALLATION

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The PFCU normal selector valve ensures the PFCU hydraulic supply or the tank return.

#### 2. P.F.C.U. Normal Selector Valve

##### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Hydraulic Fluid Container	
---------------------------	--

Access Platform Under Fuselage 3,141 m (10 ft. 3 in.)	
--	--

Lockwire Dia. 0.8 mm (0.032 in.) Corrosion Resistant Steel	
---	--

Blanking Plates	
-----------------	--

Hydraulic Fluid (Ref. 20-30-00, No.11)	
--	--

Circuit Breaker Safety Clips	
------------------------------	--

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### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22
HYD TANKS COMPR CONT	15-215	M 602	D 8
YELL/BLUE BLUE FAIL PFC & RELAY JACK "A" SYS CONT	1-213	C 286	P17
YELL/GRN GRN FAIL PFC & RELAY JACK "A" SYS CONT		C 285	P16
YELL/BLUE BLUE FAIL PFC & RELAY JACK "B" SYS CONT	3-213	C 284	A10
YELL/GRN GRN FAIL PFC & RELAY JACK "B" SYS CONT		C 283	A 9

- (3) Open door 153BB, depressurize hydraulic tanks.
- (4) Open door 151DB, depressurize Green, Blue and Yellow hydraulic systems.
- (5) Close and secure with safety pins the hydraulic tank depressurization valves.

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, YELLOW AND GREEN HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.  
DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

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### C. Remove

- (1) Disconnect electrical connectors (3).
- (2) Unsafety selector attaching screws (1).
- (3) Unscrew screws (1), retain washers, disconnect bonding strip.
- (4) Separate selector (5) from manifold (4) and remove it.
- (5) Remove sealing spools (8).
- (6) Install blanking plate.

### D. Preparation of Replacement Component

Make certain that the selector is filled with Product No. 11.

### E. Install

- (1) Remove blanking plate.
- (2) Clean manifold (4) and selector (5) mating surfaces.
- (3) Replace O-rings (6) and (10) and back-up rings (7) and (9) from sealing spools.  
  
NOTE : The thicker O-ring and back-up ring must be fitted on the spool end bearing a mark (annular groove).
- (4) Install sealing spools (8) with annular groove on manifold side.
- (5) Place selector (5) on manifold (4).
- (6) Install washers (2) bonding strip, screws (1) and tighten.  
Torque to between 0.75 and 0.85 m.daN (66.35 and 75.2 lbf.in.).
- (7) Wirelock selector attaching screws (1) on manifold (4).
- (8) Connect electrical connectors (3).
- (9) Clean selector and adjacent area carefully. Check that no trace of hydraulic fluid remains.
- (10) Remove safety clips and tags and set the following

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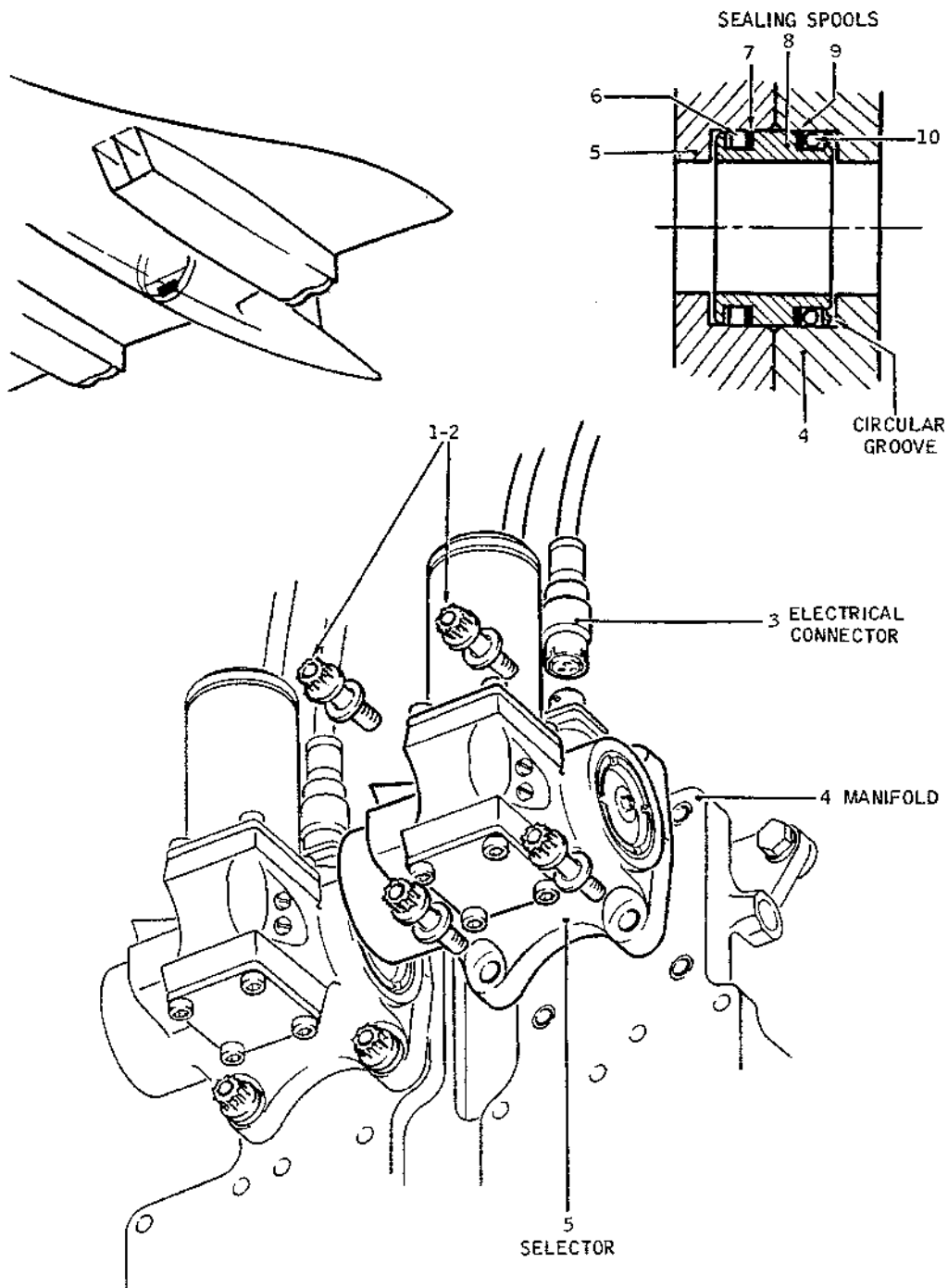
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P.F.C.U. Normal Selector Valve  
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circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22
HYD TANKS COMPR CONT		M 602	D 8
YELL/BLUE BLUE FAIL PFC & RELAY JACK "A" SYS CONT	1-213	C 286	P17
YELL/GRN GRN FAIL PFC & RELAY JACK "A" SYS CONT		C 285	P16
YELL/BLUE BLUE FAIL PFC & RELAY JACK "B" SYS CONT	3-213	C 284	A10
YELL/GRN GRN FAIL PFC & RELAY JACK "B" SYS CONT		C 283	A 9

### F. Tests

- (1) Carry out a test (Ref. 27-34-51, Adjustment/Test).
- (2) Check that no trace of hydraulic fluid remains.
- (3) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access doors 151DB, 153BB.
- (3) Remove access platform.
- (4) Remove warning notices.

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## MAINTENANCE MANUAL

### POWER FLIGHT CONTROL UNIT NORMAL SELECTOR VALVE ADJUSTMENT/TEST

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The purpose of this test is to check the correct operation of the PFCU selector valves, Green or Blue hydraulic systems.

#### 2. Normal Selector Valve Test

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Electrical Ground Power Unit	
Ground Power Unit - Hydraulic - Power and Preliminary Testing	EMH398E

##### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.

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- (2) On overhead panel :
- (a) On Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in OFF INV position and the three O & M ELEVONS, IN ELEVONS and RUDDER switches in MECH position.
  - (b) On SERVO CONTROLS unit, place both selector switches in NORMAL position.
  - (c) On RELAY JACK unit, place BLUE ONLY - NORM - GREEN ONLY switch in NORM position.
- (3) Make certain that trim controls are set to zero.
- (4) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RELAY JACK HYD SEL IND & SUP	1-213	C 281	N17
PFC IND		C 287	N18
YELL/GRN GRN FAIL ) PFC &		C 285	P16
YELL/BLUE BLUE FAIL ) RELAY		C 286	P17
YELL L.L. ) JACK "A"		C 288	P18
) SYS CONT			
FLT CONT POSN IND CONT		C 83	R11
FLT CONT POSN IND 26V	2-213	C 84	B 4
400 Hz SUP			
FLT CONT & NAV BUS 14XS		X 355	H 2
YELL L/LEVEL )PFC &	3-213	C 282	A 8
YELL/GRN GRN FAIL )RELAY		C 283	A 9
YELL/BLUE BLUE FAIL )JACK"B"		C 284	A10
)SYS CONT			

- (5) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

- (a) On overhead panel, on SERVO CONTROLS unit
- BLUE L/PRESS and GREEN L/PRESS caption lights must illuminate.
  - Indicator lights under YELLOW GREEN and YELLOW BLUE are off.

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## MAINTENANCE MANUAL

(b) On First Officer's instrument panel, on ICOVOL indicator (Flight Control Surface Position indicator) the 8 magnetic indicators must display M.

(6) Connect hydraulic ground power unit to Green or Blue hydraulic system (depending on selector valve to be checked) (Ref. 29-11-00 or 29-12-00, Servicing).

### C. Test

NOTE: Do not take caption or indicator lights which are not mentioned into account.

(1) Pressurize Green or Blue hydraulic system (Ref. 29-11-00 or 29-12-00, Servicing).

- On SERVO CONTROLS unit, GREEN L/PRESS (or BLUE L/PRESS) caption light must go off
- Elevons must deflect upwards (check on ICOVOL indicator).

(2) On overhead panel, on SERVO CONTROLS unit, place lower selector switch in YELLOW-GREEN position (or in YELLOW-BLUE position depending on selector valve to be checked).

(a) On SERVO CONTROLS unit:

- The two indicator lights under YELLOW GREEN (or YELLOW BLUE) must illuminate
- GREEN L/PRESS (or BLUE L/PRESS) caption light must illuminate.

(b) Elevons must deflect downwards.

(3) On SERVO CONTROLS unit place lower selector switch in NORMAL position

- The two indicator lights under YELLOW GREEN (or YELLOW BLUE) must go off.
- GREEN L/PRESS (or BLUE L/PRESS) caption light must go off.
- Elevons must deflect upwards.

### D. Close-up

(1) Shut down pressurization of hydraulic systems and disconnect hydraulic ground power unit (Ref. 29-11-00 or 29-12-00, Servicing).

(2) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

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- (3) On overhead panel, on Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position.
- (4) Trip, safety and tag circuit breaker : X355 FLT CONT & NAV BUS 14XS on panel 2-213, Map Ref. H2.

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## MAINTENANCE MANUAL

### MIDDLE AND OUTER ELEVON POWER FLIGHT CONTROL UNIT - REMOVAL/INSTALLATION

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

Removal/Installation of the RH and LH outer and middle elevon power flight control units (PFCU's) being identical, only the LH middle elevon PFCU Removal/Installation is dealt with below.

#### 2. Removal of Power Flight Control Unit, Set in Electrical Mode

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins - Synchro Pack	D925252000
Rigging Pin - Torque Tube at RIBS 3 and 9	D921337000
Zeroing Equipment - Elevons	D921354000
Equipment - Elevon PFCU - Removal/Installation	E920004000.
Test Set - Zero Setting - Resolvers	TE3016000

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DESCRIPTION	PART NO.
Tool Kit - Elevon PFCU - Removal/ Installation	E920003000
Rigging Pin - Mixing Unit - Servo Control	D921310000
Protractor - Elevon and Rudder or Clinometer	TE2012000
Circuit Breaker Safety Clips	
Access Platform 3.251 m (10 ft. 8 in.)	
Lockwire Dia. 0.032 in. (0.8 mm) Corrosion Resistant Steel	
General Lubricants (Ref. 20-30-00, No.51)	
Special Materials (Ref. 20-30-00, No.123)	
Warning Notices	

### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Remove following fairings as appropriate for PFCU to be removed :  
LH outer PFCU : fairings 553JB, LL, LR, KB  
552JB  
LH middle PFCU : fairings 552JB, LL, LR, KB  
553JB  
RH outer PFCU : fairings 653JB, LL, LR, KB  
652JB  
RH middle PFCU : fairings 652JB, LL, LR, KB  
653JB
- (3) If tool TE2012000 is to be employed install tool on elevons associated with PFCU to be removed.
- (4) Set flight controls in electrical mode (Ref. 27-00-00, Servicing).

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NOTE : If Blue CT is failed, set flight controls in GREEN electrical mode.

In this case, it will be necessary, when in main base, to proceed with readjustment by means of the elevon neutral setting jig.

- (5) Open access door 121FB and secure resolvers with rigging pins, as follows :  
Roll : rigging pin D925252001  
Pitch : rigging pin D925252003.
- (6) Open floor panel 241HF and insert rigging pin D921310000 in mixing unit. Re-install floor panel, but do not attach.

CAUTION : WHEN INSERTING AND REMOVING PINS. TAKE ALL NECESSARY PRECAUTIONS IN ORDER TO AVOID INTRODUCING INADVERTENTLY TOOLS OR MISCELLANEOUS ITEMS IN MIXING UNIT.

- (7) On LH or RH wing, as appropriate for PFCU to be removed, disconnect actuating rod from input lever, on both PFCUs.  
Do not alter length of rods.

NOTE : For removing or installing attachment bolts, it is necessary to press plunger on head of bolt to free the locking system balls.

- (8) Support concerned elevon in position (approximately at neutral) by means of zeroing equipment D921354000.
- (9) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing - Procedure to set Flight Controls in Electrical Mode).
- (10) Open access door 151DB and depressurize Green, Blue and Yellow hydraulic systems (Ref. 29-11-00, Servicing ; 29-12-00, Servicing ; 29-21-00, Servicing).
- (11) Open access door 153BB and depressurize Green, Blue and Yellow hydraulic system tanks (Ref. 29-13-00, Servicing).
- (12) Close hydraulic tank depressurization valves, and secure with safety pins.
- (13) Trip, safety and tag the following circuit breakers :

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFCs INV GRN FAIL IND	1-213	1C 73	M15
PFCs INV GRN SUP		1C 66	P11
FLT CONT POSN IND 26 V 400 Hz SUP	2-213	C 84	B 4
PFCs INV BLUE SUP	5-213	2C 66	B14
PFCs INV BLUE FAIL IND		2C 73	E11
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22
HYD TANKS COMPR CONT	15-215	M 602	D 8

**WARNING :** DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

(14) Set elevon to neutral position.

- (a) Remove cable loom attachments, and disconnect electrical connectors from PFCU to be removed.
- (b) Connect zero setting test set TE3016000 cable loom to PFCU connectors (switch in LABO position). Supply test set with 28 VDC.
- (c) Manually, or using any suitable means, move elevon until zero is obtained on Blue CT (or Green, if Blue CT is inoperative).

(15) Set protractor to zero on elevon concerned (or note elevon neutral position, using a clinometer).

(16) Disconnect zero setting test set connectors from PFCU.

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C. Remove (Ref. Fig.401 and 402)

**CAUTION:** GREAT CARE MUST BE TAKEN WHEN HANDLING THE PFCUs FOR REMOVAL OR INSTALLATION BECAUSE OF THE RELATIVE FRAGILITY OF SOME OF THEIR COMPONENTS. ONLY FORWARD, REAR OR CENTRE ATTACHMENT POINTS MUST BE USED FOR ATTACHMENT OR SUPPORT PURPOSES:  
Outer PFCUs WEIGH 60.6 Kg.  
Middle PFCUs WEIGH 60.6 Kg.

**CAUTION:** CARE SHOULD BE TAKEN WHEN DISCONNECTING HOSE INSTALLATIONS, THAT ANY PREFORMED BEND TAKEN BY HOSE IN SERVICE IS NOT ALTERED BY UNDUE BENDING FOR CLEARANCE PURPOSES. ON RE-INSTALLATION ORIGINAL LINE TAKEN BY HOSE SHOULD BE MAINTAINED. THIS WILL AID HOSE LONGEVITY.

FAILURE TO COMPLY WITH THIS CAUTION MAY RESULT IN PREMATURE HOSE FAILURE.

- (1) Disconnect hydraulic lines as follows:
  - (a) Maintain adapter screwed in PFCU using appropriate wrench.
  - (b) Unscrew hydraulic line union nut and disengage the latter.
  - (c) Cap open line ends.
- (2) Remove bonding strips (attachment points and ends of elevon control rods).
- (3) Remove cotter pins and nuts (24) from PFCU/elevon control rod connections and remove peel washers. Remove eccentric bushes (23) using extractor D921225000.
- (4) Remove cotter pins and nuts (26), and remove bolts (29) holding washers (25) and (28). Remove slotted nuts (30). Remove sleeves (27) and retain washers.
- (5) Remove elevon control rods (10), and remove back-up washers.
- (6) Remove nuts (5), washers (6) and bonding strip, securing resolver feedback link (2) bolt attachment plate to structure.

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- (7) Remove screws (7) and washers (8) securing tracks (21).
- (8) Fix minihoists to attachment point provided for this purpose.
- (9) Using the minihoists, bring equipment E920004000 opposite attachment points on PFCU. Attach this tool to PFCU.
- (10) Separate ball joint assemblies (1) on the end of sliding tubes, from structure: remove nuts (35), washers and bolts (32).

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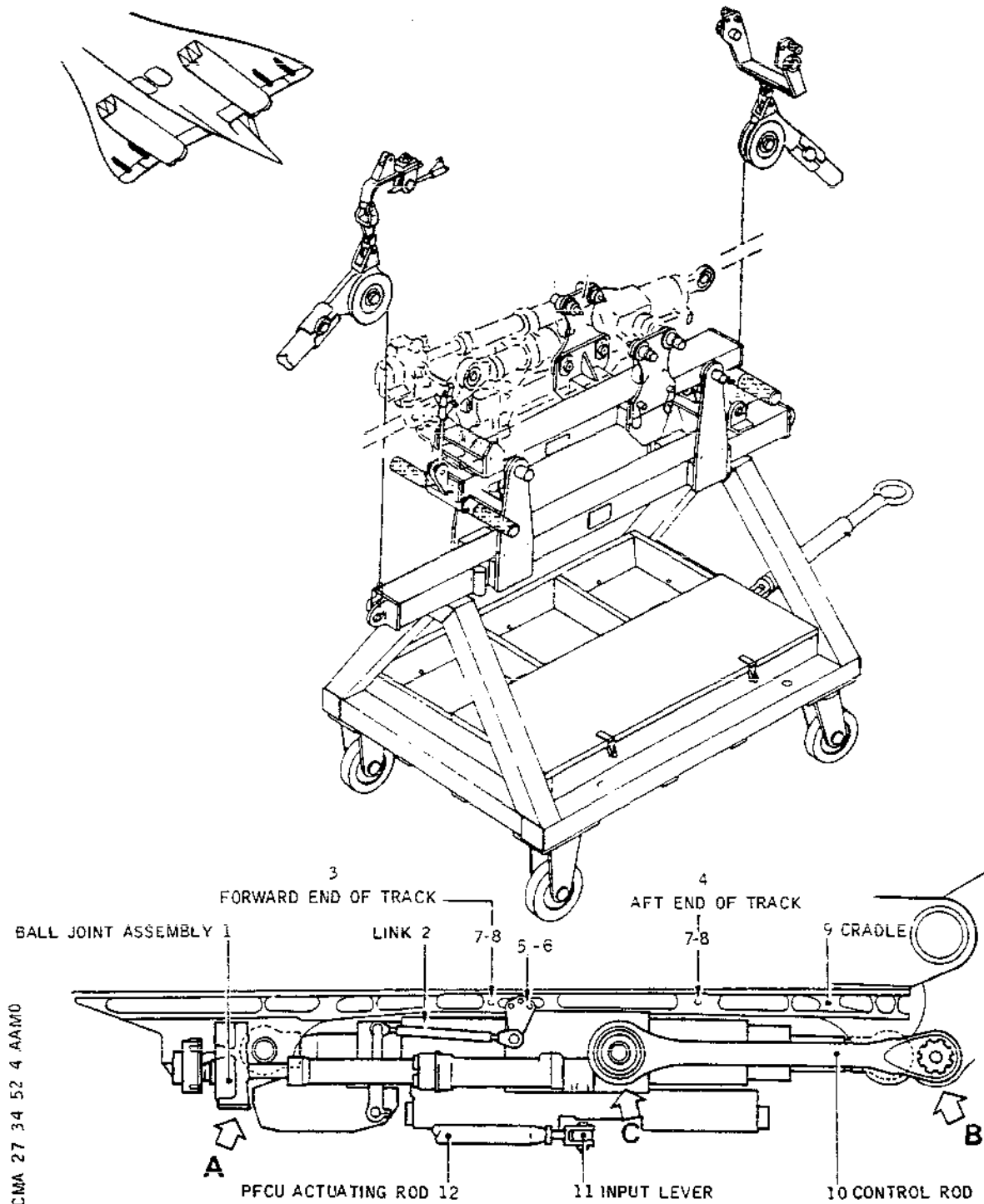
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Power Flight Control Unit  
Figure 401

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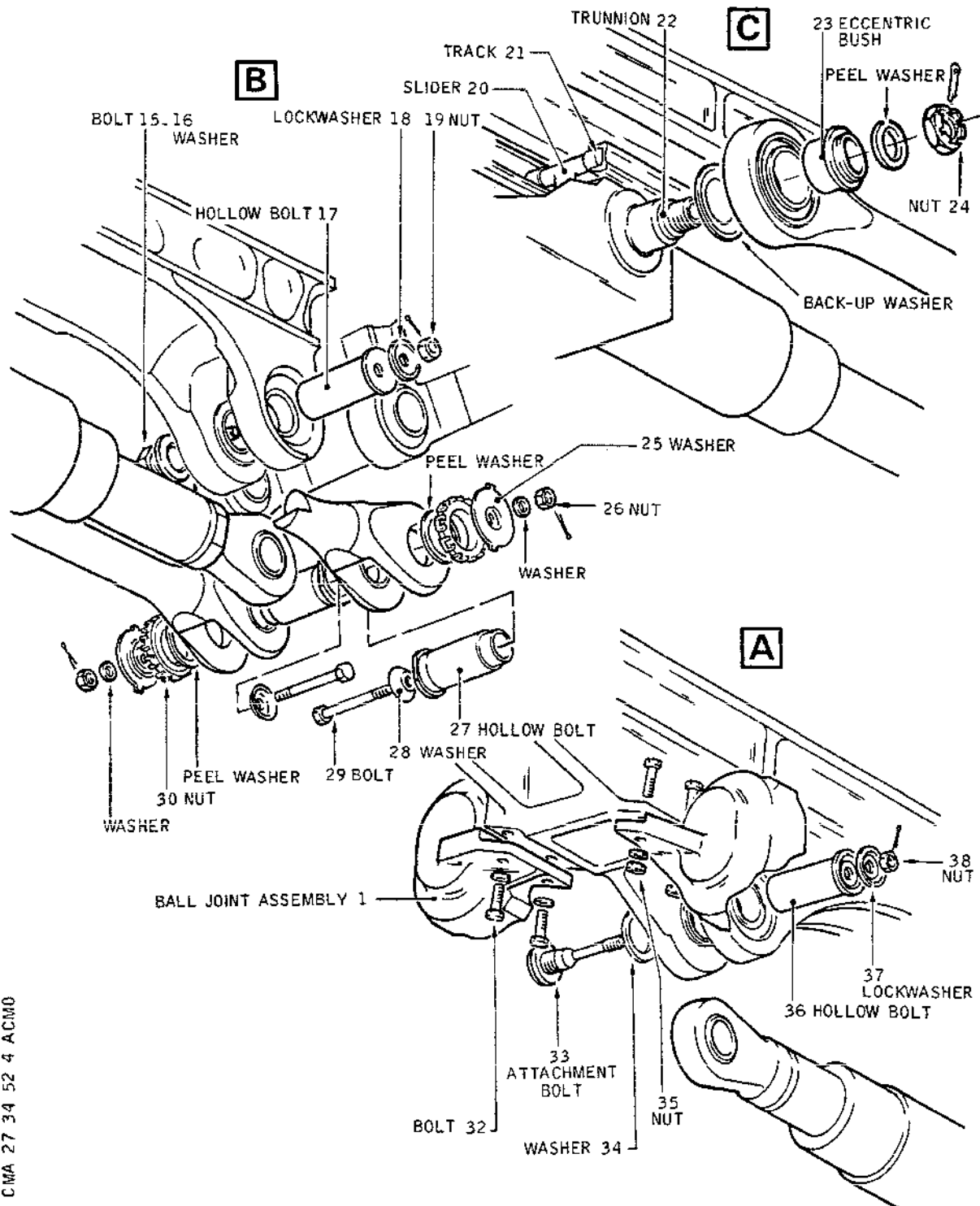
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Detail of PFCU Installation  
Figure 402

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- (11) At PFCU forward attachment point, remove cotter pin and nut (38), remove lock washer (37), attachment bolt (33), sleeve (36) and washer (34).
- (12) At PFCU aft attachment point, remove cotter pin and nut (19), remove lock washer (18), bolt (15), sleeve (17) and washer (16).

NOTE: If sleeve cannot be removed or installed easily, deflect elevon.

- (13) Lower PFCU/tool assembly.

CAUTION: DO NOT DAMAGE TRACKS AND SLIDER.

- (14) Remove PFCU from trolley.

### R D. Inspection of Removed Component

- (1) Perform ultrasonic inspection of shuttle valves on removed component according to manufacturer instructions.

### R E. Preparation of Replacement Component

- (1) Place PFCU on trolley and rig.
- (2) Using mini-hoists, hoist tool/PFCU assembly.
- (3) Circular scratches of less than 0.05 mm (0.00196 in) deep are the only permissible damage on elevon control rod attachment bolts.

### R F. Install

NOTE: Before installation apply a light coat of product No.51 on attachment bolts.

During installation of PFCU/structure attachment bolts, make certain that pitch between PFCU attachment points corresponds to that of structural attachment points.

The two bolts (coated with product No.51) must be inserted freely, without force being applied (sliding fit).

CAUTION: BEFORE FINALISING INSTALLATION IT MUST BE ENSURED THAT SUFFICIENT CLEARANCE EXISTS BETWEEN THE SMALL PFCU DRAIN HOSE AND FORWARD ATTACHMENT CRADLE EYE-END STRUCTURE.

- (1) Secure PFCU rear end fitting to fork end with sleeve (17), washer (16), bolt (15), install washer (18) and attach with nut (19).  
Bolt (15) : torque to between 1.6 and 1.8 mdaN (11.8 and 13.2 lbf ft).  
Nut (19) : torque to between 0.52 and 0.58 mdaN (45 and 50 lbf in).  
Safety nut with cotter pin.
- (2) Install each track (21) on to slider (20) on PFCU body.
- (3) Attach, but do not tighten, rear end (4) of each track (21) to cradle (9), with screws (7) equipped with wash-

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ers (8). It must be possible for the tracks to pivot on the cradle without any play.

- (4) Secure forward attachment point.  
Install sleeve (36) and washer (34), attachment bolt (33), lock washer (37). Secure washer with nut (38).  
Bolt (33) : torque to between 1.6 and 1.8 m.daN (11.8 and 13.2 lbf.ft.).  
Nut (38) : torque to between 0.52 and 0.58 m.daN (45 and 50 lbf. in.).  
Safety nut with cotter pin.
- (5) Remove equipment E920004000 and mini-hoists.
- (6) Install screws (7) equipped with washers (8) on forward end (3) of each track. Tighten screws (7) to complete installation of tracks, and wirelock. (Ref. 20-21-13).
- (7) Assemble ball joint assemblies (1) to structure using bolts (32) washers and nuts (35).  
Bolts (32) : torque to between 1.60 and 1.80 m.da.N (142 and 160 lbf.in.).  
Safety with lockwire (Ref. 20-21-13).  
Nuts (35) : torque to between 1.20 and 1.35 m.daN (106 and 120 lbf.in.).  
Safety with cotter pin.
- (8) Install elevon control rods
  - (a) LH control rod.
    - (a1) Attach to PFCU.  
  
Install back-up washer and install control rod (10) on PFCU trunnion (22), positioning eccentric bush (23) at zero. Install peel washer and nut (24).  
Torque to between 9.2 and 16.6 m.daN (67.85 and 122.43 lbf. ft). Safety with a cotter pin.
    - (a2) Attach to elevon  
  
Install control rod (10) on elevon spherical bearing. Install sleeve (27), peel washer and nut (30).  
Torque to between 6 and 8 m.daN (44.25 and 59 lbf. ft).  
Install bolt (29), cup washer (28), tab washer (25), flat washer and nut (26).  
Tighten.

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Torque to between 0.7 and 0.8 m.daN (62 and 71 lbf. in.).

Safety with cotter pin and bend tab washer tabs.

NOTE : If holes for safetying bolt are not facing slots of nut, it is necessary to adjust thickness of peel washer.

### (b) RH control rod

#### (b1) Attach to elevon

Install rod (10) on control surface spherical bearing, install sleeve (27) peel washer and nut (30). Torque to between 6 and 8 m.daN (44.25 and 59 lbf. ft).

Install bolt (29), cup washer (28), tab washer (25), flat washer and nut (26).

Tighten. Torque to between 0.7 and 0.8 m.daN (62 and 71 lbf.in.).

Safety with cotter pin and bend tab washer tabs.

NOTE : If holes for safetying bolt are not facing slots of nut, it is necessary to adjust thickness of peel washer.

#### (b2) Attach to PFCU

Install back-up washer, rod on PFCU trunnion (22). Install eccentric bush (23) peel washer and nut (24). Do not tighten.

NOTE : On PFCU RH trunnion, position eccentric bush so that rod (10) can be installed without forcing.

If, exceptionally, the eccentricity of RH eccentric bush is not sufficient adjust LH eccentric bush so that rod can be easily installed.

If necessary, adjust thickness of peel washers on trunnions to obtain required torque loading on attachment nuts (24).

#### (b3) Tighten nut (24) on trunnion

Torque to between 9.2 and 16.6 m.daN (67.85 and 122.43 lbf. ft).

Safety with cotter pin.

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(9) Connect hydraulic lines to PFCU as follows :

- (a) Maintain adapters screwed in PFCU using appropriate wrench.
- (b) Torque tighten hydraulic line union nuts to the following value :

Blue Pressure	: 2.43 to 2.76 m.daN (17.9228 to 20.3576 lbf.ft.)
Blue Return	: 4.86 to 5.31 m.daN (35.8456 to 39.1645 lbf.ft.)
Green Pressure	: 2.43 to 2.76 m.daN (17.9228 to 20.3576 lbf.ft.)
Green Return	: 4.86 to 5.31 m.daN (35.8456 to 39.1645 lbf.ft.)
Yell/Blue pressure	: 2.43 to 2.76 m.daN (17.9228 to 20.3576 lbf.ft.)
Yell/Blue return	: 4.86 to 5.31 m.daN (35.8456 to 39.1645 lbf.ft.)
Yell/Green pressure	: 2.43 to 2.76 m.daN (17.9228 to 20.3576 lbf.ft.)
Yell/Green return	: 4.86 to 5.31 m.daN (35.8456 to 39.1645 lbf.ft.)

WARNING : WHEN A HOSE WITH A BEND RADIUS IS REMOVED FROM AN INSTALLATION, CARE SHALL BE TAKEN NOT TO STRAIGHTEN THE HOSE FROM ITS ACQUIRED SHAPE. IF REQUIRED FOR RE-INSTALLATION, IT SHALL BE FITTED AS NEAR AS POSSIBLE TO THIS SHAPE WITHOUT ANY UNDUE FORMING.

- RB (10) Connect bonding strips and carry out bonding check-Resistance to be not greater than 50 milli-ohms.
- RB (11) Using protractor (or clinometer), check that elevon is in neutral.
- RB (12) Attach resolver feedback link (2) bolt attachment plate to structure. Do not safety.
- RB (13) Set resolvers to electrical zero.  
(Ref. Fig.403 and 401)
  - (a) Connect test set TE3016000 electrical cables to PFCU connectors.  
Supply test set with 28 VDC.
  - (b) Place test set POWER JACKS AND NOSE WHEEL STEERING selector switch in BLUE CT CONTROL ELEVONS position.
  - (c) Set resolvers to electrical zero.

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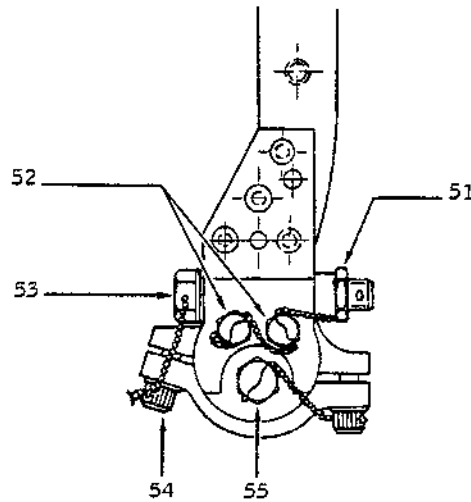
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Resolver Electrical Zero Setting  
Figure 403

- (c1) Cut and remove lockwire from nut (51) and bolts (52), (54) and (55).
- (c2) Slightly loosen bolts (52), (54) and (55).
- (c3) Loosen nut (51) so that bolt (53) can be turned, but with slight resistance.
- (c4) Turn bolt (53) in appropriate direction until adjustment indicator pointer indicates 0 deg. plus or minus 2 min. At the same time, gradually increase test set sensitivity to maximum.
- (c5) Tighten nut (51).  
Torque to between 0.15 and 0.17 m.daN (13 and 15 lbf. in.).
- (c6) Check that electrical zero has not varied.
- (c7) Tighten bolts (52) and (54).

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Torque to between 0.07 and 0.09 m.daN (6 and 8 lbf. in.).

(c8) Tighten bolt (55).

Torque to between 0.259 and 0.282 m.daN (23 and 25 lbf.in.).

(c9) Wirelock bolts (52), (54) and (55) nut (51).  
(Ref. 20-21-13).

- RB (14) Remove resolver feedback link (2) bolt attachment plates from structure.
- RB (15) Disconnect test set from PFCU.
- RB (16) Connect PFCU electrical connectors.
- RB (17) Remove tool D921354000 securing elevons in neutral.
- RB (18) Fully deflect elevon in both directions and check that in both PFCU stop positions, feedback link can be connected easily to structure.

WARNING : IN BOTH PFCU STOP POSITIONS, MAKE CERTAIN BEFORE CONNECTING FEEDBACK LINK TO STRUCTURE THAT THERE IS A CLEARANCE OF AT LEAST 1 mm (0.039 in.) BEFORE RESOLVERS ACHIEVE THEIR INTERNAL STOPS.

- RB (19) Attach resolver feedback link (2) bolt attachment plate to structure : bonding strip, washers (6), nuts(5). Wirelock. (Ref. 20-21-13).
- RB (20) Remove warning notices.
- RB (21) Remove safety clips and tags and set circuit breakers.
- RB (22) On LH or RH wing corresponding to PFCU concerned, connect actuating rods (12) to input lever (11) of the two PFCU's. Do not safety.  
(It is necessary to support elevon manually)
- RB (23) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing). Check that rigging pin D921337000 can be inserted easily, in rod and bellcrank assembly at RIB3 for outer PFCU or in rod and bellcrank assembly at RIB 9 for middle PFCU.  
On protractor (or using a clinometer) check that control surface is at neutral.  
If required adjust length of PFCU actuating rod.  
Remove rigging pin D921337000.

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- B (24) Tighten actuating rod attachment nuts on both PFCUs. Torque to between 0.31 and 0.37 mdaN (27.42 and 32.73 lbf in). Safety with cotter pin.
- B (25) Remove rigging pin D921310000 from mixing unit.
- B (26) Remove rigging pins D925252001 and D925252003 from resolvers and remove protractors.
- B (27) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in mechanical mode).

### R G. Tests

- (1) Proceed with tests as per 27-34-52, Adjustment/Test.
- (2) Upon completion of tests, check that PFCU line connections are Leak proof.
- (3) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### R H. Close-Up

- (1) Make certain that working area is clear of tools and miscellaneous items of equipment.
- (2) Clean PFCU and surrounding area, and check that no trace of hydraulic fluid remains.
- (3) Close access doors and panels.
- (4) Install elevon and PFCU fairings.
- (5) Remove access platform.

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### 3. Removal of Power Flight Control Unit (Set in Mechanical Mode with Test Set TE3016000)

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins - Synchro Pack	D925252000
Rigging Pin - Torque Tube at RIBS 3 and 9	D921337000
Zeroing Equipment - Elevons	D921354000
Equipment - Elevon PFCU, Removal/ Installation	E920004000
Jig - Neutral Setting - Elevon at Rib3	D921303000
Jig - Neutral Setting - Elevon at Rib9	D921304000
Test Set - Zero Setting - Resolvers	TE3016000
Tool Kit - Elevon PFCU, Removal/ Installation	E920003000
Protractor - Elevon and Rudder (or Clinometer)	TE2012000
Rigging Pin - Mixing Unit - Servo Control	D921310000
Circuit Breaker Safety Clips	
Access Platform 3.251 m (10 ft. 8 in.)	
Lockwire Dia. 0.8 mm (0.032 in.) Corrosion Resistant Steel	
Warning Notices	
General Lubricants (Ref. 20-30-00, No.51)	
Special Materials (Ref. 20-30-00, No.123)	

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### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
  - (2) Remove following fairings as appropriate for PFCU to be removed :  
LH outer PFCU : fairings 553JB, LL, LR, KB  
552JB  
LH middle PFCU : fairings 552JB, LL, LR, KB  
553JB  
RH outer PFCU : fairings 653JB, LL, LR, KB  
652JB  
RH middle PFCU : fairings 652JB, LL, LR, KB  
653JB
  - (3) If tool TE2012000 is to be employed install tool on elevons associated with PFCU to be removed.
  - (4) Open floor panel 241HF and leave it in position but do not attach.
  - (5) Open access door 121FB.
  - (6) Open access door 151DB and depressurize Blue, Green and Yellow hydraulic system (Ref. 29-12-00, Servicing; 29-11-00, Servicing; 29-21-00, Servicing).
  - (7) Open door 153BB and depressurize Blue, Green and Yellow hydraulic tanks (Ref. 29-13-00, Servicing).
  - (8) Close hydraulic tank depressurization valves and safety with lock pins.
  - (9) On LH or RH wing, as appropriate for PFCU to be removed, disconnect actuating rod from input lever, on both PFCUs.  
Do not alter length of rods.  
(It is necessary to support elevon manually).
- NOTE : For removing or installing attachment bolts, it is necessary to press plunger on head of bolt to free the locking system balls.
- (10) Trip, safety and tag the following circuit breakers :

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFCs INV GRN FAIL IND	1-213	1C 73	M15
PFCs INV GRN SUP		1C 66	P11
FLT CONT POSN IND 26 V 400 Hz SUP	2-213	C 84	B 4
PFCs INV BLUE SUP	5-213	2C 66	B14
PFCs INV BLUE FAIL IND		2C 73	E11
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22
HYD TANKS COMPR CONT	15-215	M 602	D 8

**WARNING :** DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT, PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

C. Remove  
(Ref. Fig.401 and 402)

**CAUTION :** GREAT CARE MUST BE TAKEN WHEN HANDLING THE PFCUs FOR REMOVAL OR INSTALLATION BECAUSE OF THE RELATIVE FRAGILITY OF SOME OF THEIR COMPONENTS. ONLY FORWARD, REAR OR CENTRE ATTACHMENT POINTS MUST BE USED FOR ATTACHMENT OR SUPPORT PURPOSES.  
Outer and Middle PFCUS weight : 60.6 Kg.

(1) Disconnect hydraulic lines as follows :

- (a) Maintain adapter screwed in PFCU using appropriate wrench.
- (b) Unscrew hydraulic line union nut and disengage the line.

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- (c) Cap open line ends.
- (2) Remove cable loom attachments, and disconnect electrical connectors from PFCU.
  - (3) Remove bonding strips (attachment points and ends of elevon control rods).
  - (4) Remove cotter pins and nuts (24) from PFCU/elevon control rod connections and remove peel washers. Remove eccentric bushes (23) using extractor D921225000.
  - (5) Remove cotter pins and nuts (26), and remove bolts (29) holding washers (25) and (28). Remove slotted nuts (30) Remove sleeves (27) and retain washers.
  - (6) Remove elevon control rods (10), and remove back-up washers.
  - (7) Remove nuts (5), washers (6) and bonding strip, securing resolver feedback link (2) bolt attachment plate to structure.
  - (8) Remove bolts (7) and washers (8) securing tracks (21).
  - (9) Fix minihoists to attachment points provided for this purpose.
  - (10) Using the minihoists, bring equipment E920004000 opposite attachment points on PFCU. Rig this tool to PFCU.
  - (11) Separate ball joint assemblies (1) on the end of sliding tubes, from structure : remove nuts (35), washers and bolts (32).
  - (12) At PFCU forward attachment point, remove cotter pin and nut (38), remove special washer (37), attachment bolt (33), sleeve (36) and washer (34).
  - (13) At PFCU aft attachment point, remove cotter pin and nut (19), remove special washer (18), bolt (15), sleeve (17) and washer (16).

NOTE : If sleeve (17) cannot be removed or installed easily, deflect elevon.

- (14) Lower PFCU/tool assembly.

CAUTION : DO NOT DAMAGE TRACKS AND SLIDER.

- (15) Remove PFCU from trolley.

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### R D. Inspection of Removed Component

- R (1) Perform ultrasonic inspection of shuttle valves on removed component  
R according to manufacturer instructions.

### R E. Preparation of Replacement Component

- (1) Install elevon zeroing equipment:

Outer PFCU - RIB3: equipment D921303000  
Middle PFCU - RIB9: equipment D921304000  
Set elevon to neutral.

- (2) Secure elevon in neutral with tool D921354000.  
(3) Set protractor to zero on elevon concerned (or note elevon neutral position, using a clinometer).  
(4) Remove tools D921303000 or D921304000.  
(5) Place PFCU on trolley and rig.  
(6) Using mini-hoist, hoist tool/PFCU assembly.  
(7) Circular scratches of less than 0.05 mm (0.00196 in) are the only permissible damage on elevon control rod attachment bolts.

### R F. Install

B **NOTE:** Before installation, apply a light coat of product No.51 on  
B attachment bolt.  
B During installation of PFCU/Structure attachment bolts, make certain  
B that pitch between PFCU attachment points corresponds to that of  
B structural attachment points. The two bolts (coated with product  
B No.51) must be inserted freely without force being applied (sliding  
B fit).

B **CAUTION:** BEFORE FINALISING INSTALLATION IT MUST BE ENSURED THAT SUFFICIENT  
B CLEARANCE EXISTS BETWEEN THE SMALL PFCU DRAIN HOSE AND FORWARD  
B ATTACHMENT CRADLE EYE-END STRUCTURE.

- (1) Secure PFCU rear end fitting to fork end with sleeve (17), washer (16), bolt (15), install washer (18) and attach with nut (19).  
Bolt (15) : torque to between 1.6 and 1.8 mdaN (11.8 and 13.2 lbf ft).  
Nut (19) : torque to between 0.52 and 0.58 mdaN (45 and 50 lbf in).  
Safety nut with cotter pin.  
(2) Install each track (21) on to slider (20) on PFCU body.  
(3) Attach, but do not tighten, rear end (4) of each track (21) to cradle (9), with screws (7) equipped with washers (8). It must be possible for the tracks to pivot on the cradle without any play.  
(4) Secure forward attachment point.

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Install sleeve (36) and washer (34), attachment bolt (33), lock washer (37). Secure washer with nut (38).  
Bolt (33) : torque to between 1.6 and 1.8 m.daN (11.8 and 13.2 lbf. ft).

Nut (38) : torque to between 0.52 and 0.58 m.daN (45 and 50 lbf. in.).

Safety nut with cotter pin.

(5) Remove equipment E920004000 and mini-hoists.

(6) Install screws (7) equipped with washers (8) on forward end (3) of each track. Tighten screws (7) to complete installation of tracks, and wirelock.  
(Ref. 20-21-13).

(7) Assemble ball joint assemblies (1) to structure using bolts (32), washers and nuts (35).

Bolts (32) : torque to between 1.60 and 1.80 m.daN (142 and 160 lbf.in.).

Safety with lockwire (Ref. 20-21-13).

Nuts (35) : torque to between 1.20 and 1.35 m.daN (106 and 120 lbf.in.).

Safety with cotter pin.

(8) Install elevon control rods

(a) LH control rod

(a1) Attach to PFCU

Install back-up washer and install control rod (10) on PFCU trunnion (22), positioning eccentric bush (23) at zero. Install peel washer and nut (24).

Torque to between 9.2 and 16.6 m.daN (67.85 and 122.43 lbf. ft).

Safety with a cotter pin.

(a2) Attach to elevon

Install control rod (10) on elevon spherical bearing. Install sleeve (27), peel washer and nut (30).

Torque to between 6 and 8 m.daN (44.25 and 59 lbf. ft).

Install bolt (29), cup washer (28), tab washer (25), flat washer and nut (26).  
Tighten.

Torque to between 0.7 and 0.8 m.daN (62 and 71 lbf.in.).

Safety with cotter pin and bend tab washer

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tabs.

NOTE : If holes for safetying bolt are not facing slots of nut, it is necessary to adjust peel washer.

(b) RH control rod

(b1) Attach to elevon

Install rod (10) on control surface spherical bearing with sleeve (27), peel washer and nut (30). Torque to between 6 and 8 m.daN (44.25 and 59 lbf. ft).

Install bolt (29), cup washer (28), tab washer (25), flat washer and nut (26).

Tighten.

Torque to between 0.7 and 0.8 m.daN (62 and 71 lbf. in).

Safety with cotter pin and bend tab washer tabs.

NOTE : If holes for safetying bolt are not facing slots of nut, it is necessary to adjust thickness of peel washer.

(b2) Attach to PFCU

Install back-up washer, rod (10) on trunnion (22) of PFCU, install eccentric bush (23), peel washer and nut (24). Do not tighten.

NOTE : On PFCU RH trunnion, position eccentric bush so that rod (10) can be installed without forcing.

If, exceptionally, the eccentricity of RH eccentric bush is not sufficient, adjust LH eccentric bush so that rod can be easily installed.

If necessary, adjust thickness of peel washers to obtain required torque loading on nuts (24).

(b3) Tighten nut (24) on trunnion.

Torque to between 9.2 and 16.6 m.daN (67.85 and 122.43 lbf.ft).

Safety with cotter pin.

(9) Connect hydraulic lines to PFCU as follows :

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- (a) Maintain adapters screwed in PFCU using appropriate wrench.
- (b) Torque tighten hydraulic line union nuts to the following values :
  - Blue Pressure : 2.43 to 2.76 m.daN  
(17.9228 to 20.3576 lbf.ft.)
  - Blue Return : 4.86 to 5.31 m.daN  
(35.8456 to 39.1645 lbf.ft.)
  - Green Pressure : 2.43 to 2.76 m.daN  
(17.9228 to 20.3576 lbf.ft.)
  - Green Return : 4.86 to 5.31 m.daN  
(35.8456 to 39.1645 lbf.ft.)
  - Yell/Blue Pressure : 2.43 to 2.76 m.daN  
(17.9228 to 20.3576 lbf.ft.)
  - Yell/Blue Return : 4.86 to 5.31 m.daN  
(35.8456 to 39.1645 lbf.ft.)
  - Yell/Green pressure: 2.43 to 2.76 m.daN  
(17.9228 to 20.3576 lbf.ft.)
  - Yell/Green Return : 4.86 to 5.31 m.daN  
(35.8456 to 39.1645 lbf.ft.)

WARNING : WHEN A HOSE WITH A BEND RADIUS IS REMOVED FROM AN INSTALLATION, CARE SHALL BE TAKEN NOT TO STRAIGHTEN THE HOSE FROM ITS ACQUIRED SHAPE. IF REQUIRED FOR RE-INSTALLATION, IT SHALL BE FITTED AS NEAR AS POSSIBLE TO THIS SHAPE WITHOUT ANY UNDUE FORMING.

- (10) Using protractor (or clinometer), check that elevon is in neutral.
- (11) Attach resolver feedback link (2) bolt attachment plate to structure. Do not safety.
- (12) Set resolvers to electrical zero.  
(Ref. Fig.403 and 401)
  - (a) Connect test set TE3016000 electrical cables to PFCU connectors.  
Supply test set with 28 VDC.
  - (b) Place test set POWER JACKS AND NOSE WHEEL STEERING selector switch in BLUE CT CONTROL ELEVONS position.
  - (c) Set resolvers to electrical zero.
    - (c1) Cut and remove lockwire from nut (51) and bolts (52), (54) and (55).

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- (c2) Slightly loosen bolts (52), (54) and (55).
  - (c3) Loosen nut (51) so that bolt (53) can be turned, but with slight resistance.
  - (c4) Turn bolt (53) in appropriate direction until adjustment indicator pointer indicates 0 deg plus or minus 2 min. At the same time, gradually increase test set sensitivity to maximum.
  - (c5) Tighten nut (51).  
Torque to between 0.15 and 0.17 m.daN (13 and 15 lbf.in.).
  - (c6) Check that electrical zero has not varied.
  - (c7) Tighten bolts (52) and (54).  
Torque to between 0.07 and 0.09 m.daN (6 and 8 lbf.in.).
  - (c8) Tighten bolt (55).  
Torque to between 0.259 and 0.282 m.daN (23 and 25 lbf.in.).
  - (c9) Wirelock bolts (52), (54) and (55), nut (51).  
(Ref. 20-21-13).
- (13) Remove resolver feedback link (2) bolt attachment plates from structure.
  - (14) Disconnect test set from PFCU.
  - (15) Connect PFCU electrical connectors.
  - (16) Remove tool D921354000 securing elevons in neutral.
  - (17) Fully deflect elevon in both directions and check that in both PFCU stop positions, feedback link can be connected easily to structure.
- WARNING :** IN BOTH PFCU STOP POSITION, MAKE CERTAIN BEFORE CONNECTING FEEDBACK LINK TO STRUCTURE THAT THERE IS A CLEARANCE OF AT LEAST 1 mm (0.039 in.) BEFORE RESOLVERS ACHIEVE THEIR INTERNAL STOPS.
- (18) Attach resolver feedback link (2) bolt attachment plate to structure : bonding strip, washers (6), nuts (5). Wirelock. (Ref. 20-21-13).

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- (19) Connect actuating rods (12) to input levers (11) of the two PFCUs. Do not safety. (It is necessary to support elevon manually).
- (20) Remove warning notices.
- (21) Remove safety clips and tags and set circuit breakers.
- (22) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (23) Immobilize resolvers with rigging pin D925252001 (Roll) and rigging pin D925252003 (Pitch).
- (24) Immobilize mixing unit with pin D921310000. Install floor panel, but do not attach.

**CAUTION:** WHEN INSERTING AND REMOVING PINS TAKE ALL NECESSARY PRECAUTIONS IN ORDER TO AVOID INTRODUCING INADVERTENTLY TOOLS OR MISCELLANEOUS ITEMS IN MIXING UNIT.

- (25) Check that rigging pin D921337000 can be easily inserted in rod and bellcrank assembly at RIB3 for outer PFCU, or in rod and bellcrank assembly at RIB9 for middle PFCU.  
On protractor (or using a clinometer) check that control surface is at neutral.  
If required, adjust length of PFCU actuating rod.  
Remove rigging pin D921337000.
- (26) Tighten actuating rod attachment nuts of both PFCUs.  
Torque to between 0.31 and 0.37 mdaN (27.42 and 32.73 lbf in).  
Safety with cotter pin.
- (27) Remove rigging pin D921310000 from mixing unit.
- (28) Remove rigging pins D925252001 and D925252003 from resolvers and remove protractors.
- (29) Shut down pressurization of hydraulic systems (Ref, 27-00-00, Servicing. Procedure to set flight controls in mechanical mode).

### R G. Tests

- (1) Proceed with tests as per 27-34-52, Adjustment/Tests.
- (2) Upon completion of tests, check that PFCU line connections are leak proof.

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- (3) Before closing access doors and panels carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### R H. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Clean PFCU and surrounding area, and check that no trace of hydraulic fluid remains.
- (3) Close access doors 151DB, 153BB.
- (4) Install elevon and PFCU fairings of relevant PFCU.
- (5) Remove access platform.

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### 4. Power Flight Control Unit Removal/Installation without Test Set TE 3016000

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Zeroing Equipment - Elevons	D921354000
Equipment - Elevon PFCU, Removal/Installation	E920004000
Tool Kit - Elevon PFCU, Removal/Installation	E920003000
Protractor - Elevon and Rudder or Clinometer	TE2012000
Circuit Breaker Safety Clips	
Access platform 3.251m (10ft. 8in.)	
Lockwire Dia 0.8mm (0.032 in.) Corrosion Resistant Steel	
Warning Notices	
Special Materials (Ref. 20-30-00, No.123)	
General Lubricants (Ref. 20-30-00, No.51)	

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Depending on PFCU to be removed, remove the following fairings :
  - LH outer PFCU : Fairings 553JB, LL, LR, KB  
552JB
  - LH middle PFCU : Fairings 552JB, LL, LR, KB  
553JB
  - RH outer PFCU : Fairing 653JB, LL, LR, KB  
652JB
  - RH middle PFCU : Fairing 652JB, LL, LR, KB  
653JB

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- (3) If tool TE 2012000 is to be employed, install it on elevons corresponding to the PFCU to be removed.
- (4) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).

NOTE : If the Blue CT is faulty, set Flight Controls in Green electrical mode. In this case, it will be necessary, when in the main base, to proceed with readjustment by means of the elevon neutral setting jig.

- (5) Fully deflect Flight Controls in both directions. Slowly release to neutral and note position of control surfaces on protractor (or using clinometer). Repeat this operation at least three times and average the readings taken in each direction. Zero reference position for readings on protractor will be the middle point of the range defined by the average values of deflections in both directions.
- (6) On LH or RH wing, according to PFCU to be removed, disconnect actuating rod from input lever, on both PFCUs.  
Do not change length of these rods.

NOTE : For installing or removing attachment bolts, it is necessary to press plunger located on head of bolt in order to release locking system.

- (7) Support elevon in position (approximately to neutral) using locking equipment D921354000.
- (8) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in electrical mode).
- (9) Open door 151 DB and depressurize Blue, Green and Yellow hydraulic systems (Ref. 29-12-00, Servicing; 29-11-00, Servicing; 29-21-00, Servicing).
- (10) Open door 153 BB, and depressurize Blue, Green and Yellow hydraulic tanks (Ref. 29-13-00, Servicing).
- (11) Close tank depressurization valves and safety with lockpin.
- (12) Trip, Safety and Tag the following circuit breakers :

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFCs INV GRN FAIL IND	1-213	1C73	M15
PFCs INV GRN SUP	1-213	1C66	P11
FLT CONT POSN IND 26V 400 HZ SUP	2-213	C84	B 4
PFCs INV BLUE SUP	5-213	2C66	B14
PFCs INV BLUE FAIL IND	5-213	2C73	E11
HYD GRND CHECK OUT SEL	15-216	M626	E22
HYD TANKS COMPR CONT	15-216	M602	D 8

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

### C. Remove (Ref. Fig.401 and 402)

WARNING : GREAT CARE MUST BE TAKEN WHEN HANDLING REMOVING OR INSTALLING THE PFCUs BECAUSE OF THE RELATIVE FRAGILITY OF SOME OF THEIR COMPONENTS. ONLY FORWARD, REAR OR CENTRE ATTACHMENT POINTS MUST BE USED FOR ATTACHMENT OR SUPPORT PURPOSES.

Outer PFCU weight : 60.6 Kgs  
Middle PFCU weight : 60.6 Kgs

#### (1) Disconnect hydraulic lines as follows :

- (a) Maintain adapter screwed in PFCU using appropriate wrench.
- (b) Unscrew hydraulic line union nut and disengage the line.

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- (c) Cap open line ends.
- (2) Remove bonding strips (attachment points, ends of elevon control rods).
- (3) On PFCU/Elevon control rod connections, remove cotter pin and unscrew nuts (24), remove shim washers : withdraw eccentric bushes (23) by means of extractor D921225000.
- (4) Remove cotter pins and unscrew nuts (26), remove bolts (29), washers (25) and (28). Unscrew slotted nuts (30), remove sleeve (27) and retain washers.
- (5) Remove elevon control rods (10) and back-up washers.
- (6) Disconnect from structure, resolver feedback link (2) bolt attachment plate; nuts (5) washers (6) bonding strips.
- (7) Remove screws (7) and washers (8) attaching tracks (21).
- (8) Fix mini-hoists to attachment points provided for this purpose.
- (9) Using the mini-hoists, bring equipment E920004000 opposite attachment points on PFCU. Attach this tool to PFCU.
- (10) Disconnect ball joint assemblies (1) on the end of sliding tubes, from structure; remove nuts (35), washers, and bolts (32).
- (11) At PFCU forward attachment point, remove cotter pin and nut (38), lock washer (37), bolt (33), sleeve (36) and washer (34).
- (12) At PFCU aft attachment point, remove cotter pin and nut (19) remove lock washer (18), bolt (15), sleeve (17) and washer (16).

NOTE : If sleeve (17) cannot be removed or installed easily, deflect elevon.

- (13) Lower PFCU/Tool assembly.

CAUTION : DO NOT DAMAGE TRACKS AND SLIDER.

- (14) Remove PFCU from trolley.

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### R D. Inspection of Removed Component

- R (1) Perform ultrasonic inspection of shuttle valves on removed component  
R according to manufacturer instructions.

### R E. Preparation of Replacement Component

- (1) Place PFCU on trolley and attach.  
(2) Using mini-hoist, hoist tool/PFCU assembly.  
(3) Circular scratches of less than 0.05 mm (0.00196 in) deep are the only permissible damage on elevon control rod attachment bolts.

### R F. Install

B **NOTE:** Before installation, apply a light coat of product No.51 on  
B attachment bolt.  
B During installation of PFCU/Structure attachment bolts, make certain  
B that pitch between PFCU attachment points corresponds to that of  
B structural attachment points.  
B The two bolts (coated with product No.51) must be inserted freely,  
B without force being applied (sliding fit).

B **CAUTION:** BEFORE FINALISING INSTALLATION IT MUST BE ENSURED THAT SUFFICIENT  
B CLEARANCE EXISTS BETWEEN THE SMALL PFCU DRAIN HOSE AND FORWARD  
B ATTACHMENT CRADLE EYE-END STRUCTURE.

- (1) Secure PFCU rear end fitting to fork end with sleeve (17), washer (16), bolt (15), install washer (18) and attach with nut (19).  
Bolt (15) : torque to between 1.6 and 1.8 mdaN (11.8 and 13.2 lbf ft).  
Nut (19) : torque to between 0.52 and 0.58 mdaN (45 and 50 lbf in).  
Safety with cotter pin.
- (2) Install each track (21) on to slider (20) on PFCU body.
- (3) Attach, but do not tighten, rear end (4) of each track (21) to cradle (9), with screws (7) equipped with washers (8). It must be possible for the tracks to pivot on the cradle without any play.
- (4) Secure forward attachment point.  
Install sleeve (36), washer (34), attachment bolt (33), lockwasher (37) and tighten nut (38).  
Bolt (33) : torque to between 1.6 and 1.8 m.daN (11.8 and 13.2 lbf ft).  
Nut (38) : torque to between 0.52 and 0.58 m.daN (45 and 50 lbf in).  
Safety with cotter pin.
- (5) Remove equipment E920004000 and mini-hoists.
- (6) Install screws (7) equipped with washers (8) on forward end (3) of each track.  
Tighten screws (7) to complete installation of tracks.

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Safety with lockwire (as per 20-21-13).

- (7) Assemble ball joint assembly (1) to structure using bolts (32), washers, nuts (35).

Bolts (32) : torque to between 1.60 and 1.80 m.daN (142 and 160 lbf.in.).

Safety with lockwire (Ref. 20-21-13).

Nuts (35) : torque to between 1.20 and 1.35 m.daN (106 and 120 lbf.in.).

Safety with cotter pin.

- (8) Install elevon control rods.

(a) LH control rod :

(a1) Attach to PFCU;

Install back-up washer, and install control rod (10) on PFCU trunnion (22), positioning eccentric bush (23) at zero. Install peel washer and nut (24).

Torque to between 9.2 and 16.6 m.daN (67.85 and 122.43 lbf.ft). Safety with cotter pin.

(a2) Attach to elevon;

Install rod (10) on elevon spherical bearing with sleeve (27), peel washer and nut (30).

Torque to between 6 and 8 m.daN (44.25 and 59 lbf.ft).

Install bolt (29), cup washer (28), tab washer (25), flat washer and nut (26). Tighten.

Torque to between 0.7 and 0.8 m.daN (62 and 71 lbf.in).

Safety with cotter pin and bend tab washer tabs.

NOTE : If holes for safetying bolt are not facing slots of nut, it is necessary to adjust thickness of peel washer.

(b) RH control rod :

(b1) Attach to elevon;

Install rod (10) on elevon spherical bearing. Install sleeve (27) peel washer and nut (30). Tighten nut.

Torque to between 6 and 8 m.daN (44.25 and 59 lbf.ft).

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Install bolt (29), cup washer (28), tab washer (25), flat washer and nut (26).  
Tighten nut.

Torque to between 0.7 and 0.8 m.daN  
(62 and 71 lbf. in.).

Safety with cotter pin and bend tab washer tabs.

NOTE : If holes for safetying bolt are not facing slots of nut, it is necessary to adjust thickness of peel washer.

### (b2) Attach to PFCU

Install back-up washer and control rod (10) on PFCU trunnion (22); install eccentric bush (23), peel washer and nut (24). Do not tighten.

NOTE : On PFCU RH trunnion, position eccentric bush so that rod (10) can be installed without forcing on control surface spherical bearing.  
If, exceptionally, the eccentricity of RH eccentric bush is not sufficient adjust LH eccentric bush so that rod can be easily installed.  
If necessary, adjust thickness of peel washers to obtain required torque loading on nuts (24).

(b3) Tighten nut (24) on trunnion.  
Torque to between 9.2 and 16.6 m.daN  
(67.85 and 122.43 lbf.ft).  
Safety with cotter pin.

### (9) Connect hydraulic lines to PFCU as follows :

- (a) Maintain adapter screwed in PFCU using appropriate wrench.
- (b) Torque tighten hydraulic line union nuts to the following values :
- |                |  |
|----------------|--|
| Blue Pressure  | : 2.43 to 2.76 m.daN<br>(17.9228 to 20.3576 lbf.ft.) |
| Blue Return    | : 4.86 to 5.31 m.daN<br>(35.8456 to 39.1645 lbf.ft.) |
| Green Pressure | : 2.43 to 2.76 m.daN<br>(17.9228 to 20.3576 lbf.ft.) |
| Green Return   | : 4.86 to 5.31 m.daN<br>(35.8456 to 39.1645 lbf.ft.) |

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Yell/Blue Pressure : 2.43 to 2.76 m.daN  
(17.9228 to 20.3576 lbf.ft.)  
Yell/Blue Return : 4.86 to 5.31 m.daN  
(35.8456 to 39.1645 lbf.ft.)  
Yell/Green pressure: 2.43 to 2.76 m.daN  
(17.9228 to 20.3576 lbf.ft.)  
Yell/Green Return : 4.86 to 5.31 m.daN  
(35.8456 to 39.1645 lbf.ft.)

**WARNING** : WHEN A HOSE WITH A BEND RADIUS IS  
REMOVED FROM AN INSTALLATION, CARE  
SHALL BE TAKEN NOT TO STRAIGHTEN THE  
HOSE FROM ITS ACQUIRED SHAPE.  
IF REQUIRED FOR RE-INSTALLATION IT  
SHALL BE FITTED AS NEAR AS POSSIBLE TO  
THIS SHAPE WITHOUT ANY UNDUE FORMING.

- (10) Remove elevon zeroing equipment 0921354000.
- (11) Connect PFCU electrical connectors.
- (12) Fully deflect elevon in both directions and check that  
in both PFCU stop positions feedback link can be con-  
nected easily to structure.

**WARNING** : IN BOTH PFCU STOP POSITIONS, MAKE CERTAIN,  
BEFORE CONNECTING FEEDBACK LINE TO STRUCTURE,  
THAT THERE IS A CLEARANCE OF AT LEAST 1 mm  
(0.039 in.) BEFORE RESOLVERS ACHIEVE THEIR  
INTERNAL STOPS.

- (13) Attach resolver feedback link (2) bolt attachment plate  
to structure : bonding strip, washer (6), nuts (5).  
Safety with lockwire (Ref. 20-21-13).
- (14) On LH or RH wings corresponding to relevant PFCU,  
connect actuating rods (12) to input lever (11) of  
the 2 PFCUS. Safety with cotter pin (It is necessary  
to support elevon manually).
- (15) Remove warning notices.
- (16) Remove safety clips and tags and set circuit breakers.
- (17) Carry out neutral setting check, if incorrect:
  - (a) In mechanical mode, adjust PFCU input rod.
  - (b) In electrical mode, adjust PFCU resolver adjustable  
Lever (Ref. Fig.4J3.)
- (18) Carry out neutral tolerance test (Ref. 27-11-00,  
adjustment/test, paragraph 4).
- (19) Remove protractors.

R B  
R B  
R B  
R B  
R B  
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R B

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## **MAINTENANCE MANUAL**

### **R G. Tests**

- (1) Carry out tests (Ref. 27-34-52, Adjustment/Tests).
- (2) After tests make certain that PFCU line connections are leak proof.
- (3) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### **R H. Close-Up**

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Clean PFCU and adjacent area. Check that no trace of hydraulic fluid remains.
- (3) Close access doors 151DB, 153BB.
- (4) Install elevon and PFCU fairings of relevant PFCU.
- (5) Remove access platform.

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### 5. Green or Blue Electrovalve Removal

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Access Platform 3.251 m (10 ft. 8 in.)	
Lockwire Dia. 0.5 mm (0.020 in.)	
Corrosion Resistant Steel	

#### B. Prepare

- (1) Take the precautions described in the previous warning paragraph.
- (2) Open door 151DB, depressurize Green, Blue and Yellow hydraulic systems (Ref. 29-11-00, 29-12-00 and 29-21-00, Servicing).
- (3) Open door 153BB, depressurize Green, Blue and Yellow hydraulic tanks (Ref. 29-13-00, Servicing).
- (4) Remove the following relevant PFCU fairings :  
LH outer PFCU : fairing 553JB  
LH middle PFCU : fairing 552JB  
RH outer PFCU : fairing 653JB  
RH middle PFCU : fairing 652JB.
- (5) Depending on electrovalve to be replaced, trip safety and tag the following circuit breakers :  
  
(a) Green Electrovalves

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
MID & OUTER ELVN CONT & MON GRN SUP	1-213	1C 55	M12
OUTER ELEVON NEUTRLN GRN SUP		1C 58	M13
HYD TANK COMPR CONT	15-215	M 602	D 8
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

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### (b) Blue Electrovalves

SERVICE	PANEL	CIRCUIT BREAKER		MAP REF.
MID & OUTER ELEVON CONT & MON BLUE SUP	5-213	2C	55	D12
OUTER ELEVON NEUTRLN BLUE SUP		2C	58	D13
HYD TANK COMPR CONT	15-215	M	602	D 8
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M	626	F22

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

#### C. Remove (Ref. Fig. 404 )

- (1) Remove protective plate (61).
  - (a) Cut lockwire and remove screws (63). Retain washers (62) and remove plate.
- (2) Disconnect electrical connector.
  - (a) Remove straps attaching electrical leads.
  - (b) Remove clamp block (70) securing junction box (75), nut (72), washer (71).
  - (c) Remove lockwire and screws (73), separate the two sections of the junction box, then disconnect plug connector. Discard gasket (74).
- (3) Cut and remove lockwire, remove screws (68) then

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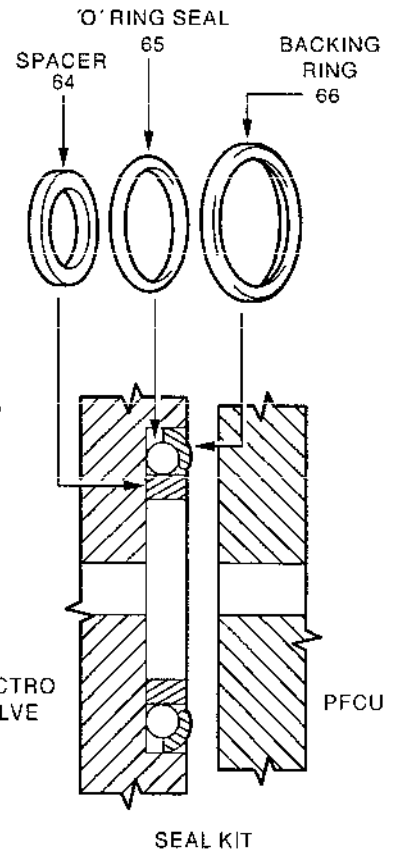
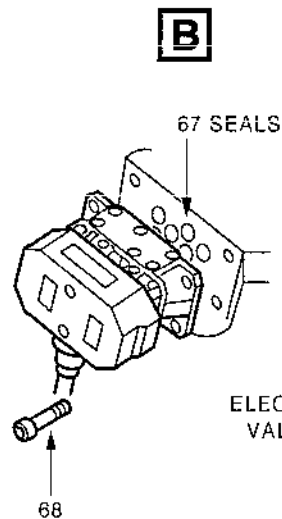
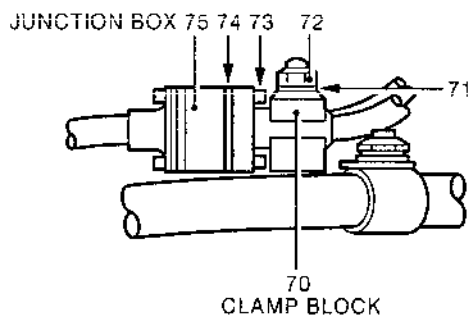
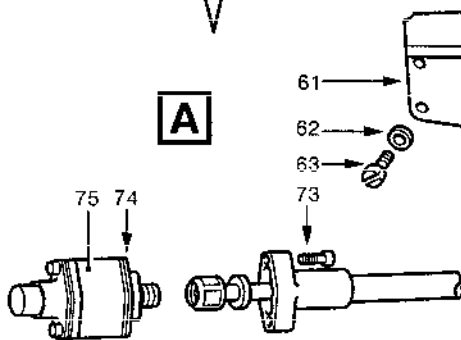
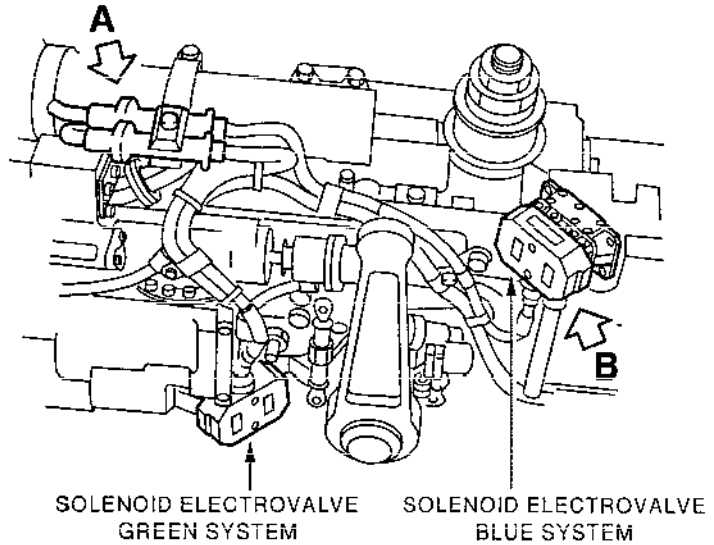
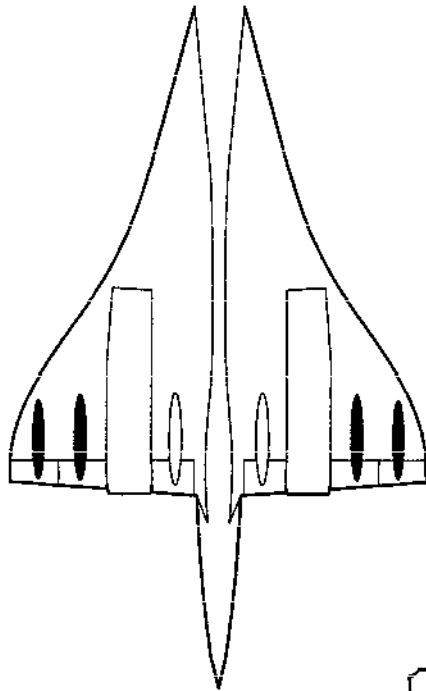
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RB

ELECTROVALVE  
Figure 404

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electrovalve with seal kit (67) or coaxial seals.

**CAUTION:** TAKE ALL NECESSARY PRECAUTIONS TO AVOID  
CONTAMINATION OF HYDRAULIC FLUID.

### D. Preparation of Replacement Component

- B (1) If fitted, the transit protective plate is to be  
RB removed from the electrovalve seal face.
- B (2) Check that the three replacement seal kits are  
B correctly installed. Before fitting the seal  
B assemblies into the electrovalve counterbore, a trial  
B installation of the copper backing rings should be  
B accomplished. If they do not fit into the counterbore  
B the copper backing rings should be lightly dressed  
B using a fine file until they do.
- B (3) The order of assembly is O ring (65) first, then  
B copper backing ring (66) with the concave surface  
B facing the seal and finally the alloy spacer (64).  
B Under pressure the O ring would distort, the light  
B alloy spacer retains it concentrically in the  
B counterbore and ensures seal loading is face to face,  
B the copper backing ring precludes feathering of the O  
B ring during its service life.

### E. Install

- (1) Position electrovalve and secure with screws (68).

**CAUTION:** WHEN POSITIONING ELECTROVALVE TAKE CARE THAT  
SEALS ARE NOT DISTURBED FROM COUNTERBORES.

Torque screws to between 20 and 22 lbf in (0.23 and  
0.25 mdaN).

Safety screws in pairs with lockwire (Ref. 20-21-13).

- (2) Connect electrical connector.

**NOTE:** Plugs are identified L for Blue electrovalves  
and F for Green electrovalves.  
Connect plugs and sockets bearing the same  
identification.

- (a) Install a new gasket (74).

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- (b) Connect the two halves of connector then the two sections of the junction box.  
Secure the two sections of junction box with screws (73). Safety screws with lockwire (Ref. 20-21-13)
- (c) Attach junction box with clamp block (70), washer (71), nut (72).
- (d) Replace lead straps if necessary.

- (3) Remove safety clips and tags and set circuit breakers.
- (4) Pressurize Green and Blue hydraulic tanks (Ref. 29-13-00, Servicing).

### F. Tests

- (1) Carry out test of electrovalve (Ref. Adjustment/Test).
- (2) Upon completion of these tests, check electrovalve for external leaks.
- (3) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools or miscellaneous items of equipment.
- (2) Install protective plate (61) and secure with screws (63) and washers (62).  
Safety with lockwire (Ref. 20-21-13).
- (3) Install PFCU fairings and close access doors.
- (4) Remove warning notices and access platform.

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## MAINTENANCE MANUAL

### 6. Synchro Pack Removal

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins - Synchro Pack	D925252000
Rigging Pin - Torque Tube at RIB3 and 9	D921337000
Zeroing Equipment - Elevons	D921354000
Rigging Pin - Mixing Unit - Servo Control	D921310000
Jig - Neutral Setting - Elevons at RIB3	D921303000
Jig - Neutral Setting - Elevons at RIB9	D921304000
Circuit Breaker Safety Clips	
Access Platform 3.251 m (10 ft. 8 in.)	
Lockwire Dia. 0.80 mm (0.032 in.) Corrosion Resistant Steel	
Warning Notice	

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Remove the following relevant PFCU fairings :  
LH outer PFCU : fairing 553JB  
LH middle PFCU : fairing 552JB  
RH outer PFCU : fairing 653JB  
RH middle PFCU : fairing 652JB
- (3) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).
- (4) Open door 121FB and immobilize resolvers :  
Roll : rigging pin D925252001  
Pitch : rigging pin D925252003

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## MAINTENANCE MANUAL

- (5) Open floor panel 241HF and immobilize mixing unit with rigging pin D921310000 position floor panel but do not attach at this stage.

**WARNING :** WHEN INSERTING AND REMOVING PINS TAKE ALL NECESSARY PRECAUTIONS IN ORDER TO AVOID INTRODUCING INADVERTENTLY TOOLS OR MISCELLANEOUS ITEMS IN MIXING UNIT.

- (6) Support elevon in its present position using equipment D921354000.
- (7) On RH or LH wing, depending on the PFCU concerned, disconnect actuating rod from the input lever of the two PFCU's. Do not alter length of rods.
- (8) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in electrical mode).
- (9) Install equipment D921303000 or D921304000, position elevon at position 0 and maintain it in this position with equipment D921354000.
- (10) Open door 151DB, and depressurize Green, Blue and Yellow hydraulic systems (Ref. 29-11-00, 29-12-00, and 29-21-00, Servicing).
- (11) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT POSN IND 26V 400 HZ SUP	2-213	C 84	B 4
MID & OUTER ELEVON BLUE CONT SUP		2C 92	C 4
MID & OUTER ELEVON MON BLUE SUP		2C 46	D 2
MID & OUTER ELEVON MON GRN SUP		1C 46	G 2
MID & OUTER ELEVON GRN CONT SUP		1C 92	H 5

### C. Removal (Ref. Fig. 405 )

- (1) Remove electrical lead attachment clips, nuts (94), washers (95), then nuts (98), washers (99). Disengage synchro pack bracket (96).

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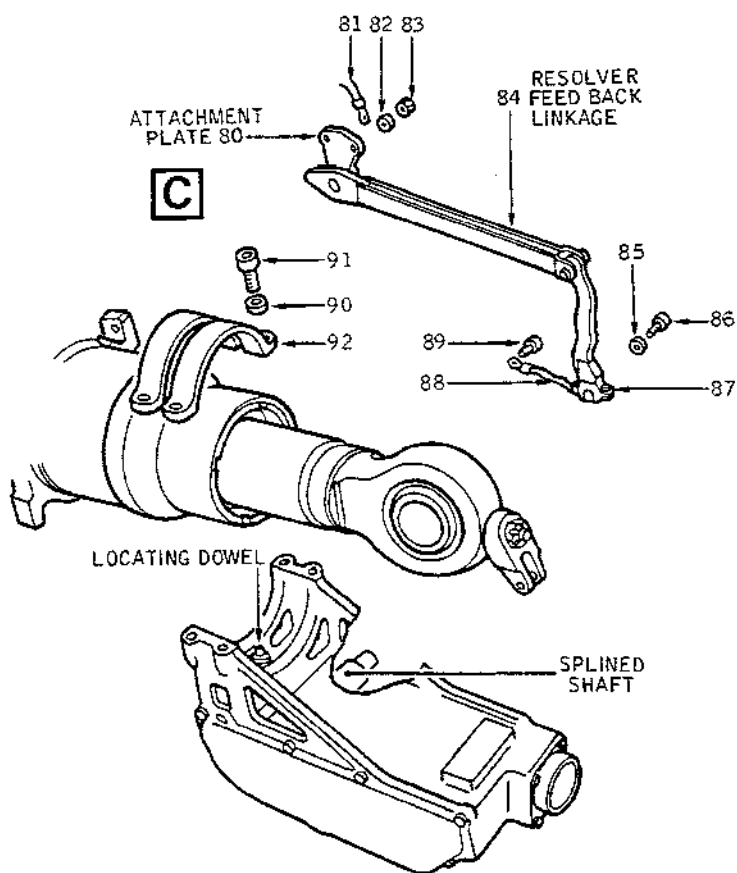
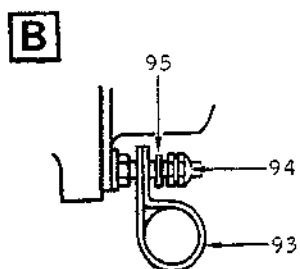
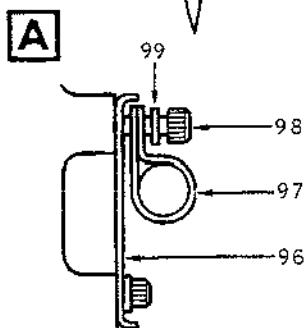
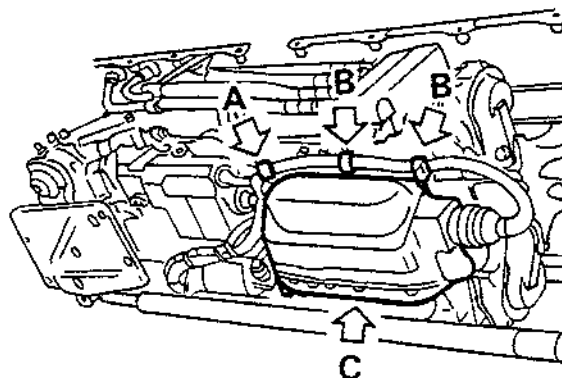
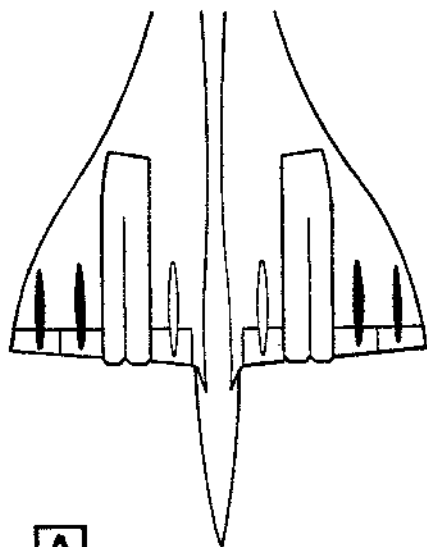
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CMA 27 34 52 4 AJM0

Synchro Pack  
Figure 405

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- (2) Unsafety then disconnect electrical connector and fit blanking cap.
- (3) Disconnect bonding strip (88) from synchro pack ; screws (89).
- (4) Disconnect resolver feedback link (84).
  - (a) Unsafety and unscrew nuts (83), retain washers (82), bonding strip (81) and remove attachment plate (80) from aircraft structure.
  - (b) Unsafety and remove nut (86), retain washer (85).
  - (c) Unsafety and slightly loosen screws (87) to withdraw resolver feedback linkage from splined shaft on synchro pack.
- (5) Unsafety and remove screws (91), retain washers (90) and remove synchro pack.

NOTE : Synchro pack straps (92) are left on ram housing.

### D. Preparation of Replacement Component

Not applicable.

### E. Install

NOTE : The gland retaining ring nut of ram assembly is wirelocked to synchro pack attaching screws (91). Prior to positioning replacement synchro pack, fit suitable length of locking wire to gland nut.

- (1) Engage location dowel of synchro pack in hole in ram body.
- (2) Secure synchro pack with screws (91) and washers (90). Torque to between 78 and 85 lbf.in. (0.87 and 0.98 m.daN). Safety screws with lockwire as per 20-21-13.
- (3) Connect resolver feedback link (84).
  - (a) Connect adjustable lever to synchro pack splined shaft. Align datum marks.
  - (b) Install washer (85) and screw (86). Torque to between : 23 and 25 lbf.in. (0.259 and 0.282 m.daN).

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- (c) Slightly tighten screws (87).
- (d) Secure link attachment plate (80) to aircraft structure, nuts (83), washers (82).
- (e) Do not safety screws and nuts at this stage.
- (4) Proceed with adjustment of synchro pack electrical zero (Ref. paragraph 2).
- (5) Remove link attachment plate (80) from aircraft structure.
- (6) Disconnect test set from PFCU.
- (7) Remove items of equipment D921354000 and D921303000 or D921304000.
- (8) Deflect elevon and check that in both fully up and fully down positions bolts used to secure attachment plate (80) can be inserted freely.

CAUTION : A FURTHER CLEARANCE OF AT LEAST 1MM (0.039 IN.) MUST BE OBTAINED BEFORE RESOLVERS ACHIEVE THEIR INTERNAL STOPS.

- (9) Secure attachment plate (80) to aircraft structure, Washers (82), nuts (83) and bonding strips (81). Safety nuts with lockwire as per 20-21-13.
- (10) Tighten screws (87). Torque to between 0.07 and 0.09 m.daN (6 and 8 lbf.in.). Safety with lockwire as per 20-21-13.
- (11) Connect electrical connector to synchro pack and safety with lockwire as per 20-21-13.
- (12) Install bracket (96) on synchro pack and secure clips (93) (97) with nuts (94) (98), washers (95) (99).
- (13) Connect PFCU input lever actuating rods disconnected during "Prepare" procedure above. Torque nut to between 0.31 and 0.37 m.daN (27.42 and 32.73 lbf.in.). Safety with cotter pin.
- (14) Connect bonding strip (88) to synchro pack, screw (89).
- (15) Remove safety clips and tags and set circuit breakers.
- (16) Set Flight Controls in mechanical mode (Ref. 27-00-00,

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Servicing).

- (17) Remove rigging pins D925252001  
D925252003  
D921310000.

- (18) Close floor panel 241HF and access door 121FB.

- (19) Shut down pressurization of hydraulic systems.  
(Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).

### F. Tests

- (1) Carry out a functional test (Ref. 27-34-52, Adjustment/Test).
- (2) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access doors and remove warning notices.
- (3) Install PFCU fairing and remove access platform.

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## MAINTENANCE MANUAL

### 7. Resolver Feedback Linkage Removal

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins - Synchro Pack	D925252000
Rigging Pin - Torque Tube at RIB3 and 9	D921337000
Zeroing Equipment - Elevons	D921354000
Rigging Pin - Mixing Unit - Servo Control	D921310000
Jig - Neutral Setting - Elevons at RIB3	D921303000
Jig - Neutral Setting - Elevons at RIB9	D921304000
Access Platform 3.251 m (10 ft. 8 in.)	
Lockwire Dia. 0.80 mm (0.032 in.) Corrosion Resistant Steel	

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Remove the following relevant PFCU fairings :  
LH outer PFCU : fairing 553JB  
LH middle PFCU : fairing 552JB  
RH outer PFCU : fairing 653JB  
LH middle PFCU : fairing 652JB.
- (3) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).
- (4) Open access door 121FB and immobilize resolvers with rigging pins :  
Roll : rigging pin D925252001  
Pitch : rigging pin D925252003.
- (5) Open floor panel 241HF and immobilize mixing unit with rigging pin D921310000, position floor panel without attaching.

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**WARNING :** WHEN INSERTING AND REMOVING PINS TAKE ALL NECESSARY PRECAUTIONS IN ORDER TO AVOID INTRODUCING INADVERTENTLY TOOLS OR MISCELLANEOUS ITEMS IN MIXING UNIT.

- (6) Support elevon in its present position using equipment D921354000.
- (7) On RH or LH wing, depending on PFCU concerned, disconnect actuating rod from the input lever of the two PFCU's. Do not alter length of rods.
- (8) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in electrical mode).
- (9) Install equipment D921303000 or D921304000, position elevon at position 0 and maintain it in this position with equipment D921354000.
- (10) Open door 151DB, depressurize Green, Blue and Yellow hydraulic systems (Ref. 29-11-00, 29-12-00 and 29-21-00, Servicing).
- (11) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT POSN IND 26V 400HZ SUP	2-213	C 84	B 4
MID & OUTER ELEVON BLUE CONT SUP		2C 92	C 4
MID & OUTER ELEVON MON BLUE SUP		2C 46	D 2
MID & OUTER ELEVON MON GRN SUP		1C 46	G 2
MID & OUTER ELEVON GRN CONT SUP		1C 92	H 5

### C. Removal (Ref. Fig. 406 )

- (1) Disconnect feedback link from synchro pack.
  - (a) Unsafety and remove screw (110), retain washer (111).
  - (b) Unsafety and remove screw (109) attaching bonding strip (108), slightly loosen the other screw

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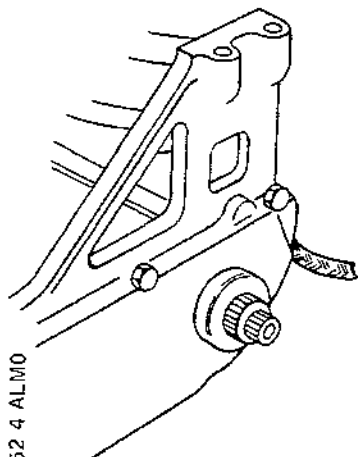
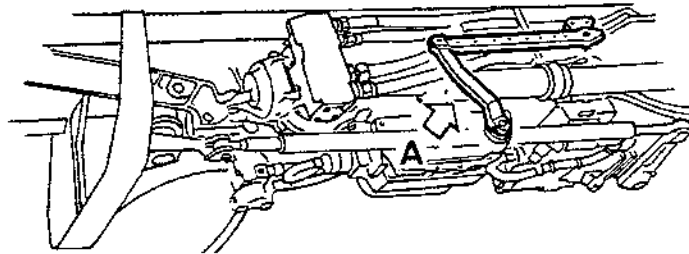
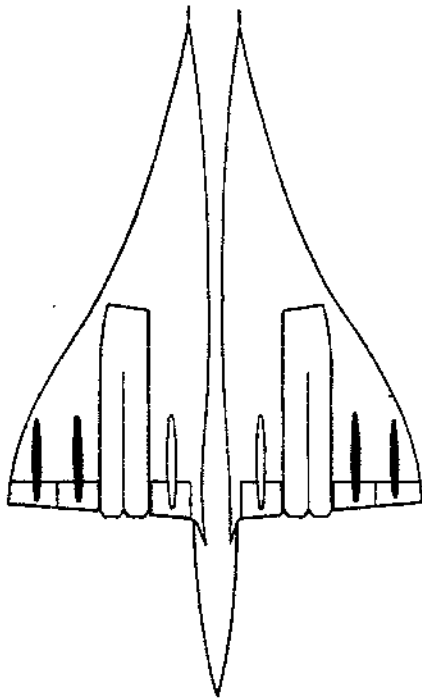
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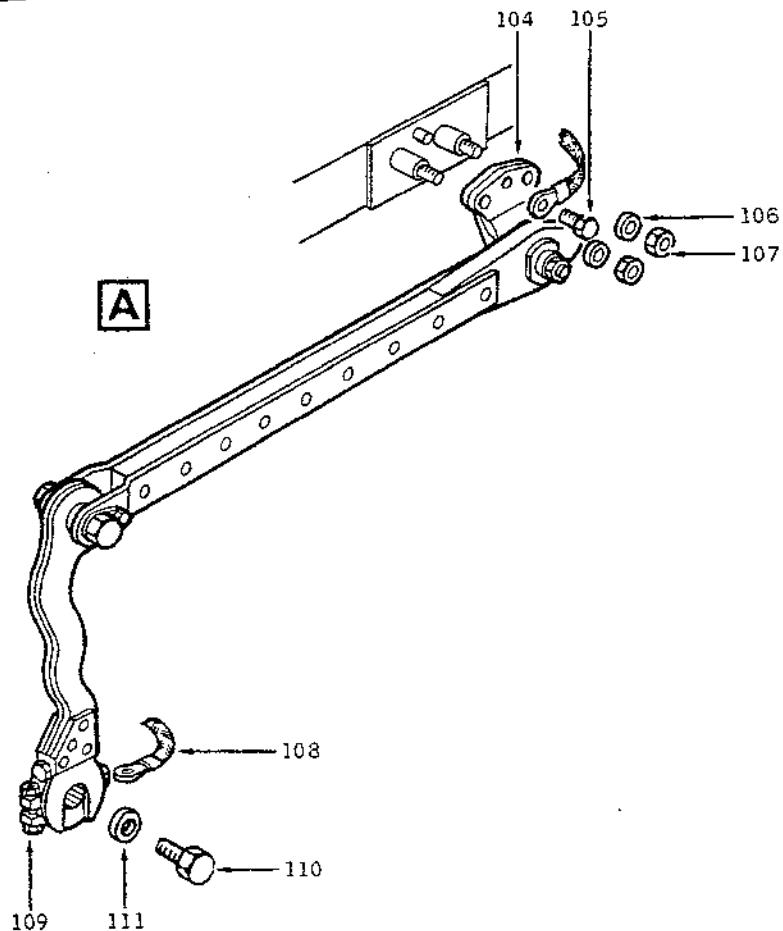
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CMA 27 34 52 4 ALMO



Resolver Feedback Linkage  
Figure 406

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(109).

(c) Remove feedback lever from synchro pack splined shaft.

(2) Disconnect feedback link from aircraft structure.

(a) Unsafety and remove screw (105) attaching bonding strip.

(b) Unsafety and remove nuts (107), retain washers (106).

(3) Remove linkage.

### D. Preparation of Replacement Component

Not applicable.

### E. Install

(1) Connect linkage to synchro pack.

(a) Connect adjustable lever to synchro pack splined shaft. Align datum marks.

(b) Install washer (111) and screw (110). Torque to between 23 and 25 lbf. in. (0.259) and 0.282 m.daN).

(c) Install bonding strip (108) and slightly tighten screws (109).

(2) Install link attachment plate (104) on aircraft structure, nuts (107), washers (106).

(3) Do not safety screws and nuts at this stage.

(4) Proceed with adjustment of synchro pack electrical zero (Ref. paragraph 2).

(5) Remove attachment plate (104) from aircraft structure.

(6) Disconnect test set from PFCU.

(7) Remove items of equipment D921354000, D921303000 and D921304000.

(8) Deflect elevon and check that in both fully up and fully down positions, attachment plate (104) bolts can be inserted freely.

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**CAUTION** : A FURTHER CLEARANCE OF AT LEAST 1 MM (0.039 IN.) MUST BE OBTAINED BEFORE RESOLVERS ACHIEVE THEIR INTERNAL STOPS.

- (9) Secure attachment plate (104) to aircraft structure, washers (106), nuts (107) and bonding strip with screw (105).  
Safety nuts with lockwire as per 20-21-13.
- (10) Tighten screws (109). Torque to between 0.07 and 0.09 m.daN (6 and 8 lbf.in.).  
Safety with lockwire as per 20-21-13.
- (11) Connect actuating rods to input levers of PFCU's. Torque to between 0.31 and 0.37 m.daN (27.42 and 32.73 lbf.in.). Safety with cotter pin.
- (12) Remove safety clips and tags and set the circuit breakers.
- (13) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (14) Remove rigging pins D925252001  
D925252003  
D921310000  
D921311000
- (15) Install floor panel 241HF and close access door 121FB.
- (16) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in mechanical mode).

### F. Tests

- (1) Carry out a functional test (Ref. 27-34-52, Adjustment/Test).
- (2) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access doors.
- (3) Install PFCU fairing and remove access platform.

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### 8. Removal of Shuttle Valve Assembly

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Adapter Torque - Elevon PFCU	TL1-P215-45-1175
Protection Sleeve - Elevon/Rudder PFCU	ST2-P235-45-18
Extraction Tool - Elevon/Rudder PFCU	ET1-P215-45-2
Bullet - Elevon PFCU	B1-P235-45-2
Bullet - Elevon PFCU	B2-P235-45-2
Bullet - Elevon PFCU	B3-P235-45-2
Circuit Breaker Safety Clips	
Access Platform 3.251 m (10 ft. 8 in.)	
Lockwire Dia. 0.8 mm (0.032 in.) Corrosion Resistant Steel	
Warning Notices	
Blanking Caps	

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Open access door 151DB and depressurize Green, Blue and Yellow Hydraulic systems (Ref. 29-11-00, 29-12-00 and 29-21-00, Servicing).
- (3) Open access door 153BB and depressurize Green, Blue and Yellow hydraulic tanks (Ref. 29-13-00, Servicing).
- (4) Remove the following relevant PFCU fairings :
  - LH outer PFCU : fairing 553JB
  - LH middle PFCU : fairing 552JB
  - RH outer PFCU : fairing 653JB
  - LH middle PFCU : fairing 652JB

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(5) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL/ VALVE CONT	15-216	M 626	F22
HYD TANKS COMPR CONT	15-215	M 602	D 8

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

C. Removal (Ref. Fig. 407 )

CAUTION : TAKE ALL NECESSARY PRECAUTIONS TO AVOID HYDRAULIC FLUID CONTAMINATION.

(1) Disconnect hydraulic lines as follows :

- (a) Maintain adapter screwed in PFCU using appropriate wrench.
- (b) Loosen hydraulic line union nut and disengage the line.
- (c) Cap open ends.

(2) Unsafety and remove screws (136) retain washers (137) on RH shuttle valve assembly. On LH shuttle valve assembly, remove cotter pin and loosen nuts (133), retain washers (134) and remove bolts (135).

(3) Unsafety and using equipment TL1-P215-45-1175, unscrew spigot nut (122) until threaded end of sliding tube (124) is disengaged ; remove ball joint assembly (121).

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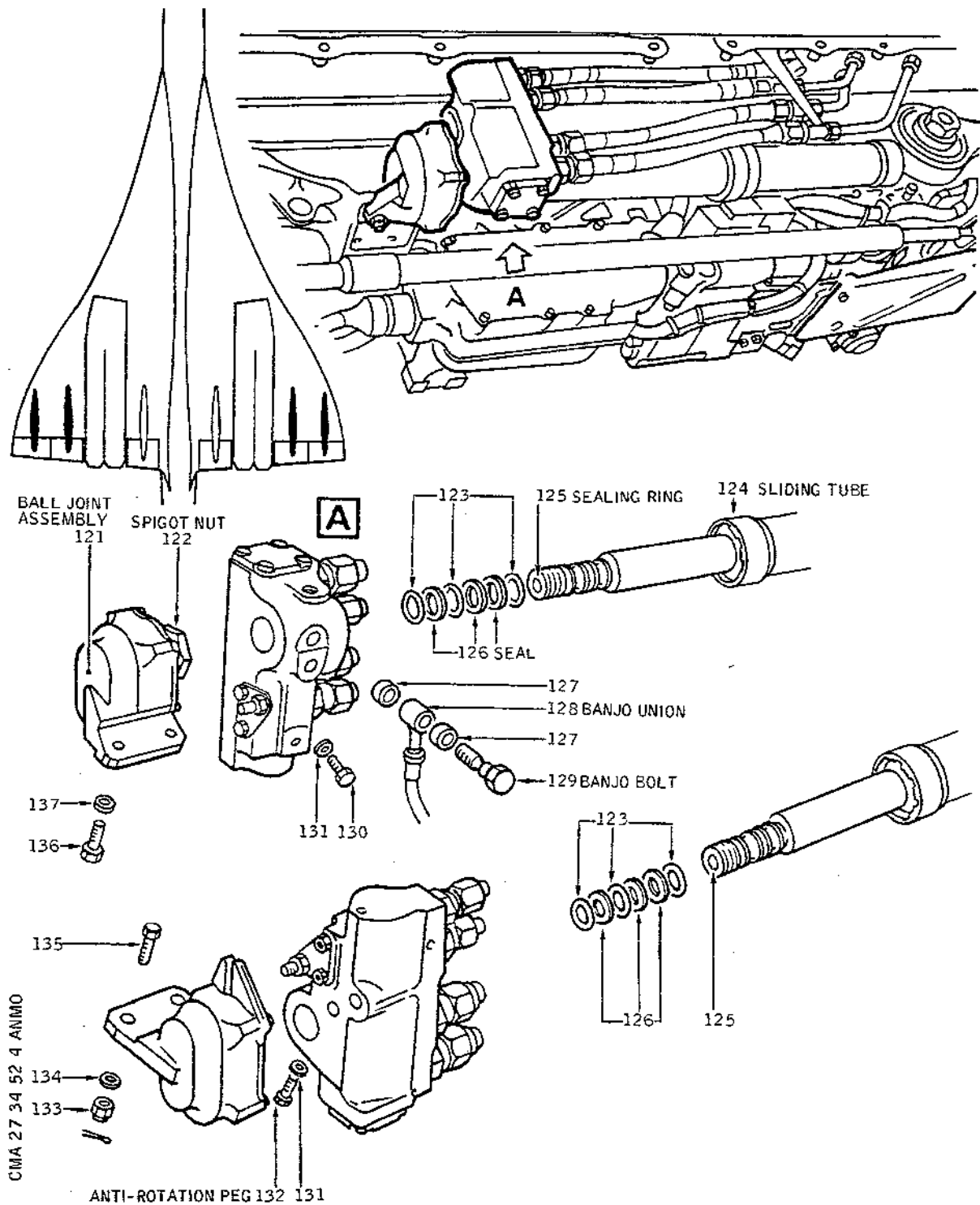
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Shuttle Valve Assembly  
Figure 407

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- (4) For RH shuttle valve only, unsafety and remove banjo bolt (129), disengage banjo union (128) with clam seals (127).
- (5) Remove anti-rotation peg (130) or (132) with clam seal (131).
- (6) Install equipment ST2-P235-45-18 on sliding tube threaded end, and by means of equipment ET1-P215-45-2 remove shuttle valve from sliding tube.
- (7) Remove and discard seals (126) and backing rings (123). Identify seals and backing rings locations.

### D. Preparation of Replacement Component

Not applicable.

### E. Install

- (1) Position seals (126) and backing rings (123) on sliding tube according to their respective locations identified during removal procedure.  
Use items of equipment B1-B2.B3.P235-45-2.
- (2) Check that sealing ring (125) is installed on sliding tube threaded end.
- (3) Install shuttle valve on sliding tube and remove equipment ST2-P235-45-18.
- (4) Align shuttle valve with hole in sliding tube and install anti-rotation peg (130) or (132) and clam seal (131).  
Ensure correct engagement of peg before tightening.  
Torque to between 53 and 55 lbf.in. (0.596 and 0.621 m.daN).
- (5) Install ball joint assembly (121) on shuttle valve and tighten spigot nut (122) using equipment TL1-P215-45-1175.  
Torque to between 170 and 190 lbf.in. (1.92 and 2.15 m.daN). Safety spigot nut and anti-rotation peg (130) or (132) with lockwire as per 20-21-13.
- (6) For RH shuttle valve, install banjo union (128) with clam seals (127) and banjo bolt (129).  
Torque to between 165 and 175 lbf.in. (1.86 and 1.98 m.daN). Safety with lockwire as per 20-21-13.

NOTE : Position union so that synchro pack is clear

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of flexible line when ram body is in forward position.

- (7) Secure RH ball joint assembly (121) with bolt (135) nut (133), washer (134). Torque nuts (133) to between 1.20 and 1.35 m.daN (106 and 120 lbf.in.). Safety nut with cotter pin.  
Secure LH ball joint assembly (121) with washers (137), screws (136). Torque screws to between 1.60 and 1.80 m.daN (142 and 160 lbf.in.).  
Safety screws with lockwire as per 20-21-13.
- (8) Connect hydraulic lines to shuttle valve assembly as follows :
- (a) Maintain adapters screwed in housing using appropriate wrench.
- (b) Torque tighten hydraulic line union nuts to the following values :
- |                     |  |
|---------------------|--|
| Blue Pressure       | : 2.43 to 2.76 m.daN<br>(17.9228 to 20.3576 lbf.ft.) |
| Blue Return         | : 4.86 to 5.31 m.daN<br>(35.8456 to 39.1645 lbf.ft.) |
| Green Pressure      | : 2.43 to 2.76 m.daN<br>(17.9228 to 20.3576 lbf.ft.) |
| Green Return        | : 4.86 to 5.31 m.daN<br>(35.8456 to 39.1645 lbf.ft.) |
| Yell/Blue Pressure  | : 2.43 to 2.76 m.daN<br>(17.9228 to 20.3576 lbf.ft.) |
| Yell/Blue Return    | : 4.86 to 5.31 m.daN<br>(35.8456 to 39.1645 lbf.ft.) |
| Yell/Green pressure | : 2.43 to 2.76 m.daN<br>(17.9228 to 20.3576 lbf.ft.) |
| Yell/Green Return   | : 4.86 to 5.31 m.daN<br>(35.8456 to 39.1645 lbf.ft.) |

**WARNING** : WHEN A HOSE WITH A BEND RADIUS IS REMOVED FROM AN INSTALLATION, CARE SHALL BE TAKEN NOT TO STRAIGHTEN THE HOSE FROM ITS ACQUIRED SHAPE. IF REQUIRED FOR RE-INSTALLATION, IT SHALL BE FITTED AS NEAR AS POSSIBLE TO THIS SHAPE WITHOUT ANY UNDUE FORMING.

- (9) Remove safety clip and tag and set circuit breaker.
- (10) Pressurize Green, Blue and Yellow hydraulic tank (Ref. 29-13-00, Servicing).

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### F. Tests

- (1) Carry out a functional test (Ref. 27-34-52, paragraph 2, Adjustment/Test).
- (2) Upon completion of tests, check replacement shuttle valve for external leaks.
- (3) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access doors.
- (3) Install PFCU fairing and remove access platform.

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### MIDDLE AND OUTER ELEVON POWER FLIGHT CONTROL UNIT ADJUSTMENT/TEST

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN 24-00-00, SERVICING.

#### 1. General

Test of PFCU (Power Flight Control Unit) operation after Removal/Installation.

#### 2. Operational Test

##### A. Equipment and Materials

##### B. Prepare

(1) Take the precautions described in the previous WARNING paragraph.

(2) On overhead panel

(a) On Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in OFF INV position and make certain that O & M ELEVONS, IN.ELEVONS and RUDDER switches are in MECH position.

(b) On SERVO CONTROLS unit, make certain that the

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control switches are in NORMAL position.

(c) On RELAY JACK unit, place switch in NORM position.

(3) On circuit breaker panels, make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
INNER ELVN CONT & MON GRN SUP 1	1-213	1C 53	M11
MID & OUTER ELVN CONT & MON GRN SUP		1C 55	M12
OUTER ELVON NEUTRLN GRN SUP		1C 58	M13
INNER ELEVON CONT & MON GRN SUP 2		1C 59	M14
P.F.C.S. INV GRN FAIL IND		1C 73	M15
AUDIO WARN SYS SUP 1		W 279	M21
RUDDER CONT & MON GRN SUP		1C 62	N11
RUDDER MON LOGIC GRN SUP		1C 63	N12
P.F.C.S. ALL SURFACES MON GRN SUP		1C 54	N13
P.F.C.S. INV BLUE FAIL SUP		1C 67	N14
P.F.C.S. INV GRN PROTN COT		1C 68	N15
RELAY JACK HYD SEL		C 281	N17
IND & SUP			
P.F.C. IND		C 287	N13
M.W.S. SUP 1		W 252	N21
P.F.C.S. INV GRN SUP		1G 65	P11
YEL/GRN - GRN FAIL		C 285	P16
YEL/BLUE - BLUE FAIL		C 286	P17
YELL L.L.		C 288	P18
FLT CONT POSN IND CONT		C 83	R11
FLT CONT POSN IND 26 V 4000 Hz SUP	2-213	C 84	B 4
OUTER ELEVON AMP BLUE SUP		2C 44	C 1
INNER ELEVON BLUE CONT SUP		2C 94	C 2
MID ELEVON AMP BLUE SUP		2C 93	C 3
MID & OUTER ELEVON BLUE CONT SUP		2C 92	C 4
INNER		2C 47	D 1
MIDDLE & OUTER		2C 46	D 2
RUDDER MON BLUE SUP		2C 49	D 3
RUDDER BLUE 26 V 1800 Hz CONT SUP		2C 76	D 4
P.F.C.S. INV BLUE PROTN SUP		2C 71	D 5
OUTER ELEVON AMP GRN SUP		1C 44	E 1

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
INNER ELEVON GRN CONT SUP		1C 94	F 1
MID ELEVON AMP GRN SUP		1C 93	F 2
INNER		1C 47	G 1
MIDDLE & OUTER		1C 46	G 2
RUDDER MON GRN SUP		1C 49	G 3
P.F.C.S. INV GRN PROTN SUP		1C 71	G 5
MID & OUTER ELEVON GRN CONT SUP		1C 92	H 5
RUDDER GRN 26 V 1800 Hz CONT SUP		1C 76	H 6
YELL L/LEVEL	3-213	C 282	A 8
YELL/GRN GRN FAIL		C 283	A 9
YELL/BLUE BLUE FAIL		C 284	A10
P.F.C.S INV BLUE SUP	5-213	2C 66	B14
RUDDER CONT 2 MON		2C 62	C11
RUDDER MON LOGIC		2C 63	C12
P.F.C.S IN GRN FAIL SUP		2C 67	C13
P.F.C.S INV BLUE PROTN CONT		2C 68	C14
AUDIO WARN SYS SUP 2		W 372	C17
INNER ELEVON CONT & MON BLUE SUP 1		2C 53	D11
MID & OUTER ELEVON CONT & MON BLUE SUP		2C 55	D12
OUTER ELEVON NEUTRLN BLUE SUP		2C 58	D13
INNER ELEVON CONT & MON BLUE SUP 2		2C 59	D14
M.W.S. SUP 2		W 251	D15
P.F.C.S INV BLUE FAIL IND		2C 73	E11
P.F.C.S ALL SURFACES MON BLUE SUP		2C 54	E12

- (4) On panel 2-213, set circuit breaker :  
FLT. CONT & NAV BUS 14XS (X355, Map Ref. : H2).

- R (5) Make certain that trim controls are set to zero.
- (6) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

NOTE : During test, do not take into account the illumination of indicator and warning lights and aural warnings which are not mentioned.

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### C. Test

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RB

CAUTION: NOTE SHOULD BE TAKEN OF HYDRAULIC RESERVOIR LEVELS BEFORE AND DURING THIS TEST AS A LOWERING OF ONE LEVEL WITH CORRESPONDING RISE IN ANOTHER COULD IDENTIFY A HYDRAULIC TRANSFER WHICH SHOULD BE INVESTIGATED.

- (1) Using electric pumps, pressurize Yellow hydraulic system (Ref. 29-21-00, Servicing).
- (2) On overhead panel, on SERVO CONTROLS unit place lower switch in GREEN L.PRESS position.
  - Elevons must deflect up to position zero.
- (3) Operate slowly control column and handwheel from stop to stop, in both directions.  
On ICOVOL indicator (Flight control surface position indicator) check that :
  - in roll, the outer and middle elevons deflect (in opposite direction for each wing) 20° in both directions (14° for inner elevons)
  - in pitch, the 6 elevons deflect 17° in nose down and nose up directions.
- (4) On flight engineer's panel on GROUND HYD CHECK OUT unit place switch in G/B position.
- (5) On overhead panel, on SERVO CONTROLS unit place lower switch in NORMAL position.
- (6) Repeat above procedure (3).
  - On ICOVOL indicator, results must be identical.
- (7) On overhead panel, on SERVO CONTROLS unit, place lower switch in BLUE L.PRESS position.
- (8) On GROUND HYD CHECK OUT unit place switch in Y/Y position.
- (9) Repeat above procedure (3).
  - On ICOVOL indicator, results must be identical.
- (10) On overhead panel, on Flight Control Unit, place GREEN INVERTER and BLUE INVERTER switches in ON position and O & M ELEVONS, IN.ELEVONS switches in BLUE position. Press and release the RESET push-button located on RH side of each switch.
  - On ICOVOL indicator, the 6 magnetic indicators corresponding to elevons must display B.
- (11) On RELAY JACK unit, on overhead panel, place switch in

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GREEN ONLY position.

(12) Operate control column and handwheel with a deflection value not exceeding 5°.

- The Elevons must deflect accordingly.

(13) On overhead panel, carry out the following procedure :

(a) On SERVO CONTROLS unit place lower switch in GREEN L.PRESS position.

- On ICOVOL indicator, the 8 magnetic indicators must display M

(b) On Flight Control Unit, place O & M ELEVONS and IN.ELEVONS switches in GREEN position, then press and release the RESET push-buttons (RH side of switches).

- On ICOVOL indicator the 6 corresponding magnetic indicators must display G.

(c) On RELAY JACK unit place switch in BLUE ONLY position.

(14) Operate flight controls as in (12) above :

The Elevons must deflect accordingly.

(15) On RELAY JACK unit, on overhead panel, place switch in NORM position.

(16) Repeat above procedure (3).

- identical results.

(17) On overhead panel, carry out the following procedure.

(a) On SERVO CONTROLS unit, place the lower switch in BLUE L.PRESS position.

- On ICOVOL indicator, the 8 magnetic indicators must display M.

(b) On Flight Control Unit, place O & M ELEVONS and IN ELEVONS switches in BLUE position, then press the corresponding RESET push-buttons.

- On ICOVOL indicator, the 6 magnetic indicators corresponding to elevons must display B.

(18) Repeat above procedure (3).

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- Identical results.

### D. Close-Up

- (1) Shut down pressurization of Yellow hydraulic system (Ref. 29-21-00, Servicing).
- (2) On overhead panel :
  - (a) On Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position and the O & M ELEVONS and IN ELEVONS switches in MECH position.
  - (b) On SERVO CONTROLS unit place lower switch in NORMAL position.
- (3) De-energize the aircraft electrical network and remove electrical ground power unit (Ref. 24-41-00, Servicing)
- (4) On panel 2-213, trip safety and tag circuit breaker : FLT.CONT & NAV BUS 14XS (X355, Map Ref. : H2)

### 3. Jamming Microswitch Functional Test

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Tool - Jamming Detector	ST4P285-45-002
Access Platform 9 ft. 8 in. (2.946 m)	
Access Platform	
10 ft. 1 in. (3.073 m) (middle PFCU)	
9 ft. 1 in. (2.769 m) (outer PFLU)	
Circuit Breaker Safety Clips	
Lockwire dia. : 0.032 in. (0.812 mm)	
Corrosion Resistant Steel	

#### B. Prepare

- (1) This test is carried out without hydraulic power : Depressurize Blue, Green and Yellow hydraulic systems (Ref. 29-12-00, Servicing ; 29-11-00, Servicing ; 29-21-00, Servicing).

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- (2) On panel 1-213, trip, safety and tag the following circuit breaker :  
P.F.C. IND. (C287, Map Ref. : N18)
- (3) Open access door 151DB.
- (4) At zone 151, disconnect connectors C290A and C292A from pressure switches C290 and C292.
- (5) On panel 1-213, remove safety clip and tag and set circuit breaker :  
F.F.C. IND. (C287, Map Ref. : N18)
- (6) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFCs INV GRN FAIL IND	1-213	1C 73	M15
AUDIO WARN SYS SUP 1		W 371	M21
PFCs ALL SURFACES MON GRN SUP		1C 54	N13
MWS SUP 1		W 252	N21
AUDIO SARN SYS SUP 2	5-213	W 372	C17
MWS SUP 2		W 251	D15
PFCs INV BLUE FAIL IND		2C 73	E11
PFCs ALL SURFACES MON BLUE SUP		2C 54	E12
ROOF PNL L.T TEST SUP	15-216	L1002	D13

- (7) Remove fairing :  
552 JB for test of LH middle elevon PFCU spool valve jamming microswitches.  
553 JB for test of LH outer elevon PFCU spool valve jamming microswitches.  
652 JB for test of RH middle elevon PFCU spool valve jamming microswitches.  
653 JB for test of RH outer elevon PFCU spool valve jamming microswitches.
- (8) On PFCU :
  - (a) Cut and remove lockwire safetying the attachment screws of input lever protective plate.
  - (b) Unscrew and remove screws.

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- (c) Remove protective plate.
- (9) On overhead panel :
- (a) On Flight Control Unit, place GREEN INVERTER and BLUE INVERTER switches in OFF INV position, and make certain that O & M ELEVONS, IN ELEVONS and RUDDER switches are in MECH position.
  - (b) On SERVO CONTROLS unit, make certain that both switches are in NORMAL position.
- (10) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing):
- Gong must sound.
- On overhead panel :
- On Flight Control Unit, MECH. JAM warning light must illuminate.
  - On master warning panel, PFC warning light must illuminate.
- NOTE : Do not take into account indications and visual or aural warnings which are not mentioned.
- (11) Press and release PFC warning light :
- It must go off.
- (12) On overhead panel, on SERVO CONTROLS unit, press and release T push button located below BLUE JAM caption light
- Gong must sound.
  - BLUE JAM caption light must illuminate, then go off.
  - PFC warning light must illuminate.
- (13) Press and release PFC warning light :
- It must go off.
- (14) On SERVO CONTROLS unit, press and release T push button located below GREEN JAM caption light
- Gong must sound.
  - GREEN JAM caption light must illuminate, then go off.
  - PFC warning light must illuminate.
- (15) Press and release PFC warning light :
- It must go off.

### C. Test

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- (1) Install equipment ST4-P285-45002 :
  - (a) For Blue spool valve jamming test :
    - (a1) On the rear section of PFCU, on the (Blue) springbox and microswitch assembly.
  - (b) For Green spool valve jamming test :
    - (b1) On the front section of PFCU, on the (Green) springbox and microswitch assembly.
- (2) Carefully turn equipment operating handle clockwise up to stop (Maintain in this position for at least one second)
  - Gong must sound
  - BLUE JAM (GREEN JAM) caption light must illuminate on SERVO CONTROLS unit, on overhead panel.
  - PFC warning light must illuminate on overhead panel.
- (3) Turn equipment operating handle counterclockwise and remove equipment :
  - BLUE JAM (GREEN JAM) caption light and PFC warning light must remain illuminated.
- (4) Install test equipment on the second springbox and microswitch assembly.
- (5) Repeat operation (2) above:
  - Gong must sound
  - GREEN JAM (BLUE JAM) caption light must illuminate on SERVO CONTROLS unit. (BLUE JAM (or GREEN JAM) caption light and PFC warning light must remain illuminated).
- (6) Turn equipment operating handle counterclockwise and remove equipment :
  - No change occurs in above mentioned indicator and warning lights.
- (7) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFCs ALL SURFACES MON GRN SUP	1-213	1C 54	N18
PFCs ALL SURFACES MON BLUE SUP	5-213	2C 54	E12

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- When tripping the second circuit breaker ; BLUE JAM, GREEN JAM, MECH JAM caption lights and PFC warning light must go off.
- (8) Set either of the circuit breakers mentioned above in (7) :
  - Gong must sound.
  - On overhead panel PFC warning light and MECH JAM warning light must illuminate.

NOTE : Make certain that, on SERVO CONTROLS unit, BLUE JAM and GREEN JAM caption lights remain off.

- (9) Set the second circuit breaker mentioned above in (7)
  - No results

### D. Close-Up

- (1) On overhead panel, on Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position.
- (2) On panel 1-213, trip safety and tag circuit breaker : PFC IND (C287, Map Ref. : N18)
- (3) At zone 151, connect connectors C290A and C292A to pressure switches C290 and C292.
- (4) Close access door 151DB.
- (5) On tested PFCU, install input lever protective plate and engage attachment screws.
- (6) Tighten protective plate attachment screws.
- (7) Wirelock above mentioned screws.
- (8) Install and secure tested PFCU fairing.
- (9) On panel 1-213, set circuit breaker :
  - PFC IND (C287, Map Ref. : N18)
  - On SERVO CONTROLS unit, on overhead panel, make certain that BLUE L.PRESS and GREEN L.PRESS caption lights illuminate when above mentioned circuit breaker is set.
- (10) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

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## MAINTENANCE MANUAL

### MIDDLE/OUTER ELEVON POWER FLIGHT CONTROL UNIT INSPECTION/CHECK

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The purpose of the procedure described in this topic is to check :

- PFCUs (Power Flight Control Unit) for external hydraulic leakage.
- PFCUs for internal hydraulic leakage between chambers.
- Permissible loads applied to end of input lever to initiate PFCU forward and rearward movement.
- General condition of PFCU components and attachments by visual inspection.

#### 2. PFCU External Hydraulic Leakage

##### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Access Platform 10 ft. 8 in. (3.25 m)	
---------------------------------------	--

Hydraulic Fluid Container	
---------------------------	--

##### B. Prepare

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- (1) Remove PFCU fairings  
552JB, KB - 553JB, KB - 652JB, KB - 653JB, KB.
- (2) Take the precautions described in the previous WARNING paragraph.
- (3) Set Flight Controls in Blue electrical mode  
(Ref. 27-00-00, Servicing)
- (4) Check that pitch and roll trim controls are set to zero

### C. Check

- (1) Make certain that Flight Controls are set in Blue electrical mode.
- (2) Check on Flight Engineer's HYDRAULIC MANAGEMENT panel that hydraulic fluid temperature is between 30° and 70°C (86°F and 158°F)  
If necessary, deflect elevons in pitch and roll configuration to reach the required temperature.
- (3) During check, PFCUs shall remain motionless and approximately at zero position.
- (4) Wait 3 minutes for stabilization of external leak and proceed with measurement of leak.
- (5) Permissible leak rate for PFCU assembly is 4 drops per minute.
- (6) Repeat the same operations in Green electrical mode.

### D. Close-Up

- (1) Shut down pressurization of hydraulic systems  
(Ref. 27-00-00, Servicing, Procedure to set Flight Controls in electrical mode).
- (2) Install PFCU Fairings ;  
552JB, KB - 553JB, KB - 652JB, KB - 653JB, KB.
- (3) Remove access platforms.

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### 3. Internal Hydraulic Leakage between Chambers of PFCUs

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 10 ft. 8 in (3.25 m)	
Ground Power Unit - Hydraulic, Power and Preliminary Testing (Qty 2)	
Flowmeters, 1 For each System (Qty 2) These flowmeters must have the following characteristics : Flow Rate Range : 0 to 25 l/mn Accuracy : 96% in a flow rate range between 4 and 25 l/mn.	

#### B. Prepare

- (1) Remove Fairings :  
552JB, KB - 553JB, KB - 652JB, KB - 653JB, KB.
- (2) Take the precautions described in the previous WARNING paragraph.
- (3) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).

NOTE : Install flowmeters listed in equipment and materials paragraph, on hydraulic ground power units.

- (4) Check that pitch, roll and yaw trim controls are set to zero.

#### C. Check.

NOTE : Except Flight Controls, no other hydraulic services must operate during this check.

- (1) Check on Flight Engineer's HYDRAULIC MANAGEMENT panel, that hydraulic fluid temperature is between 30°C and 70°C (68°F and 158°F).  
If necessary, deflect elevons in pitch and roll configuration to reach the required temperature.
- (2) Wait 3 minutes approximately, then note flow rate per minute of each QB and QG flowmeter. Elevons are in neu-

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tral position.

- (3) Shut down pressurization of Blue and Green hydraulic systems.
- (4) With elevons in low position, remove actuating rod from LH outer PFCU input lever. Slightly lift elevon in order to allow disengagement of rod.

NOTE : For removing bolt, it is necessary to press plunger on head of bolt in order to free the locking balls.

- (5) Manually position PFCU input lever a few degrees beyond neutral position towards nose of aircraft. Maintain this position on PFCU during test.
- (6) Pressurize Green and Blue hydraulic systems. Wait two minutes approximately then note flow rate per minute of each QB1 and QG1 flowmeters. Elevons are in neutral position.
- (7) Difference in flow rate between QB1-QB and QG1-QG must be less than 6 l/mn.
- (8) Shut down pressurization of Blue and Green hydraulic systems.
- (9) Connect actuating rod to PFCU input lever. Bolt, special washer, flat washer, nut. Torque to between 0.31 and 0.37 m.daN (27,42 and 32,73 lbf. in). Safety with cotter pin.
- (10) Repeat the same operations on the other PFCUs (RH outer, LH and RH middle PFCUs).

### D. Close-Up

- (1) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
- (2) Install Fairings : 552JB, KB ; 553JB, KB.  
652JB, KB ; 653JB, KB.
- (3) Remove access platforms.

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### 4. Permissible loads applied to end of PFCU input lever.

#### A. Equipemnt and Materials.

DESCRIPTION	PART NO.
Spring Scale From 0 to 20 N (0 to 4.48 lbf.)	
Access Platform 10 ft. 8 in. (3.25 m)	
Rigging Pins - Synchro Pack	D925252000

#### B. Prepare

- (1) Remove fairing 552JB - 553JB - 652JB - 653JB.
- (2) Take the precautions described in the previous WARNING paragraph.
- (3) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (4) Check that pitch and roll trim controls are set to zero

#### C. Load measurement

- (1) Make certain that Flight Controls are in mechanical mode.
- (2) Operate control surfaces in pitch and roll configuration several times.
- (3) Open access door 121FB and immobilize roll pitch and yaw resolvers with rigging pins D925252001, D925252002 and D925252003.
- (4) Disconnect actuating rod at PFCU input lever.
- (5) Proceed with measurements under following conditions :
  - Hydraulic Fluid temperature.  
40°C plus or minus 10°C (104°F plus or minus 18°F)
  - Ambient temperature  
20°C plus or minus 15°C (68°F plus or minus 27°F)
  - Load applied to end of lever,  
Less than 6.5N (1.46 lbf.)                      permissible  
Greater than 11N (2.47 lbf.) Not permissible

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If load is greater than 6.5N (1.46 lbf) and less than 11N (2.47 lbf.), carry out new measurements under following conditions :

- Hydraulic fluid temperature 70°C plus or minus 5°C (158°F plus or minus 9°F)
- Ambient temperature 20°C plus or minus 10°C (68°F plus or minus 18°F)
- Load applied to end of lever. Equal to or less than 8.5N (1.9 lbf) permissible. Greater than 8.5N (1.9 lbf) Not permissible.

(6) Connect actuating rod to PFCU input lever. Bolt, special washer, flat washer, nut.  
Torque to between 0.31 and 0.37 m.daN (27.42 and 32.73 lbf. in).

(7) Repeat the same operations on each servo control.

### D. Close-Up

- (1) Remove rigging pins D925252001, D925252002 and D925252003 from resolvers.
- (2) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
- (3) Close access doors 121FB.
- (4) Install PFCU fairings 552JB, 553JB, 652JB and 653JB.
- (5) Remove access platforms.

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### 5. Visual check of PFCU

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 10 ft. 8 in. (3.25 m)	

#### B. Prepare.

- (1) Remove fairings 552JB, KB, MB ; 553JB, KB, MB.  
652JB, KB, MB ; 653JB, KB, MB.

#### C. Check

- (1) Control rods (rods between PFCU and elevon)
- (a) Check that control rods are not ruptured.
  - (b) Check that they do not foul retaining plate.
  - (c) Apply a load to each end of rod to ensure that it is in working condition.
  - (d) Visually and, if required, with an inspection mirror, check the following components for cracks, without removing them.
    - PFCU trunnions
    - Rod ends (PFCU side and elevon side)
    - Rod body.
    - Fork end and pick up fitting on control surface.
  - (e) On front attachment point, check for presence of self locking nut and safetying (cotter pin). On rear attachment points, check for presence of central nut and safetying.
- (2) PFCU and structural attachment points.
- (a) Apply a vertical load, at rear attachment point, to piston or to PFCU body to ensure there is no rupture of attachment.
  - (b) Apply a vertical load at front attachment point, (load may be applied to resolver box) to ensure there is no rupture of attachment.
  - (c) Check that PFCU does not jam in track by turning

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servo control body both ways : Free movement of servo control can thus be checked.

- (d) Visually and, if required, using an inspection mirror, check the following attachment points for cracks :

- Front and rear attachment fittings on structure
- PFCU piston ends (front and rear)

- (e) Check safetying (cotter pins) of front and rear attachments.

(3) Feedback linkage.

- (a) Visually and, if required, using an inspection mirror, check the following components for rupture or cracks :

- Upper and lower sections of feedback link and bolt attachment plate to structure.
- Upper and lower sections of resolver box adjustable lever.

NOTE : Resolver box adjustable lever must be inspected with the greatest care, as a total rupture of this lever, during flight, may have catastrophic effects.

A typical crack on resolver box adjustable lever is illustrated as an example  
(Ref. Fig. 601 )

- (b) Check safetying and attachments of the following components :

- Link bolt attachment plate
- Feedback link between bolt attachment plate and resolver box adjustable lever.
- Resolver adjustment device.
- Bonding strips.

(4) Electrical wiring and connection.

- (a) Check presence of bonding strips between :

- Resolver box and adjustable lever.
- Adjustable lever and feedback link.
- Feedback link and bolt attachment plate to structure.
- PFCU forward eye end and structure.

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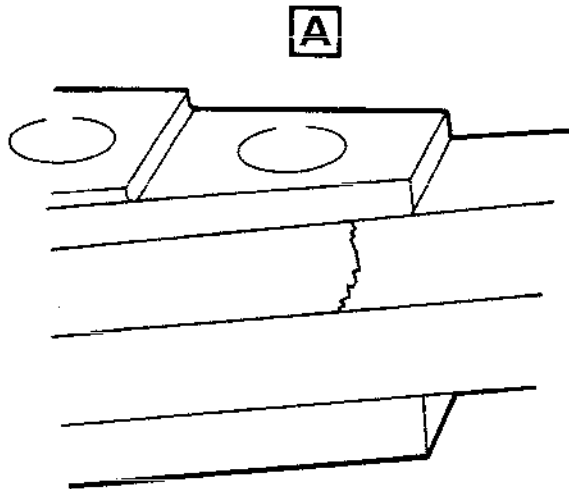
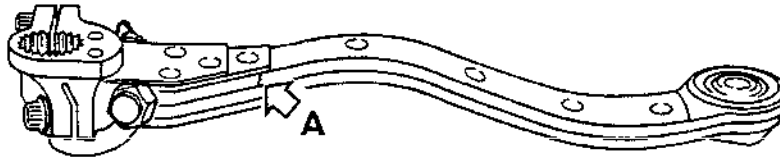
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CMA 27 34 52 6 AAM0

Resolver box adjustable lever  
Typical crack  
Figure 601

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- PFCU aft eye end and structure.

- (b) Make certain that the following connectors are correctly locked :

LH outer PFCU  
connector C101A  
connector C101B  
connector T, D, K, A, B.

LH middle PFCU  
connector C103A  
connector C103B  
connector T, D, K, A, B.

RH outer PFCU  
connector C102A  
connector C102B  
connector T, D, K, A, B.

RH middle PFCU  
connector C104A  
connector C104B  
connector T, D, K, A, B.

- (c) Make certain that cable looms are in good condition (free of chafing, correct attachment).  
LH and RH middle, outer PFCU.

P266450068  
P266450069  
P266450070  
P266450071  
P266450072  
P266450073  
P266450074  
P285450158  
0159  
6685717100

- (5) Hydraulic system

- (a) Check that telescopic supply tubes and shuttle valve housings are free of cracks.
- (b) Check that telescopic tubes can move freely (a few degrees in rotation) and that anti rotation pegs are not peened.
- (c) Check that flexible hoses are not in contact with structure or with other hoses. Check that they are free of chafing or dents.

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- (d) On each electrovalve, check that safety disc is still present on side of housing and is not deformed. (Safety disc is of a lighter colour than the electrovalve housing).
- (e) Take the precautions described in the previous WARNING paragraph.  
Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).  
Check that visible surfaces of telescopic tubes and servo control piston rod are in good condition by operating controls in nose up and nose down directions.

### D. Close-Up

- (1) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
- (2) Install fairings : 552JB, KB, MB ; 553JB, KB, MB.  
652JB, KB, MB ; 653JB, KB, MB.
- (3) Remove access platform.

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## MAINTENANCE MANUAL

### INNER ELEVON POWER FLIGHT CONTROL UNIT - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

Removal/Installation of inner elevon power flight control units (PFCUs) being identical, only the LH inner elevon PFCU removal/installation is dealt with below.

#### 2. Removal of Power Flight Control Unit, Set in Electrical Mode

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins - Synchro Pack	D925252000
Rigging Pin - Torque Tube at RIB24	D921311000
Zeroing Equipment - Elevons	D921354000
Test Set - Zero Setting - Resolvers	TE3016000
Tool Kit - Elevon PFCU - Removal/ Installation	E920003000
Equipment - Elevon PFCU - Removal/ Installation	E920004000

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DESCRIPTION	PART NO.
Rigging Pin - Mixing Unit - Servo Control	D921310000
Protractor - Elevon and Rudder or Clinometer	TE2012000
Circuit Breaker Safety Clips	
Access Platform 3.251 m (10 ft. 8 in.)	
Warning Notices	
Lockwire Dia 0.032 in. (0.80 mm) Corrosion Resistant Steel	
Special Materials (Ref. 20-30-00, No.123)	
General Lubricants (Ref. 20-30-00, No.51)	

### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Remove following fairings as appropriate for PFCU to be removed :  
LH inner PFCU : fairings 551JB, LL, LR, KB  
RH inner PFCU ; fairings 651JB, LL, LR, KB
- (3) If Tool TE2012000 is to be employed, install tool on elevons associated with PFCU to be removed.
- (4) Set flight controls in electrical mode (Ref. 27-00-00, Servicing).

NOTE : If Blue CT is failed, set flight controls in Green electrical mode.  
In this case, it will be necessary, when in main base, to proceed with readjustment by means of the elevon neutral setting jig.

- (5) Open access doors 121FB and immobilize resolvers with rigging pins, as follows :  
Roll : rigging pin D925252001

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Pitch : rigging pin D925252003

- (6) Open floor panel 241HF and insert rigging pin D921310000 in mixing unit. Re-install floor panel, but do not attach.

**CAUTION** : WHEN INSERTING AND REMOVING PINS, TAKE ALL NECESSARY PRECAUTIONS IN ORDER TO AVOID INTRODUCING INADVERTENTLY TOOLS OR MISCELLANEOUS ITEMS IN MIXING UNIT.

- (7) On PFCU concerned, disconnect actuating rod (12) from input lever (11) of PFCU.  
Do not alter length of rods.

**NOTE** : For removing or installing attachment bolts, it is necessary to press plunger on head of bolt to free the locking system balls.

- (8) Support elevon in position (approximately at neutral) by means of zeroing equipment D921354000.

- (9) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing - Procedure to set Flight Controls in Electrical Mode).

- (10) Open access door 151DB and depressurize Green, Blue and Yellow hydraulic systems (Ref. 29-11-00, Servicing ; 29-12-00, Servicing ; 29-21-00, Servicing).

- (11) Open access door 153BB and depressurize Green, Blue and Yellow hydraulic system tanks (Ref. 29-13-00, Servicing).

- (12) Close hydraulic tank depressurization valves, and safety with lockpin.

- (13) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFCs INV GRN FAIL IND	1-213	1C 73	M15
PFCs INV GRN SUP		1C 66	P11
FLT CONT POSN IND 26V 400 Hz SUP	2-213	C 84	B 4
PFCs INV BLUE SUP	5-213	2C 66	B14
PFCs INV BLUE FAIL IND		2C 73	E11

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22
HYD TANKS COMPR CONT	15-215	M 602	D 8

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

(14) Set elevon to neutral position.

- (a) Remove cable loom attachments, and disconnect electrical connectors from PFCU to be removed.
- (b) Connect zero setting test set TE3016000 cable loom to PFCU connectors (switch in LABO position). Supply test set with 28VDC.
- (c) Manually or using any suitable means, move elevon until zero is obtained on Blue CT (or Green, if Blue CT is inoperative).

(15) Set protractor to zero on elevon concerned (or note elevon neutral position, using a clinometer).

(16) Disconnect zero setting test set connectors from PFCU.

C. Remove (Ref. Fig.401 and 402)

CAUTION : GREAT CARE MUST BE TAKEN WHEN HANDLING THE PFCU FOR REMOVAL OR INSTALLATION BECAUSE OF THE RELATIVE FRAGILITY OF SOME OF ITS COMPONENTS. ONLY FORWARD, REAR OF CENTRE ATTACHMENT POINTS MUST BE USED FOR ATTACHMENT OR SUPPORT PURPOSES.  
The inner PFCU weighs 63.3 Kg.

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- (1) Disconnect hydraulic lines as follows :
  - (a) Maintain adapter on PFCU using appropriate wrench.
  - (b) Unscrew hydraulic line union nut and disengage the line.
  - (c) Cap open line ends.
- (2) Remove bonding strips (attachment points and ends of elevon control rods).
- (3) Remove cotter pins and nuts (24) from PFCU/elevon control rod connections, remove peel washers. Remove eccentric bushes (23) using an extractor. (D92 1225000)
- (4) Remove cotter pins and nuts (26) and remove bolts (29) holding washers (25) and (28). Remove slotted nuts (30).  
Remove sleeve (27) and retain washers.
- (5) Remove elevon control rods (10), and remove back-up washers.
- (6) Remove nuts (5), washers (6) and bonding strip, securing feedback link (2) bolt attachment plate to structure.
- (7) Remove screws (7) and washers (8) securing tracks (21).
- (8) Attach mini-hoists to attachment points provided for this purpose.
- (9) Using mini-hoists, bring equipment E920004000 opposite attachment points on PFCU. Attach tool to PFCU.
- (10) Separate ball joint assemblies (1) on the end of sliding tubes, from structure : remove nuts (35), washers, and bolts (32).
- (11) At PFCU forward attachment point, remove cotter pin and nut (38), remove lock washer (37), attachment bolt (33), sleeve (36) and washer (34).
- (12) At PFCU aft attachment point, remove cotter pin and nut (19), remove lock washer (18), bolt (15), sleeve (17) and washer (16).

NOTE : If sleeve cannot be removed or installed easily, deflect elevon.

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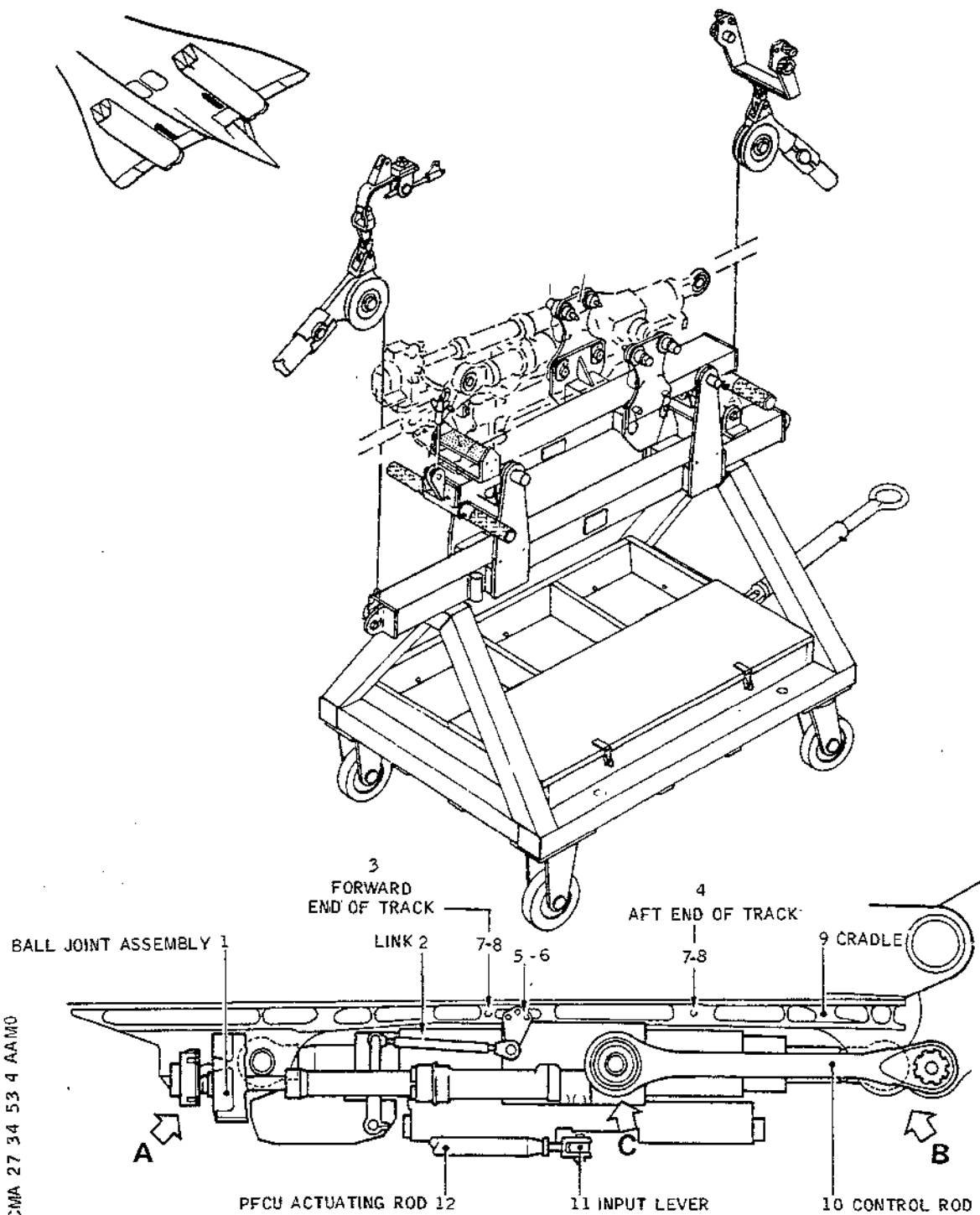
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Power Flight Control Unit  
Figure 401

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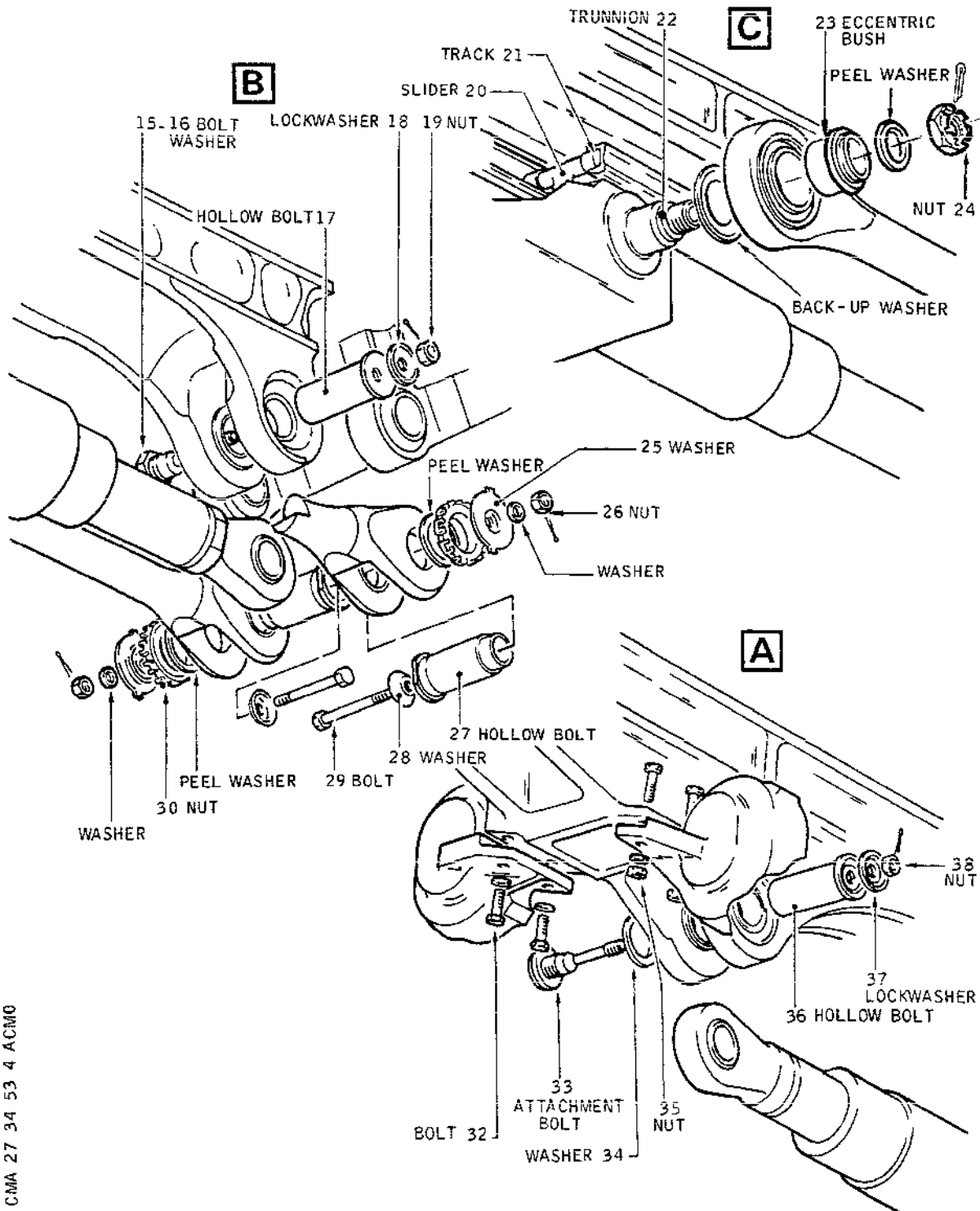
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Detail of PFCU Installation  
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(13) Lower tool/PFCU assembly.

CAUTION: DO NOT DAMAGE TRACKS OR SLIDER.

(14) Remove PFCU from trolley.

R D. Inspection of Removed Component

R (1) Perform ultrasonic inspection of shuttle valves on removed component  
R according to manufacturer instructions.

R E. Preparation of Replacement Component

(1) Place PFCU on trolley and attach.

(2) Using mini-hoists, hoist PFCU/tool assembly.

(3) Circular scratches of less than 0.05 mm (0.00196 in) deep are the only permissible damage on elevon control rod attachment bolts.

R F. Install

B NOTE: Before installation apply a light coat of product No.51 on attachment  
B bolts.

B During installation of PFCU/structure attachment bolts, make certain  
B that pitch between PFCU attachment points corresponds to that of  
B structural attachment points.

B The two bolts (coated with product No.51) must be inserted freely,  
B without force being applied (sliding fit).

B CAUTION: BEFORE FINALISING INSTALLATION IT MUST BE ENSURED THAT SUFFICIENT  
B CLEARANCE EXISTS BETWEEN THE SMALL PFCU DRAIN HOSE AND FORWARD  
B ATTACHMENT CRADLE EYE-END STRUCTURE.

(1) Secure PFCU rear end fitting to fork end with sleeve (17), washer (16),  
bolt (15), install washer (18) and attach with nut (19).  
Bolt (15) : torque to between 1.6 and 1.8 mdaN (11.8 and 13.2 lbf ft).  
Nut (19) : torque to between 0.52 and 0.58 mdaN (45 and 50 lbf in).  
Safety nut with cotter pin.

(2) Install each track (21) on to slider (20) on PFCU body.

(3) Attach, but do not tighten, rear end (4) of each track (21) to  
cradle (9), with screws (7) equipped with washers (8). It must be  
possible for the tracks to pivot on the cradle without any play.

(4) Secure forward attachment point.  
Install sleeve (36) and washer (34), attachment bolt (33), lock  
washer (37), secure washer with nut (38).  
Bolt (33) : torque to between 1.6 and 1.8 mdaN (11.8 and 13.2 lbf ft).  
Nut (38) : torque to between 0.52 and 0.58 mdaN (45 and 50 lbf in).  
Safety nut with cotter pin.

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- (5) Remove equipment E920004000 and the mini-hoists.
- (6) Install screws (7) equipped with washers (8) on forward end (3) of each track. Tighten screws (7) to complete installation of tracks, and wirelock (Ref. 20-31-13).
- (7) Assemble ball joint assemblies (1) to structure by means of bolts (32), washers and nuts (35).  
Bolts (32): Torque to between 1.60 and 1.80 m.daN (142 and 160 lbf.in).  
Safety with lockwire (Ref. 20-21-13).  
Nuts (35): Torque to between 1.20 and 1.35 m.daN (106 and 120 lbf.in).  
Safety with cotter pin.
- (8) Install elevon control rods.
  - (a) LH control rod
    - (a1) Attach to PFCU  
Install back-up washer and install control rod (10) on PFCU trunnion (22), positioning eccentric bush (23) at zero. Install peel washer and nut (24).  
Torque to between 9.2 and 16.6 m.daN (67.85 and 122.43 lbf.ft.)  
Safety with a cotter pin.
    - (a2) Attach to elevon  
Install control rod (10) on elevon spherical bearing. Install sleeve (27), peel washer and nut (30).  
Torque to between 6 and 8 m.daN (44.25 and 59 lbf.ft).  
Install bolt (29), cup washer (28) tab washer (25), flat washer and nut (26).  
Tighten.  
Torque to between 0.7 and 0.8 m.daN (62 and 71 lbf.in.).  
Safety with cotter pin and bend tab washer tabs.
  - NOTE :** If holes for safetying bolt are not facing slots of nut, it is necessary to adjust thickness of peel washer.
- (b) RH control rod
  - (b1) Attach to elevon.  
Install rod (10) on control surface spherical bearing, install sleeve (27) peel was-

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her and nut (30).

Torque to between 6 and 8 m.daN (44.25 and 59 lbf.ft).

Install bolt (29), cup washer (28) tab washer (25), flat washer and nut (26).

Tighten.

Torque to between 0.7 and 0.8 m.daN (62 and 71 lbf.in.).

Safety with cotter pin and bend tab washer tabs.

NOTE : If holes for safetying bolt are not facing slots of nut, it is necessary to adjust thickness of peel washer.

(b2) Attach to PFCU.

Install back-up washer, rod (10) on PFCU trunnion (22). Install eccentric bush (23) peel washer and nut (24). Do not tighten.

NOTE : On PFCU RH trunnion, position eccentric bush so that rod (10) can be installed without forcing.  
If, exceptionally the eccentricity of RH eccentric bush is not sufficient adjust LH eccentric bush so that rod can be easily installed.

If necessary, adjust thickness of peel washers on trunnions to obtain required torque loading on attachment nuts (24).

(b3) Tighten nut (24) on trunnion.

Torque to between 9.2 and 16.6 m.daN (67.85 and 122.43 lbf.ft).

Safety with cotter pin.

(9) Connect hydraulic lines to PFCU as follows.

(a) Maintain adapters screwed in PFCU using appropriate wrench.

(b) Torque tighten hydraulic line union nuts to the following values.

Blue pressure : 2.43 to 2.76 m.daN (17.9228 to 20.3576 lbf. ft.)

Blue return : 4.86 to 5.31 m.daN (35.8456 to 39.1645 lbf. ft.)

Green pressure : 2.43 to 2.76 m.daN (17.9228 to 20.3576 lbf. ft.)

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Green return : 4.86 to 5.31 m.daN (35.8456 to 39.1645 lbf. ft.)  
Yell/Blue pressure : 2.43 to 2.76 m.daN (17.9228 to 20.3576 lbf. ft.)  
Yell/Blue return : 4.86 to 5.31 m.daN (35.8456 to 39.1645 lbf. ft.)  
Yell/Green pressure : 2.43 to 2.76 m.daN (17.9228 to 20.3576 lbf. ft.)  
Yell/Green return : 4.86 to 5.31 m.daN (35.8456 to 39.1645 lbf. ft.)

**WARNING** : WHEN A HOSE WITH A BEND RADIUS IS REMOVED FROM AN INSTALLATION, CARE SHALL BE TAKEN NOT TO STRAIGHTEN THE HOSE FROM ITS ACQUIRED SHAPE.

IF REQUIRED, FOR RE-INSTALLATION IT SHALL BE FITTED AS NEAR AS POSSIBLE TO THIS SHAPE WITHOUT ANY UNDUE FORMING.

- RB (10) Connect bonding strips and carry out bonding check-Resistance to be not greater 50 milli-ohms.
- RB (11) Using protractor (or clinometer), check that elevon is at neutral.
- RB (12) Attach resolver feedback link (2) bolt attachment plate to structure. Do not safety.
- RB (13) Set resolvers to electrical zero.  
(Ref. Fig.403 and 401)
- (a) Connect test set TE3016000 electrical cables to PFCU connectors.  
Supply test set with 28VDC.
- (b) Place test set POWER JACKS AND NOSE WHEEL STEERING selector switch in BLUE CT CONTROL ELEVONS position.
- (c) Set resolvers to electrical zero.
- (c1) Cut and remove lockwire from nut (51) and bolts (52), (54) and (55).
- RB (c2) Slightly loosen bolts (52), (54), and (55).
- (c3) Loosen nut (51) so that bolt (53) can be turned, but with slight resistance.
- (c4) Turn bolt (53) in appropriate direction until adjustment indicator pointer indicates 0° plus or minus 2 min. At the same time, gradually increase test set sensitivity to maximum.

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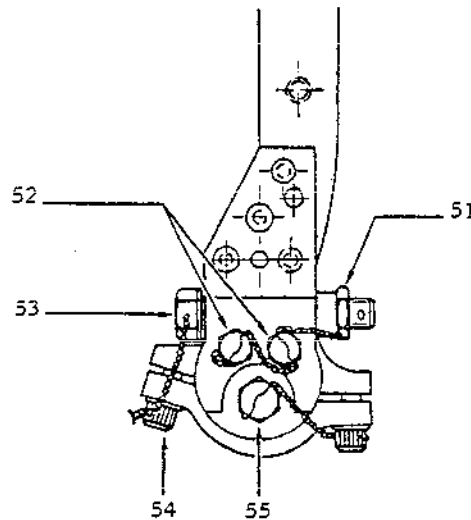
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CMA 27 34 53 4 AEMO



Resolver Electrical Zero Setting  
Figure 403

- (c5) Tighten nut (51).  
Torque to between 0.15 and 0.17 m.daN (13 and 15 lbf.in.).
- (c6) Check that electrical zero has not varied.
- (c7) Tighten bolts (52) and (54).  
Torque to between 0.07 and 0.09 m.daN (6 and 8 lbf.in.).
- (c8) Tighten bolt (55).  
Torque to between 0.259 and 0.282 m.daN (23 and 25 lbf. in.).
- (c9) Wirelock bolts (52), (54) and (55) nut (51)  
(Ref. 20-21-13).

RB (14) Remove resolver feedback link (2) bolt attachment plates from structure.

RB (15) Disconnect test set from PFCU.

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- B (16) Connect PFCU electrical connectors.
- B (17) Remove tool D921354000 securing elevons in neutral.
- B (18) Fully deflect elevon in both directions and check that in both PFCU stop positions, feedback link can be connected easily to structure.
- WARNING: IN BOTH PFCU STOP POSITIONS, MAKE CERTAIN BEFORE CONNECTING FEEDBACK LINK TO STRUCTURE THAT THERE IS A CLEARANCE OF AT LEAST 1 mm (0.039 in) BEFORE RESOLVERS ACHIEVE THEIR INTERNAL STOPS.
- B (19) Attach resolver feedback link (2) bolt attachment plate to structure: bonding strip, washers (6) nuts (5). Wirelock (Ref. 20-21-13).
- B (20) Remove warning notices.
- B (21) Remove safety clips and tags and set circuit breakers.
- B (22) On PFCU concerned connect actuating rod (12) to input lever (11). Do not safety.  
(It is necessary to support elevon manually).
- B (23) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing). Check that rigging pin D921311000 can be inserted easily in rod and bellcrank assembly at RIB24.  
On protractor (or using a clinometer) check that control surface is at neutral.  
If required adjust length of PFCU actuating rod. Remove rigging pin D921311000.
- B (24) Tighten PFCU actuating rod attachment nut. Torque to between 0.31 and 0.37 mdaN (27.42 and 32.73 lbf in). Safety nut with cotter pin.
- B (25) Remove rigging pin D921310000 from mixing unit.
- B (26) Remove rigging pins D925252001 and D925252003 and remove protractors.
- B (27) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing - Procedure to set Flight Controls in mechanical mode).
- R G. Test
- (1) Proceed with tests as per 27-34-53, Adjustment/Test.

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- (2) Upon completion of tests, check that PFCU line connections are leak proof.
- (3) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### **R H. Close-Up**

- (1) Make certain that working area is clear of tools and miscellaneous items of equipment.
- (2) Clean PFCU and surrounding area, and check that no trace of hydraulic fluid remains.
- (3) Close access doors and panels.
- (4) Install elevon and PFCU fairings.
- (5) Remove access platform.

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### 3. Removal of Power Flight Control Unit, (Set in Mechanical Mode With Test Set TE3016000)

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins - Synchro Pack	D925252000
Rigging Pin - Torque Tube at RIB24	D921311000
Zeroing Equipment - Elevons	D921354000
Equipment - Elevon PFCU, Removal/Installation	E920004000
Jig - Neutral Setting - Elevon at Rib24	E920001000
Test Set - Zero Setting, Resolvers	TE3016000
Tool Kit - Elevon PFCU, Removal/Installation	E920003000
Protractor - Elevon and Rudder (or Clinometer)	TE2012000
Rigging Pin - Mixing Unit - Servo Control	D921310000
Circuit Breaker Safety Clips	
Access Platform, 3.251 m (10 ft.8 in.)	
Lockwire Dia. 0.8 mm (0.032 in.), Corrosion Resistant Steel	
Warning Notices	
Special Materials (Ref. 20-30-00, No.123)	
General Lubricants (Ref. 20-30-00, No.51)	

#### B. Prepare

(1) Take the precautions described in the previous WARNING

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paragraph.

- (2) Remove following fairings as appropriate for PFCU to be removed :
- LH inner PFCU : fairings 551JB, LL, LR, KB  
RH inner PFCU : fairings 651JB, LL, LR, KB
- (3) If tool TE2012000 is to be employed, install tool on elevons associated with PFCU to be removed.
- (4) Open floor panel 241HF and leave it in position but do not attach.
- (5) Open door 121FB.
- (6) Open access door 151DB and depressurize Blue, Green and Yellow hydraulic systems (Ref. 29-12-00, Servicing; 29-11-00, Servicing; 29-21-00, Servicing).
- (7) Open access door 153BB and depressurize Blue, Green and Yellow hydraulic tanks (Ref. 29-13-00, Servicing).
- (8) Close hydraulic tank depressurization valves and safety with lock pins.
- (9) On PFCU concerned, disconnect actuating rod (12) from PFCU input lever (11).  
Do not alter length of rods. (It is necessary to support elevon manually).

NOTE : For removing or installing attachment bolts, it is necessary to press plunger on head of bolt to free the locking system balls.

- (10) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFCU INV GRN FAIL IND	1-213	1C 73	M15
PFCU INV GRN SUP		1C 66	P11
FLT CONT POSN IND 26V 400 Hz SUP	2-213	C 84	B 4
PFCU INV BLUE SUP	5-213	2C 66	B14
PFCU INV BLUE FAIL IND		2C 73	E11
HYD GRND CHECK OUT SEL	15-216	M 626	F22

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
---------	-------	--------------------	-------------

### VALVE CONT

HYD TANKS COMPR CONT      15-215      M 602      D 8

**WARNING :** DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

R      C. Remove  
(Ref. Fig.401 and 402)

**CAUTION :** GREAT CARE MUST BE TAKEN WHEN HANDLING THE PFCUs FOR REMOVAL OR INSTALLATION BECAUSE OF THE RELATIVE FRAGILITY OF SOME OF THEIR COMPONENTS. ONLY FORWARD, REAR OR CENTRE ATTACHMENT POINTS MUST BE USED FOR ATTACHMENT OR SUPPORT PURPOSES.  
Inner PFCUs weigh 63.3 Kg.

- (1) Disconnect hydraulic lines as follows :
  - (a) Maintain adapter screwed in PFCU using appropriate wrench.
  - (b) Unscrew hydraulic line union nut and disengage the line.
  - (c) Cap open line ends.
- (2) Remove cable loom attachments, and disconnect electrical connectors from PFCU.
- (3) Remove bonding strips (attachment points and ends of elevon control rods).
- (4) Remove cotter pins and nuts (24) from PFCU/elevon

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control rod connections and remove shim washers. Remove eccentric bushes (23) using extractor D921225000.

- (5) Remove cotter pins and nuts (26) and remove bolts (29) holding washers (25) and (28). Remove slotted nuts (30). Remove sleeves (27) and retain washers.
- (6) Remove elevon control rods (10), and remove back-up washers.
- (7) Remove nuts (5), washers (6) and bonding strip, securing resolver feedback link (2) bolt attachment plate to structure.
- (8) Remove screws (7) and washers (8) securing tracks (21).
- (9) Fix mini-hoists to attachment points provided for this purpose.
- (10) Using the mini hoists, bring equipment E920004000 opposite attachment points on PFCU. Rig this tool to PFCU.
- (11) Separate ball joint assemblies (1) on the end of sliding tubes, from structure: remove nuts (35), washers and bolts (32).
- (12) At PFCU forward attachment point, remove cotter pin and nut (38), remove lock washer (37), attachment bolt (33), sleeve (36) and washer (34).
- (13) At PFCU aft attachment point, remove cotter pin and nut (19), remove lock washer (18), bolt (15), sleeve (17) and washer (16).

**NOTE:** If sleeve cannot be removed or installed easily, deflect elevon.

- (14) Lower PFCU/tool assembly.

**CAUTION:** DO NOT DAMAGE TRACKS OR SLIDER.

- (15) Remove PFCU from trolley.

### R D. Inspection of Removed Component

- R (1) Perform ultrasonic inspection of shuttle valves on removed component according to manufacturer instructions.

### R E. Preparation of Replacement Component

- (1) Install elevon zeroing equipment E920001000, and set elevon to neutral.
- (2) Support elevon in neutral with tool D921354000.

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- (3) Set protractor to zero on elevon concerned (or note elevon neutral position, using a clinometer).
- (4) Remove tool E920001000.
- (5) Place PFCU on trolley and insert rigging pins.
- (5) Using mini-hoist, hoist tool/PFCU assembly.
- (7) Circular scratches of less than 0.05 mm (0.00196 in) are the only permissible damage on elevon control rod attachment bolts.

### R F. Install

**NOTE:** Before installation, apply a light coat of product No.51 on attachment bolt.  
During installation of PFCU/structure attachment bolts, make certain that pitch between PFCU attachment points corresponds to that of structural attachment points.  
The two bolts (coated with product No.51) must be inserted freely, without force being applied (sliding fit).

**B CAUTION:** BEFORE FINALISING INSTALLATION IT MUST BE ENSURED THAT SUFFICIENT  
**B CLEARANCE EXISTS BETWEEN THE SMALL PFCU DRAIN HOSE AND FORWARD**  
**B ATTACHMENT CRADLE EYE-END STRUCTURE.**

- (1) Secure PFCU rear end fitting to fork end with sleeve (17), washer (16), bolt (15), install washer (18) and attach with nut (19).  
Bolt (15) : torque to between 1.6 and 1.8 mdaN (11.8 and 13.2 lbf ft).  
Nut (19) : torque to between 0.52 and 0.58 mdaN (45 and 50 lbf in).  
Safety nut with cotter pin.
- (2) Install each track (21) on to slider (20) on PFCU body.
- (3) Attach, but do not tighten, rear end (4) of each track (21) to cradle (9), with screws (7) equipped with washers (8). It must be possible for the tracks to pivot on the cradle without any play.
- (4) Secure forward attachment point.  
Install sleeve (36) and washer (34), attachment bolt (33), lock washer (37).  
Secure with nut (38).  
Bolt (33) : torque to between 1.6 and 1.8 mdaN (11.8 and 13.2 lbf ft).  
Nut (38) : torque to between 0.52 and 0.58 mdaN (45 and 50 lbf in).  
Safety nut with cotter pin.

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- (5) Remove equipment E920004000 and mini hoists.
- (6) Install screws (7) equipped with washers (8) on forward end (3) of each track.  
Tighten screws (7) to complete installation of tracks, and wirelock.
- (7) Secure ball joint assemblies (1) to structure using bolts (32), washers and nuts (35).  
Bolts (32): torque to between 1.60 and 1.80 m.daN (142 and 160 lbf.in).  
Safety with lockwire (Ref. 20-21-13).  
Nuts (35): torque to between 1.20 and 1.35 m.daN (106 and 120 lbf.in).  
Safety with cotter pin.
- (8) Install elevon control rods.
  - (a) LH control rod.
    - (a1) Attach to PFCU.  
Install back-up washer and install control rod (10) on PFCU trunnion (22), positioning eccentric bush (23) at zero. Install peel washer and nut (24).  
Torque to between 9.2 and 16.6 m.daN (67.85 and 122.43 lbf.ft.).  
Safety with a cotter pin.
    - (a2) Attach to elevon  
Install control rod (10) on elevon spherical bearing. Install sleeve (27), peel washer and nut (30).  
Torque to between 6 and 8 m.daN (44.25 and 59 lbf.ft.).  
Install bolt (29), cup washer (28), tab washer (25), flat washer and nut (26).  
Torque to between 0.7 and 0.8 m.daN (62 and 71 lbf.in.).  
Safety with cotter pin and bend tab washer tabs.
  - NOTE : If holes for safetying bolt are not facing slots of nut, it is necessary to adjust thickness of peel washer.
  - (b) RH control rod
    - (b1) Attach to elevon.  
Install rod (10) on control surface spherical bearing with sleeve (27) peel washer

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and nut (30).

Torque to between 6 and 8 m.daN (44.25 and 59 lbf.ft).

Install bolt (29), cup washer (28), tab washer (25), flat washer and nut (26).

Torque to between 0.7 and 0.8 m.daN (62 and 71 lbf.in).

Safety with cotter pin and bend tab washer tabs.

NOTE : If holes for safetying bolt are not facing slots of nuts, it is necessary to adjust thickness of peel washer.

(b2) Attach to PFCU.

Install back-up washer, rod (10) on trunnion (22) of PFCU, install eccentric bush (23) peel washer and nut (24) without tightening.

NOTE : On PFCU RH trunnion, position eccentric bush so that rod can be installed without forcing.

If, exceptionally, the eccentricity of RH eccentric bush is not sufficient, adjust LH eccentric bush so that rod can be easily installed.

If necessary, adjust thickness of peel washers to obtain required torque loading on nuts (24).

(b3) Tighten nut (24) on trunnion.

Torque to between 9.2 and 16.6 m.daN (67.85 and 122.43 lbf.ft).

Safety with cotter pin.

(9) Connect hydraulic lines to PFCU as follows :

(a) Maintain adapters screwed in PFCU using appropriate wrench.

(b) Torque tighten hydraulic line union nuts to the following values.

Blue pressure	: 2.43 to 2.76 m.daN (17.9228 to 20.3576 lbf. ft.)
Blue return	: 4.86 to 5.31 m.daN (35.8456 to 39.1645 lbf. ft.)
Green pressure	: 2.43 to 2.76 m.daN (17.9228 to 20.3576 lbf. ft.)
Green return	: 4.86 to 5.31 m.daN (35.8456 to 39.1645 lbf. ft.)
Yell/Blue pressure	: 2.43 to 2.76 m.daN (17.9228

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to 20.3576 lbf. ft.)  
Yell/Blue return : 4.86 to 5.31 m.daN (35.8456  
to 39.1645 lbf. ft.)  
Yell/Green pressure : 2.43 to 2.76 m.daN (17.9228  
to 20.3576 lbf. ft.)  
Yell/Green return : 4.86 to 5.31 m.daN (35.8456  
to 39.1645 lbf. ft.)

**WARNING** : WHEN A HOSE WITH A BEND RADIUS IS REMOVED FROM AN INSTALLATION, CARE SHALL BE TAKEN NOT TO STRAIGHTEN THE HOSE FROM ITS ACQUIRED SHAPE.  
IF REQUIRED, FOR RE-INSTALLATION IT SHALL BE FITTED AS NEAR AS POSSIBLE TO THIS SHAPE WITHOUT ANY UNDUE FORMING.

- (10) Using protractor (or clinometer), check that elevon is in neutral.
- (11) Attach resolver feedback link (2) bolt attachment plate to structure. Do not safety.
- (12) Set resolvers to electrical zero.  
(Ref. Fig.403 and 401)
  - (a) Connect test set TE3016000 electrical cables to PFCU connectors.  
Supply test set with 28VDC.
  - (b) Place test set POWER JACKS AND NOSE WHEEL STEERING selector switch in BLUE CT CONTROL ELE-VONS position.
  - (c) Set resolvers to electrical zero.
    - (c1) Cut and remove lockwire from nut (51) and bolts (52), (54), and (55).
    - (c2) Slightly loosen bolts (52), (54) and (55)
    - (c3) Loosen nut (51) so that bolt (53) can be turned, but with slight resistance.
    - (c4) Turn bolt (53) in appropriate direction until adjustment indicator pointer indicates 0° plus or minus 2 min. At the same time, gradually increase test set sensitivity to maximum.
    - (c5) Tighten nut (51).  
Torque to between 0.15 and 0.17 m.daN

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(13 and 15 lbf.in.).

(c6) Check that electrical zero has not varied.

(c7) Tighten bolts (52) and (54).  
Torque to between 0.07 and 0.09 m.daN  
(6 and 8 lbf.in.).

(c8) Tighten bolt (55).  
Torque to between 0.259 and 0.282 m.daN (23  
and 25 lbf.in.).

(c9) Wirelock bolts (52) (54), and (55), nut (51)  
(Ref. 20-21-13).

(13) Remove resolver feedback link (2) bolt attachment  
plates from structure.

(14) Disconnect test set from PFCU.

(15) Connect PFCU electrical connectors.

(16) Remove tool D921354000 securing elevons at neutral.

(17) Fully deflect elevon in both directions and check that  
in both PFCU stop positions feedback link can be con-  
nected easily to structure.

**WARNING** : IN BOTH PFCU STOP POSITIONS, MAKE CERTAIN,  
BEFORE CONNECTING FEEDBACK LINK TO STRUCTURE,  
THAT THERE IS A CLEARANCE OF AT LEAST 1 mm  
(0.039 in.) BEFORE RESOLVERS ACHIEVE THEIR  
INTERNAL STOPS.

(18) Attach resolver feedback link (2) bolt attachment  
plate to structure : bonding strip, washers (6), nuts  
(5). Wirelock (Ref. 20-21-13).

(19) Connect actuating rod (12) to input lever (11) of con-  
cerned PFCU. Do not safety.  
(it is necessary to support elevon manually).

(20) Remove warning notices.

(21) Remove safety clips and tags and set circuit breakers.

(22) Set Flight controls in mechanical mode (Ref. 27-00-00  
Servicing).

(23) Immobilize resolvers with rigging pin D925252001  
(Roll) and rigging pin D925252003 (Pitch)

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- (24) Immobilize mixing unit with pin D921310000. Install floor panel without attaching it.

CAUTION: WHEN INSERTING AND REMOVING PINS, TAKE ALL NECESSARY PRECAUTIONS IN ORDER TO AVOID INTRODUCING INADVERTENTLY TOOLS OR MISCELLANEOUS ITEMS IN MIXING UNIT.

- (25) Check that rigging pin D921311000 can be easily inserted in rod and bellcrank assembly at RIB24.  
On protractor (or using a clinometer) check that control surface is at neutral.  
If required, adjust length of PFCU actuating rod. Remove rigging pin D921311000.
- (26) Tighten actuating rod attaching nut.  
Torque to between 0.31 and 0.37 mdaN (27.42 and 32.73 lbf in). Safety with cotter pin.
- (27) Remove rigging pin D921310000 from mixing unit.
- (28) Remove rigging pins D925252001 and D925252003 from resolvers and remove protractors.
- (29) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing - Procedure to set Flight Controls in mechanical mode).

### R G. Test

- (1) Proceed with tests as per 27-34-53, Adjustment/Test.
- (2) Upon completion of tests, check that PFCU line connections are leak proof.
- (3) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### R H. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Clean PFCU and surrounding area, and check that no trace of hydraulic fluid remains.
- (3) Close access doors 151DB, 153BB.
- (4) Install elevon and PFCU fairings of relevant PFCU.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

(5) Remove access platform.

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## MAINTENANCE MANUAL

### 4. Power Flight Control Unit Removal/Installation Without Test Set TE3016000

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Zeroing Equipment - Elevons	D921354000
Equipment - Elevon PFCU Removal/Installation	E920004000
Tool Kit - Elevon PFCU Removal/Installation	E920003000
Protractor - Elevon and Rudder or Clinometer	TE2012000
Circuit Breaker Safety Clips	
Access Platform 3.251 m (10 ft 8 in)	
Lockwire Dia. 0.8 mm (0.032 in) Corrosion Resistant Steel	
Warning Notices	
Special Materials (Ref. 20-30-00, No.123)	
General Lubricants (Ref. 20-30-00, No.51).	

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Depending on PFCU to be removed, remove the following fairings :  
  
LH inner PFCU : fairings 551JB, LL, LR, KB  
RH inner PFCU : fairings 651JB, LL, LR, KB
- (3) If tool TE2012000 is to be used, install it on elevons corresponding to the PFCU to be removed.
- (4) Set Flight Controls in electrical mode (Ref. 27-00-00,

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Servicing).

**NOTE** : If the Blue CT is faulty, set Flight Controls in Green electrical mode.  
In this case, it will be necessary, when in the main base, to proceed with readjustment by means of the elevons neutral setting jig.

- (5) Fully deflect Flight Controls in both directions. Slowly release to neutral and note position of control surfaces on protractor (or using clinometer). Repeat this operation at least three times and average the readings taken in each direction. Zero reference position for readings on protractor will be the middle point of the range defined by the average values of deflections in both directions.
- (6) Disconnect actuating rod from PFCU input lever. Do not change the length of this rod.  
  
**NOTE** : For removing or installing attachment bolts it is necessary to press plunger on head of bolt to free the locking system balls.
- (7) Support elevon at position (approximately neutral) using locking equipment D921354000.
- (8) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in electrical mode).
- (9) Open door 151DB, and depressurize Green, Blue and Yellow hydraulic systems (Ref. 29-11-00, Servicing ; 29-12-00, Servicing ; 29-21-00, Servicing)
- (10) Open door 153BB, and depressurize Blue, Green and Yellow hydraulic tanks (Ref. 29-13-00, Servicing).
- (11) Close tank depressurization valves and safety with lockpin.
- (12) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFCs INV GRN FAIL IND	1-213	1C 73	M15
PFCs INV GRN SUP		1C 66	P11
FLT CONT POSN IND 26V	2-213	C 84	B 4

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
400HZ SUP			
PFCs INV BLUE FAIL IND	5-213	2C 73	E11
PFCs INV BLUE SUP		2C 66	B14
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22
HYD TANKS COMPR CONT	15-215	M 602	D 8

**WARNING:** DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURISATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

C. Remove (Ref. Fig.401 and 402)

**CAUTION:** GREAT CARE MUST BE TAKEN WHEN HANDLING, REMOVING OR INSTALLING THE PFCUs BECAUSE OF THE RELATIVE FRAGILITY OF SOME OF THEIR COMPONENTS. ONLY FORWARD, REAR OR CENTRE ATTACHMENT POINTS MUST BE USED FOR ATTACHMENT OR SUPPORT PURPOSES:

RB **CAUTION:** CARE SHOULD BE TAKEN WHEN DISCONNECTING HOSE  
RB INSTALLATIONS, THAT ANY PREFORMED BEND TAKEN BY  
RB HOSE IN SERVICE IS NOT ALTERED BY UNDUE BENDING FOR  
RB CLEARANCE PURPOSES. ON RE-INSTALLATION ORIGINAL  
RB LINE TAKEN BY HOSE SHOULD BE MAINTAINED. THIS WILL  
RB AID HOSE LONGEVITY.

RB FAILURE TO COMPLY WITH THIS CAUTION MAY RESULT IN  
RB PREMATURE HOSE FAILURE.

INNER PFCU WEIGHT : 63.3 Kgs.

EFFECTIVITY: ALL

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- (1) Disconnect hydraulic lines as follows:
  - (a) Maintain adapter screwed in PFCU using appropriate wrench.
  - (b) Unscrew hydraulic line union nut and disengage the line.
  - (c) Cap open line ends.
- (2) Remove bonding strips (attachment points, ends of elevon control rods).

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- (3) On PFCU/Elevon control rod connections remove cotter pin and unscrew nuts (24), remove shim washers. Withdraw eccentric bushes (23) by means of extractor D921225000.
- (4) Remove cotter pin and unscrew nuts (26), remove bolts (29) washers (25) and (28). Unscrew slotted nuts (30) remove sleeve (27) and retain washers.
- (5) Remove elevon control rods (10) and back-up washers.
- (6) Disconnect from structure, resolver feedback link (2) bolt attachment plate: nuts (5), washers (6), bonding strips.
- (7) Remove screws (7) and washers (8) attaching tracks (21).
- (8) Fix mini-hoists to attachment points provided for this purpose.
- (9) Using the mini-hoists, bring equipment E920004000 opposite attachment points on PFCU. Rig this tool to PFCU.
- (10) Disconnect ball joint assemblies (1) on the end of sliding tubes, from structure: remove nut (35) washers and bolts (32).
- (11) At PFCU forward attachment point, remove cotter pin and nut (38), special washer (37), bolt (33), sleeve (36) and washer (34).
- (12) At PFCU aft attachment point, remove cotter pin and nut (19), remove lock washer (18), bolt (15), sleeve (17) and washer (16).

**NOTE:** If sleeve (17) cannot be removed or installed easily deflect elevon.

- (13) Lower PFCU/tool assembly.

**CAUTION:** DO NOT DAMAGE TRACKS OR SLIDER.

- (14) Remove PFCU from trolley.

### R D. Inspection of Removed Component

- R (1) Perform ultrasonic inspection of shuttle valves on removed component  
R according to manufacturer instructions.

### R E. Preparation of Replacement Component

- (1) Place PFCU on trolley and insert rigging pins.

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- (2) Using mini-hoist, hoist tool/PFCU assembly.
- (3) Circular scratches of less than 0.05 mm (0.00196 in) deep are the only permissible damage on elevon control rod attachment bolts.

### R F. Install

B NOTE: Before installation, apply a light coat of product No.51 on  
B attachment bolt.  
During installation of PFCU/structure attachment bolts, make certain that pitch between PFCU attachment points corresponds to that of structural attachment points.  
The two bolts (coated with product No.51) must be inserted freely, without force being applied (sliding fit).

B CAUTION: BEFORE FINALISING INSTALLATION IT MUST BE ENSURED THAT SUFFICIENT  
B CLEARANCE EXISTS BETWEEN THE SMALL PFCU DRAIN HOSE AND FORWARD  
B ATTACHMENT CRADLE EYE-END STRUCTURE.

- (1) Secure PFCU rear end fitting to fork end with sleeve (17), washer (16), bolt (15). Install washer (18) and attach with nut (19).

Bolt (15) : torque to between 1.6 and 1.8 mdaN (11.8 and 13.2 lbf ft).  
Nut (19) : torque to between 0.52 and 0.58 mdaN (45 and 50 lbf in).  
Safety nut with cotter pin.

- (2) Install each track (21) on to slider (20) on PFCU body.

- (3) Attach, but do not tighten, rear end (4) of each track (21) to cradle (22), with screws (7) equipped with washers (8).  
It must be possible for the tracks to pivot on the cradle without any play.

- (4) Secure forward attachment point.  
Install sleeve (36), washer (34), attachment bolt (33), lock washer (37) and tighten nut (38).

Bolt (33) : torque to between 1.6 and 1.8 mdaN (11.8 and 13.2 lbf ft).  
Nut (38) : torque to between 0.52 and 0.58 mdaN (45 and 50 lbf in).  
Safety with cotter pin.

- (5) Remove equipment E920004000 and mini-hoists.

- (6) Install screws (7) equipped with washers (8) on forward end (3) of each track.  
Tighten screws (7) to complete installation of tracks.  
Safety with lockwire (as per 20-31-13).

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- (7) Assemble ball joint assemblies (1) to structure using bolts (32), washers and nuts (35).  
Bolts (32): torque to between 1.60 and 1.80 m.daN (142 and 160 lbf.in).  
Safety with lockwire (Ref. 20-21-13).  
Nuts (35) torque to between 1.20 and 1.35 m.daN (106 and 120 lbf.in).  
Safety with cotter pin.
- (8) Install elevon control rods.
- (a) LH control rod
- (a1) Attach to PFCU  
Install back-up washer and install control rod (10) on PFCU trunnion (22), positioning eccentric bush (23) at zero. Install peel washer and nut (24).  
Torque to between 9.2 and 16.6 m.daN (67.85 and 122.43 lbf.ft).  
Safety with cotter pin.
- (a2) Attach to elevon.  
Install control rod (10) on elevon spherical bearing. Install sleeve (27) peel washer and nut (30). Torque to between 6 and 8 m.daN (44.25 and 59 lbf.ft.).  
Install bolt (29), cup washer (28), tab washer (25), flat washer and nut (26).  
Tighten.  
Torque to between 0.7 and 0.8 m.daN (62 and 71 lbf.in.).  
Safety with cotter pin and bend tab washer tabs.
- NOTE : If holes for safetying bolt are not facing slots of nut, it is necessary to adjust thickness of peel washer.
- (b) RH control rod
- (b1) Attach to elevon.  
Install rod (10) on control surface spherical bearing with sleeve (27), peel washer and nut (30). Torque to between 6 and 8 m.daN (44.25 and 59 lbf.ft).  
Install bolt (29), cup washer (28), tab washer (25), flat washer and nut (26).  
Tighten.  
Torque to between 0.7 and 0.8 m.daN (62 and 71 lbf.in.).

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Safety with cotter pin and bend tab washer tabs.

NOTE : If holes for safetying bolt are not facing slots of nut, it is necessary to adjust thickness of peel washer.

- (b2) Attach to PFCU  
Install back-up washer and install control rod (10) on PFCU trunnion (22) ; install eccentric bush (23), peel washer and nut (24) without tightening.

NOTE : On PFCU RH trunnion, position eccentric bush so that rod (10) can be installed without forcing.  
If, exceptionally, the eccentricity of RH eccentric bush is not sufficient adjust LH eccentric bush so that rod can be easily installed.  
If necessary, adjust thickness of peel washers to obtain required torque loading on nuts (24).

- (b3) Tighten nut (24) on trunnion.  
Torque to between 9.2 and 16.6 m.daN (67.85 and 122.43 lbf.ft).  
Safety with cotter pin.

- (9) Connect hydraulic lines to PFCU as follows :

- (a) Maintain adapters screwed in PFCU using appropriate wrench.
- (b) Torque tighten hydraulic line union nuts to the following values.
- |                     |  |
|---------------------|--|
| Blue pressure       | : 2.43 to 2.76 m.daN (17.9228 to 20.3576 lbf. ft.) |
| Blue return         | : 4.86 to 5.31 m.daN (35.8456 to 39.1645 lbf. ft.) |
| Green pressure      | : 2.43 to 2.76 m.daN (17.9228 to 20.3576 lbf. ft.) |
| Green return        | : 4.86 to 5.31 m.daN (35.8456 to 39.1645 lbf. ft.) |
| Yell/Blue pressure  | : 2.43 to 2.76 m.daN (17.9228 to 20.3576 lbf. ft.) |
| Yell/Blue return    | : 4.86 to 5.31 m.daN (35.8456 to 39.1645 lbf. ft.) |
| Yell/Green pressure | : 2.43 to 2.76 m.daN (17.9228 to 20.3576 lbf. ft.) |
| Yell/Green return   | : 4.86 to 5.31 m.daN (35.8456 to 39.1645 lbf. ft.) |

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to 39.1645 lbf ft).

**WARNING:** WHEN A HOSE WITH A BEND RADIUS IS REMOVED FROM AN INSTALLATION, CARE SHALL BE TAKEN NOT TO STRAIGHTEN THE HOSE FROM ITS ACQUIRED SHAPE.  
IF REQUIRED, FOR RE-INSTALLATION IT SHALL BE FITTED AS NEAR AS POSSIBLE TO THIS SHAPE WITHOUT ANY UNDUE FORMING.

- (10) Remove elevon zeroing equipment D921354000.
- (11) Connect PFCU electrical connectors.
- (12) Fully deflect elevon in both directions and check that in both PFCU stop positions, feedback link can be connected easily to structure.

**WARNING:** IN BOTH PFCU STOP POSITIONS, MAKE CERTAIN, BEFORE CONNECTING FEEDBACK LINK TO STRUCTURE, THAT THERE IS A CLEARANCE OF AT LEAST 1 mm (0.039 in) BEFORE RESOLVERS ACHIEVE THEIR INTERNAL STOPS.

- (13) Attach resolver feedback link (2) bolt attachment plate to structure: bonding strip, washer (6) nuts (5).  
Safety with lockwire (as per 20-31-13).
- (14) Connect actuating rod (12) to input Lever (11) of relevant PFCU.  
Safety with cotter pin. (It is necessary to support elevon manually).
- (15) Remove warning notices.
- (16) Remove safety clips and tags and set circuit breakers.

B (17) Carry out neutral setting check, if incorrect:

B (a) In mechanical mode, adjust PFCU input rod.

B (b) In electrical mode, adjust PFCU resolver adjustable lever.  
B (Ref. Fig.403).

B (18) Carry out neutral tolerance test (Ref. 27-11-00) Adjustment/Test,  
B para.4).

B (19) Remove protractors.

### R G. Tests

- (1) Carry out tests (Ref. 27-34-53, Adjustment/Tests).

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- (2) After tests, make certain that PFCU line connections are leak proof.
- (3) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### **R H. Close-Up**

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Clean PFCU and adjacent area. Check that no trace of hydraulic fluid remains.
- (3) Close access doors 151DB, 153BB.
- (4) Install elevon and PFCU fairings of relevant PFCU.
- (5) Remove access platform.

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## MAINTENANCE MANUAL

### 5. Green or Blue Electrovalve Removal

#### A. Equipment and materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Access Platform 3.251 m (10 ft. 8 in.)	
Lockwire Dia. 0.5 mm (0.020 in.)	
Corrosion Resistant Steel	
Warning notice	

#### B. Prepare

- (1) Take the precautions described in the previous warning paragraph.
- (2) Open door 151DB, depressurize Green, Blue and Yellow hydraulic systems (Ref. 29-11-00, 29-12-00 and 29-21-00, Servicing).
- (3) Open door 153BB, depressurize Green, Blue and Yellow hydraulic tanks (Ref. 29-13-00, Servicing).
- (4) Remove the following relevant PFCU fairings.  
LH inner PFCU : Fairing 551JB.  
RH INNER PFCU : Fairing 651JB.
- (5) Depending on electrovalve to be replaced, trip safety and tag the following circuit breakers :
  - (a) Green Electrovalves

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
INNER ELVN CONT & MON GRN SUP 1	1-213	1C 53	M11
INNER ELEVEN CONT & MON GRN SUP 2		1C 59	M14
HYD TANKS COMPR CONT	15-215	M 602	D 8
HYD GRND CHECK OUT SEL	15-216	M 626	F22

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
VALVE CONT			
(b) Blue Electrovalves			

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
INNER ELEVON CONT & MON BLUE SUP 1	5-213	2C 53	D11
INNER ELEVON CONT & MON BLUE SUP 2		2C 59	D14
HYD TANKS COMPR CONT	15-215	M 602	D 8
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2  
AND 3 PROHIBITING PRESSURIZATION OF  
BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS  
BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT  
ENGINEER'S STATION PROHIBITING USE OF  
GROUND PRESSURIZING SYSTEM ELECTRIC  
PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CON-  
NECTED DISPLAY A WARNING NOTICE ON THIS  
UNIT PROHIBITING PRESSURIZATION OF THE  
AIRCRAFT HYDRAULIC SYSTEMS.

C. Remove (Ref. Fig. 404 )

(1) Remove protective plate (61)

(a) Cut lockwire and remove screws (63). Retain  
washers (62) and remove plate.

(2) Disconnect electrical connector.

(a) Remove straps attaching electrical leads

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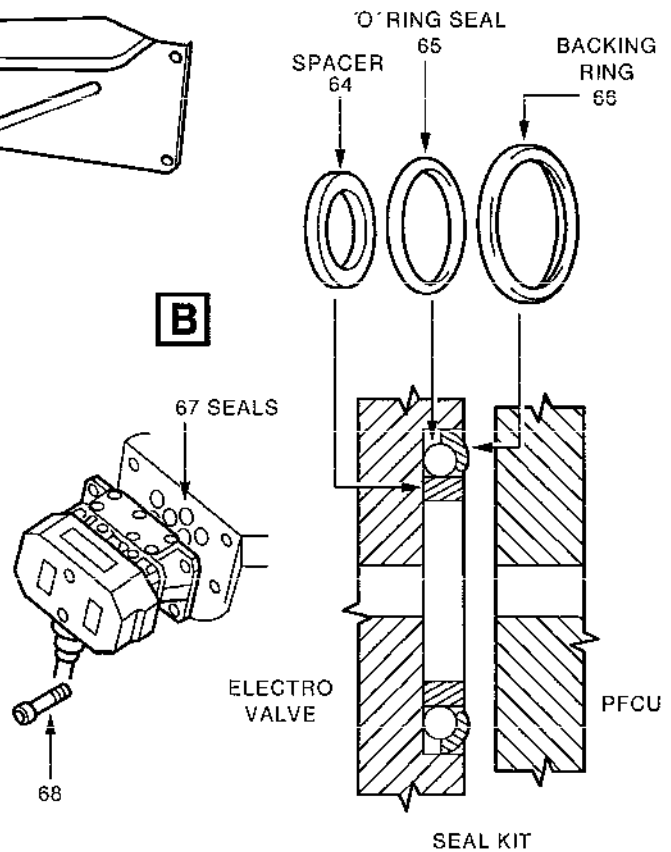
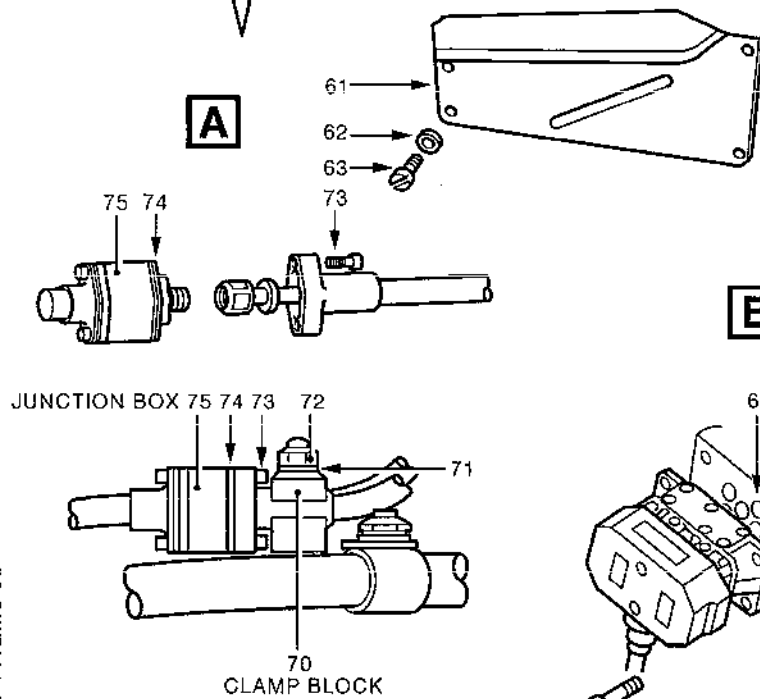
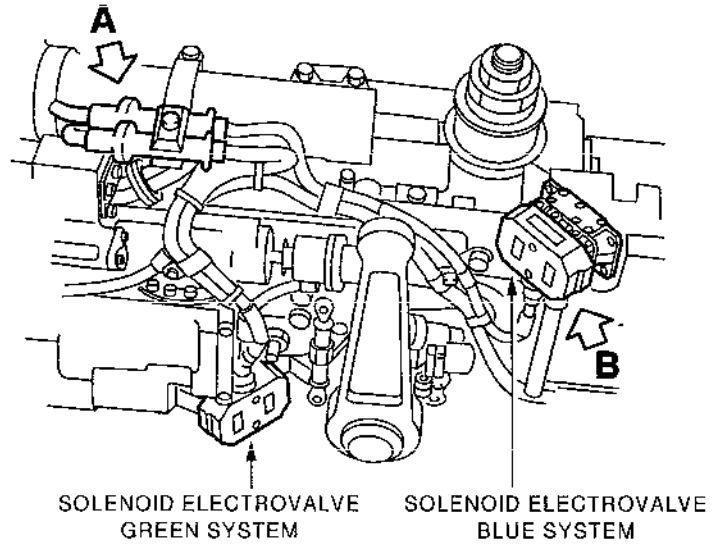
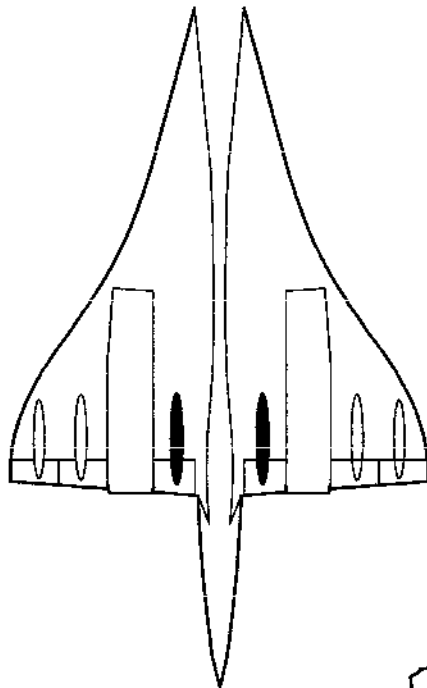
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Electrovalve  
Figure 404

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- (b) Remove clamp block (70) securing junction box, nut (71), washer (72).
- (c) Remove lockwire and screws (73), separate the two sections of the junction box, then disconnect plug connector. Discard gasket (74).
- (3) Cut and remove lockwire, remove screws (68) then electrovalve with seal kits (67) or coaxial seals.

**CAUTION:** TAKE ALL NECESSARY PRECAUTIONS TO AVOID CONTAMINATION OF HYDRAULIC FLUID.

### D. Preparation of Replacement Component

- (1) If fitted, the transit protective plate is to be removed from the electrovalve seal face.
- (2) Check that the three replacement seal kits are correctly installed. Before fitting the seal assemblies into the electrovalve counterbore, a trial installation of the copper backing rings should be accomplished. If they do not fit into the counterbore the copper backing rings should be lightly dressed using a fine file until they do.
- (3) The order of assembly is O ring (65) first, then copper backing ring (66) with the concave surface facing the seal and finally the alloy spacer (64). Under pressure the O ring would distort, the light alloy spacer retains it concentrically in the counterbore and ensures seal loading is face to face, the copper backing ring precludes feathering of the O ring during its service life.

### E. Install

- (1) Position electrovalve and secure with screws (68).

**CAUTION:** WHEN POSITIONING ELECTROVALVE TAKE CARE THAT SEALS ARE NOT DISTURBED FROM COUNTERBORES.

Torque screws to between 20 and 22 lbf in (0.23 and 0.25 mdaN)  
Safety screws in pairs with lockwire (Ref. 20-21-13).

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- R (2) Connect electrical connector

NOTE: Plugs are identified L for Blue electrovalves and F for Green electrovalves.  
Connect plugs and sockets bearing the same identification.

- (a) Install a new gasket (74).
- (b) Connect the two halves of connector then the two sections of junction box.  
Secure the two sections of junction box with screws (73). Safety screws with lockwire (Ref. 20-21-13).
- (c) Attach junction box with clamp block (70), washer (71), nut (72).
- (d) Replace lead straps if necessary.

- R (3) Remove safety clips and tags and set circuit breakers.

- R (4) Pressurize Green and Blue hydraulic tanks (Ref. 29-13-00, Servicing).

### F. Tests

- (1) Carry out test of electrovalve (Ref. Adjustment/Test).
- (2) Upon completion of test, check electrovalve for external leaks.
- (3) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools or miscellaneous items of equipment.
- (2) Install protective plate (61) and secure with screws (63) and washers (62).  
Safety with lockwire (Ref. 20-21-13).
- (3) Install PFCU fairings and close access doors.
- (4) Remove warning notices and access platforms.

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## MAINTENANCE MANUAL

### 6. Synchro Pack Removal

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins - Synchro pack	D925252000
Rigging Pin - Torque Tube at RIB24	D921311000
Zeroing Equipment - Elevons	D921354000
Rigging pin - Mixing Unit-Servo Control	D921310000
Jig - Neutral Setting - Elevons at RIB24	E920001000
Circuit Breaker Safety Clips	
Access Platform 3.251 m (10 ft. 8 in.)	
Lockwire Dia. 0.80 mm (0.032 in.) Corrosion Resistant Steel	
Warning Notice	

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Remove the following relevant PFCU fairings  
LH inner PFCU : Fairing 551JB  
RH inner PFCU : Fairing 651JB
- (3) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).
- (4) Open door 121FB and immobilize resolvers :  
Roll : rigging pin D925252001  
Pitch : rigging pin D925252003
- (5) Open floor panel 241HF and immobilize mixing unit with rigging pin D921310000. Position floor panel but do not attach at this stage.

**WARNING** : WHEN INSERTING AND REMOVING PINS TAKE ALL NECESSARY PRECAUTIONS IN ORDER TO AVOID IN-

EFFECTIVITY: ALL

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TRODUCING INADVERTENTLY TOOLS OR MISCELLANEOUS ITEMS IN MIXING UNIT.

- (6) Support elevon in its present position using equipment D921354000.
- (7) Disconnect actuating rod from PFCU input lever.
- (8) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in electrical mode).
- (9) Install equipment E920001000, position elevon at position 0 and maintain it in this position with equipment D921354000.
- (10) Open door 151DB, and depressurize Green, Blue and Yellow hydraulic systems (Ref. 29-11-00, 29-12-00, and 29-21-00, Servicing).
- (11) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT POSN IND 26V 400Hz SUP	2-213	C 84	B 4
INNER ELEVON BLUE CONT SUP		2C 94	C 2
INNER ELEVON MON BLUE SUP		2C 47	D 1
INNER ELEVON GRN CONT SUP		1C 94	F 1
INNER ELEVON MON GRN SUP		1C 47	G 1

### C. Removal (Ref. Fig. 405 )

- (1) Remove electrical lead attachment clips, nuts (94), washers (95), then nuts (98), washers (99). Disengage synchro pack bracket (96).
- (2) Unsafety then disconnect electrical connector and fit blanking cap.
- (3) Disconnect bonding strip (88) from synchro pack ; screws (89).
- (4) Disconnect resolver feedback link.
  - (a) Unsafety and unscrew nuts (83), retain washers (82), bonding strip (81) and remove attachment plate (80) from aircraft structure.

EFFECTIVITY: ALL

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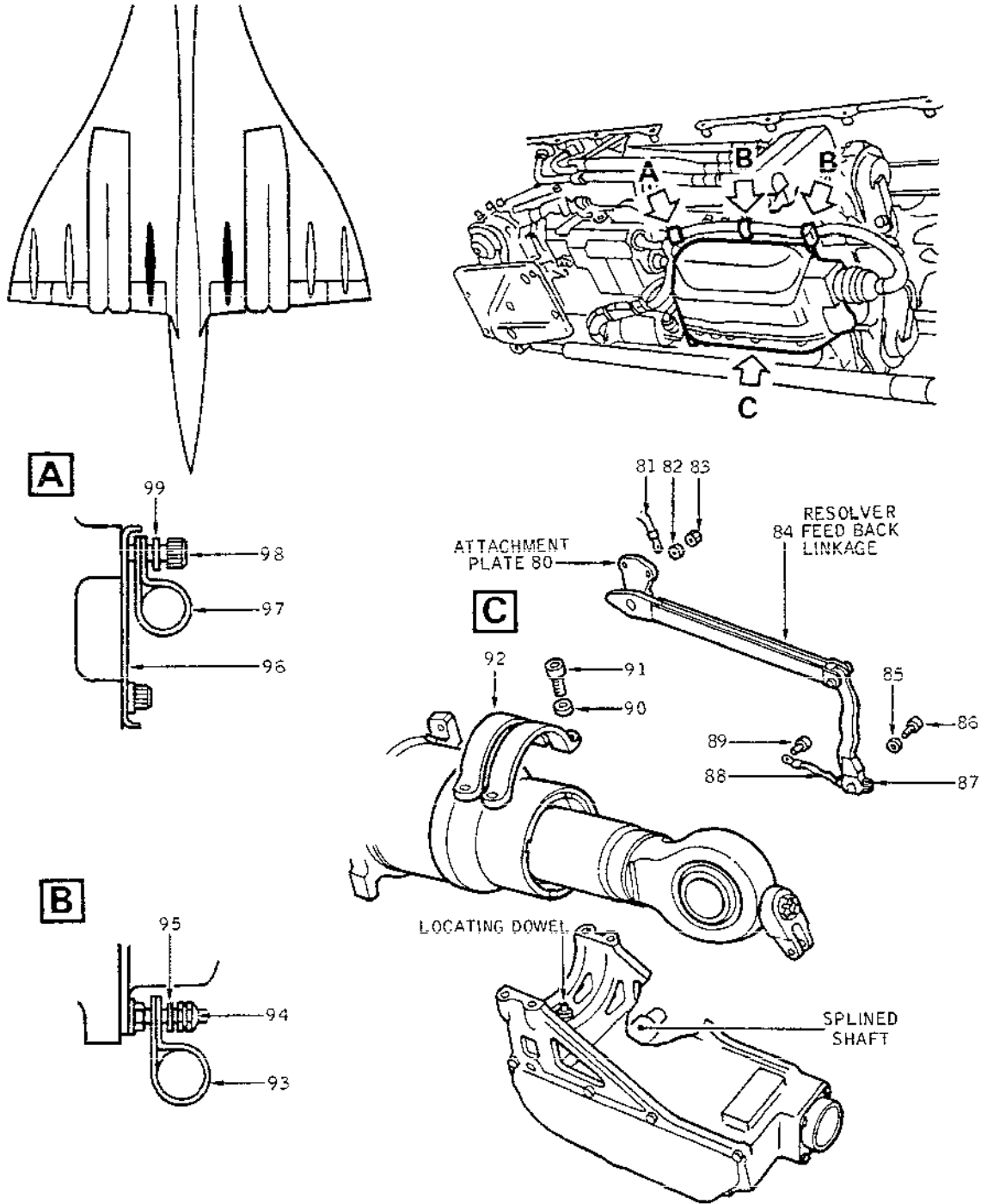
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CMA 27 34 53 4 AJMO

Synchro pack  
Figure 405

EFFECTIVITY: ALL

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- (b) Unsafety and remove nut (86), retain washer (85)
- (c) Unsafety and slightly loosen screws (87) to withdraw resolver feedback linkage from splined shaft on synchro pack.

- (5) Unsafety and remove screws (91), retain washers (90) and remove synchro pack.

NOTE : Synchro pack straps (92) are left on ram housing

### D. Preparation of Replacement Component.

Not applicable.

### E. Install

NOTE : The gland retaining ring nut of ram assembly is wire-locked to synchro pack attaching screws (91). Prior to positioning replacement synchro pack, fit suitable length of locking wire to gland nut.

- (1) Engage location dowel of synchro pack in hole in ram body.
- (2) Secure synchro pack with screws (91) and washers (90). Torque to between 78 and 85 lbf. in. (0.87 and 0.98 m.daN). Safety screws with lockwire as per 20-21-13.
- (3) Connect resolver feedback link (84).
  - (a) Connect adjustable lever to synchro pack splined shaft. Align datum marks.
  - (b) Install washer (85) and screw (86). Torque to between 23 and 25 lbf. in. (0.259 and 0.282 m.daN)
  - (c) Slightly tighten screws (87)
  - (d) Secure link attachment plate (80) to aircraft structure, nuts (83), washers (82).
  - (e) Do not safety screws and nuts at this stage.
- (4) Proceed with adjustment of synchro pack electrical zero (Ref. paragraph 2).
- (5) Remove link attachment plate (80) from aircraft structure.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (6) Disconnect test set from PFCU.
- (7) Remove items of equipment D921354000 and E920001000.
- (8) Deflect elevon and check that in both fully up and fully down positions, bolts used to secure attachment plate (80) can be inserted freely.  
  
**CAUTION** : A FURTHER CLEARANCE OF AT LEAST 1 mm (0.039 in.) MUST BE OBTAINED BEFORE RESOLVERS ACHIEVE THEIR INTERNAL STOPS.
- (9) Secure attachment plate (80) to aircraft structure, washers (82), nuts (83) and bonding strips (81). Safety nuts with lockwire as per 20-21-13.
- (10) Tighten screws (87). Torque to between 0.07 and 0.09 m.daN (6 and 8 lbf. in.). Safety with lockwire as per 20-21-13.
- (11) Connect electrical connector to synchro pack and safety with lockwire as per 20-21-13.
- (12) Install bracket (96) on synchro pack and secure clips (93) (97) with nuts (94) (98), washers (95) (99).
- (13) Connect bonding strip (88) to synchro pack, screw (89).
- (14) Connect actuating rod to PFCU input lever. Torque to between 0.31 and 0.37 m.daN (27.42 and 32.73 lbf.in.). Safety with cotter pin.
- (15) Remove safety clips and tags and set circuit breakers.
- (16) Set Flight Controls in mechanical mode. (Ref. 27-00-00, Servicing).
- (16) Remove rigging pins D925252001  
D925252003  
D921310000
- (18) Close floor panel 241HF and access door 121FB.
- (19) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).

### F. Tests

- (1) Carry out a functional test (Ref. 27-34-53, Adjustment/Test).

EFFECTIVITY: ALL

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- (2) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### E. Close-up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access doors.
- (3) Install PFCU fairing and remove access platform.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### 7. Resolver Feedback Linkage Removal

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging Pins - Synchro Pack	D925252000
Rigging Pin - Torque Tube at RIB24	D921311000
Zeroing Equipment - Elevons	D921354000
Rigging Pin - Mixing Unit - Servo Control	D921310000
Jig - Neutral Setting - Elevons at RIB24	E920001000
Access Platform 3.251 m (10 ft. 8 in.)	
Lockwire - Dia 0.80 mm (0.032 in.) Corrosion Resistant Steel.	

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Remove the following relevant PFCU fairings.  
LH inner PFCU : Fairing 551JB.  
RH inner PFCU : Fairing 651JB.
- (3) Set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).
- (4) Open access door 121FB and immobilize resolvers with rigging pins :  
Roll : Rigging pin D925252001  
Pitch : Rigging pin D925252003
- (5) Open floor panel 241HF and immobilize mixing unit with rigging pin D921310000. Position floor panel without attaching.

WARNING : WHEN INSERTING AND REMOVING PINS TAKE ALL NECESSARY PRECAUTIONS IN ORDER TO AVOID INTRODUCING INADVERTENTLY TOOLS OR MISCELLANEOUS ITEMS IN MIXING UNIT.

EFFECTIVITY: ALL

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- (6) Support elevon in its present position using equipment D921354000.
- (7) Disconnect actuating rod from PFCU input lever.
- (8) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in electrical mode).
- (9) Install equipment E920001000, position elevon at position 0 and maintain it in this position with equipment D921354000.
- (10) Open door 151DB, depressurize Green, Blue and Yellow hydraulic systems (Ref. 29-11-00, 29-12-00 and 29-21-00, Servicing).
- (11) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT POSN IND 26V 400Hz SUP	2-213	C 84	B 4
INNER ELEVON BLUE CONT SUP.		2C 94	C 2
INNER ELEVON MON BLUE SUP.		2C 47	D 1
INNER ELEVON GRN CONT SUP.		1C 94	F 1
INNER ELEVON MON GRN SUP.		1C 47	E 1

### C. Removal (Ref. Fig. 406 )

- (1) Disconnect feedback link from synchro pack.
  - (a) Unsafety and remove screw (110), retain washer (111)
  - (b) Unsafety and remove screw (109) attaching bonding strip (108), slightly loosen the other screw (109).
  - (c) Remove feedback lever from synchro pack splined shaft.
- (2) Disconnect feedback link from aircraft structure.
  - (a) Unsafety and remove screw (105) attaching bonding strip.

EFFECTIVITY: ALL

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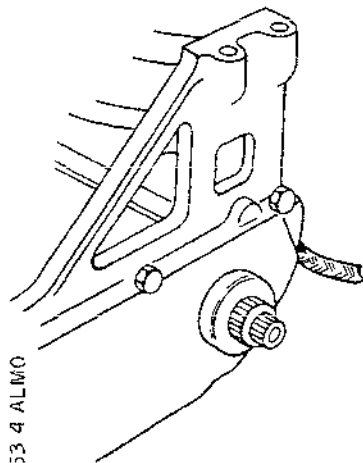
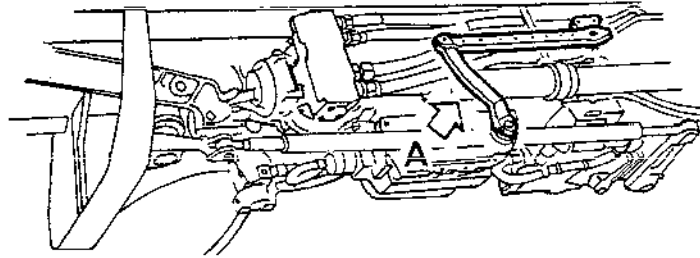
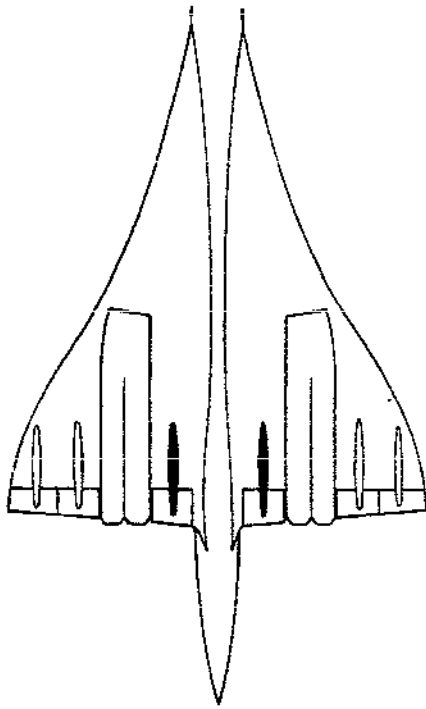
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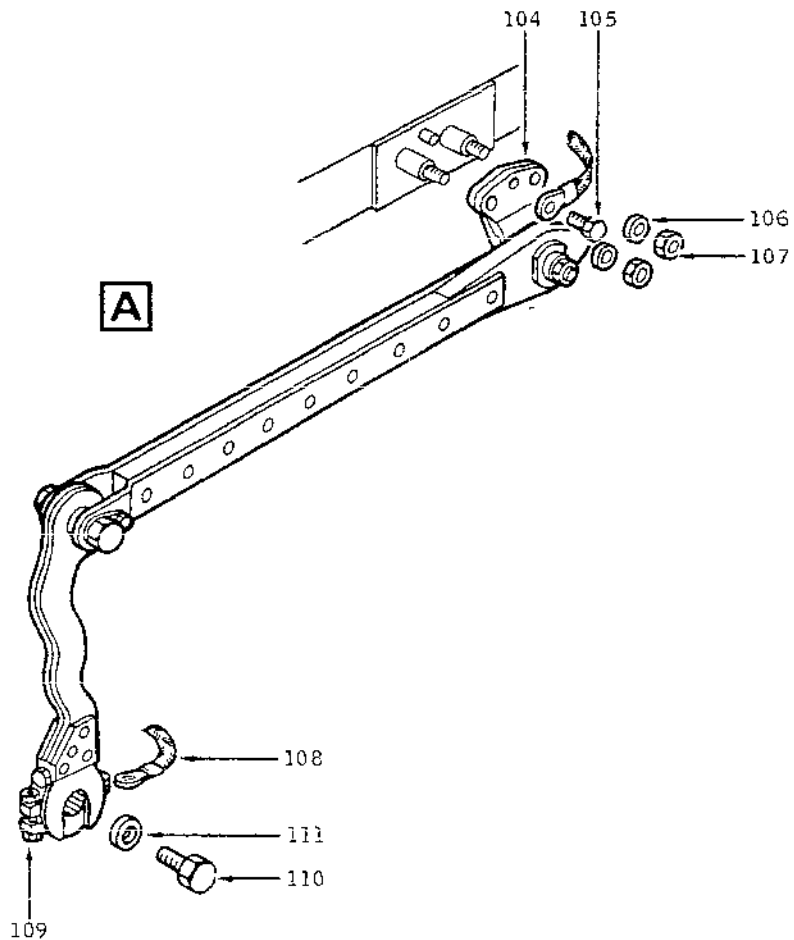
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CMA 27 34 53 4 ALMO



Resolver Feedback Linkage  
Figure 406

EFFECTIVITY: ALL

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(b) Unsafety and remove nuts (107), retain washers (106).

(3) Remove linkage

### D. Preparation of Replacement Component

Not applicable.

### E. Install

(1) Connect linkage to synchro pack.

(a) Connect adjustable lever to synchro pack splined shaft. Align datum marks.

(b) Install washer (111) and screw (110)  
Torque to between 23 and 25 lbf. in. (0.259 and 0.282 m.daN).

(c) Install bonding strip (108) and slightly tighten screws (109).

(2) Install link attachment plate (104) on aircraft structure, nuts (107), washers (106).

(3) Do not safety screws and nuts at this stage.

(4) Proceed with adjustment of synchro pack electrical zero (Ref. paragraph 2).

(5) Remove attachment plate (104) from aircraft structure.

(6) Disconnect test set from PFCU.

(7) Remove items of equipment D921354000 and E920001000.

(8) Deflect elevon and check that in both fully up and fully down positions, attachment plate (104) bolts can be inserted freely.

**CAUTION** : A FURTHER CLEARANCE OF AT LEAST 1 mm  
(0.039 in.) MUST BE OBTAINED BEFORE RESOLVERS  
ACHIEVE THEIR INTERNAL STOPS.

(9) Secure attachment plate (104) to aircraft structure, washers (106), nuts (107) and bonding strip with screw (105).

Safety nuts with lockwire as per 20-21-13.

(10) Tighten screws (109). Torque to between 0.07 and

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## MAINTENANCE MANUAL

0.09 m.daN (6 and 8 lbf. in.).

Safety with lockwire as per 20-21-13.

- (11) Connect actuating rod to PFCU input lever. Torque to between 0.31 and 0.37 m.daN (27.42 and 32.73 lbf.in.)  
Safety with cotter pin.
- (12) Remove safety clips and tags and set the circuit breakers.
- (13) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (14) Remove rigging pins D925252001  
D925252003  
D921310000  
D921311000
- (15) Install Floor panel 241HF and close access door 121FB.
- (16) Shut down pressurization of hydraulic systems  
(Ref. 27-00-00, Servicing. Procedure to set Flight Controls in mechanical mode).

### F. Tests

- (1) Carry out a functional test (Ref. 27-34-53, Adjustment/Test).
- (2) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access doors
- (3) Install PFCU fairing and remove access platform.

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## MAINTENANCE MANUAL

### 8. Removal of Shuttle Valve Assembly

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Adapter Torque - Elevon PFCU	TL1 - P215-45-1175
Protection Sleeve - Elevon/ Rudder PFCU	ST2 - P235-45-18
Extraction Tool - Elevon/ Rudder PFCU	ET1 - P215-45-2
Bullet - Elevon PFCU	B1 - P235-45-2
Bullet - Elevon PFCU	B2 - P235-45-2
Bullet - Elevon PFCU	B3 - P235-45-2
Circuit Breaker Safety Clips	
Access Platform 3.251 m (10 ft. 8 in.)	
Lockwire Dia 0.8 mm (0.032 in.) Corrosion Resistant Steel	
Warning Notice	
Blanking Caps	

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Open access door 151DB and depressurize Green, Blue and Yellow hydraulic systems (Ref. 29-11-00, 29-12-00 and 29-21-00, Servicing).
- (3) Open access door 153BB and depressurize Green, Blue and Yellow hydraulic tanks (Ref. 29-13-00, Servicing).
- (4) Remove the following relevant PFCU fairings :  
LH inner PFCU : Fairing 551JB  
RH inner PFCU : Fairing 651JB
- (5) Trip, safety and tag the following circuit breaker :

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## MAINTENANCE MANUAL

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL/ VALVE CONT	15-216	M 626	F22
HYD TANKS COMPR CONT	15-215	M 602	D 8
<p><u>WARNING</u> : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.</p> <p>DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.</p> <p>IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.</p>			

### C. Removal (Ref. Fig. 407 )

CAUTION : TAKE ALL NECESSARY PRECAUTIONS TO AVOID HYDRAULIC FLUID CONTAMINATION.

- (1) Disconnect hydraulic lines as follows.
  - (a) Maintain adapter screwed in PFCU using appropriate wrench.
  - (b) loosen hydraulic line union nut and disengage the line.
  - (c) Cap open ends
- (2) Unsafety and remove screws (136) retain washers (137) on RH shuttle valve assembly. On LH shuttle valve assembly, remove cotter pin and loosen nuts (133), retain washers (134) and remove bolts (135).
- (3) Unsafety and using equipment TL1-P215-45-1175, unscrew spigot nut (122) until threaded end of sliding tube (124) is disengaged ; remove ball joint assembly (121).
- (4) For RH shuttle valve only, unsafety and remove banjo

EFFECTIVITY: ALL

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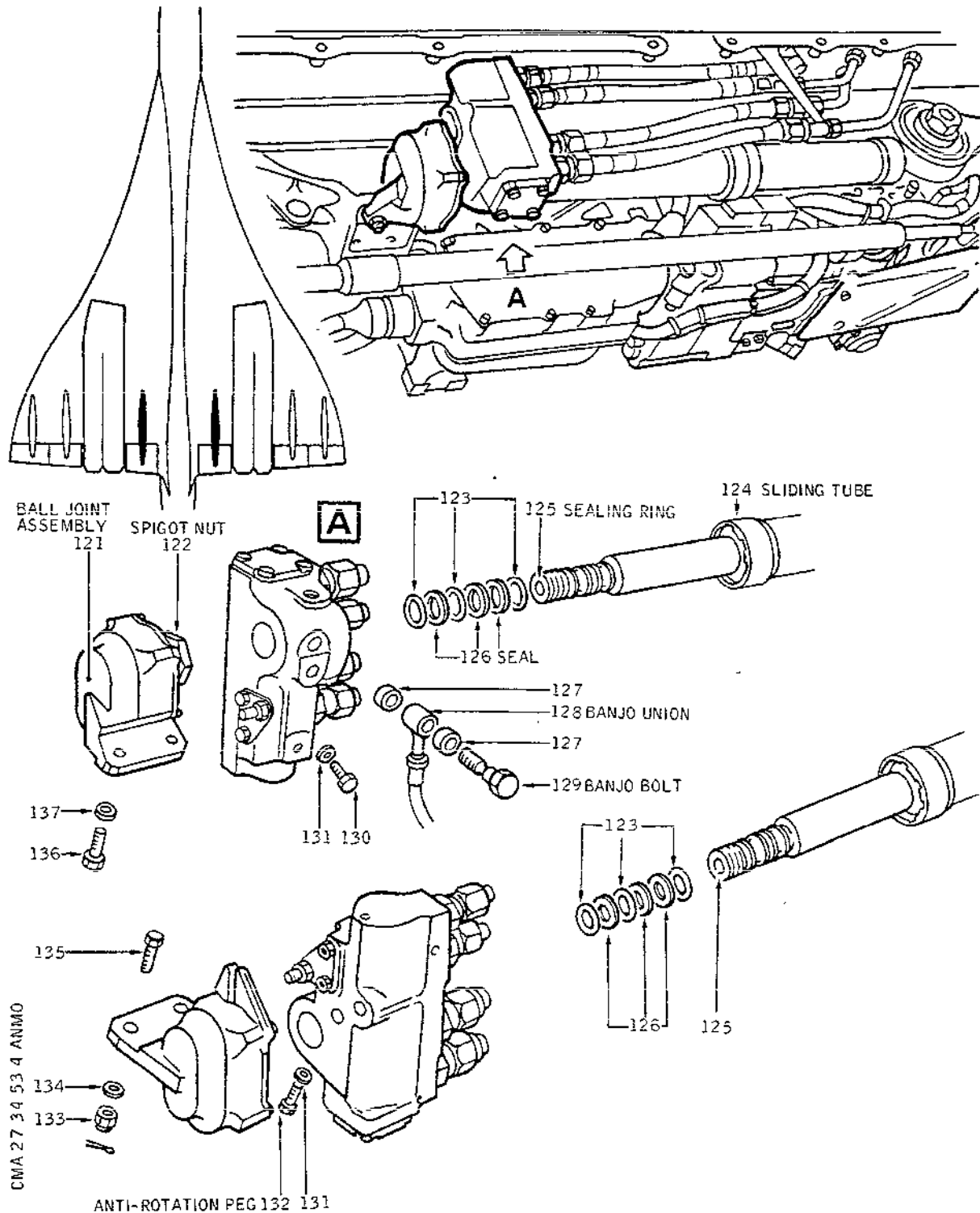
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Shuttle Valve Assembly  
Figure 407

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

bolt (129), disengage banjo union (128) with clam seals (127).

- (5) Remove anti-rotation peg (130) or (132) with clam seal (131).
- (6) Install equipment ST2-P235-45-18 on sliding tube threaded end, and by means of equipment ET1-P215-45-2 remove shuttle valve from sliding tube.
- (7) Remove and discard seals (126) and backing rings (123). Identify seal and backing ring locations.

### D. Preparation of Replacement Component

Not applicable.

### E. Install

- (1) Position new seals (126) and backing rings (123) on sliding tube according to their respective locations identified during removal procedure.  
Use items of equipment B1, B2, B3-P235-45-2.
- (2) Check that sealing ring (125) is installed on sliding tube threaded end.
- (3) Install shuttle valve on sliding tube and remove equipment ST2-P235-45-18.
- (4) Align shuttle valve with hole in sliding tube and install anti-rotation peg (130) or (132) and clam seal (131).  
Ensure correct engagement of peg before tightening.  
Torque to between 53 and 55 lbf. in. (0.596 and 0.621 m.daN.).
- (5) Install ball joint assembly (121) on shuttle valve and tighten spigot nut (122) using equipment TL1-P215-45-1175.  
Torque to between 170 and 190 lbf. in. (1.92 and 2.15 m.daN). Safety spigot nut and anti-rotation peg (130) or (132) with lockwire as per 20-21-13.
- (6) For RH shuttle valve, install banjo union (128) with clam seals (127) and banjo bolt (129).  
Torque to between 165 and 175 lbf. in. (1.86 and 1.98 m.daN). Safety with lockwire as per 20-21-13.

NOTE : Position union so that synchro pack is clear of flexible line when ram body is in forward posi-

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tion.

- (7) Secure LH ball joint assembly (121) with bolts (135) nuts (133), washers (134).  
Nuts (133): Torque to between 1.20 and 1.35 m.daN (106 and 120 lbf.in).  
Safety with cotter pin.  
Secure RH ball joint assembly (121) with washers (137), screws (136). Torque to between 1.60 and 1.80 m.daN (142 and 160 lbf. in.).  
Safety screws with lockwire as per 20-21-13.
- (8) Connect hydraulic lines to shuttle valve assembly as follows :
- (a) Maintain adapters screwed in housing using appropriate wrench.
- (b) Torque tighten hydraulic line union nuts to the following values.
- |                     |  |
|---------------------|--|
| Blue pressure       | : 2.43 to 2.76 m.daN (17.9228 to 20.3576 lbf. ft.) |
| Blue return         | : 4.86 to 5.31 m.daN (35.8456 to 39.1645 lbf. ft.) |
| Green pressure      | : 2.43 to 2.76 m.daN (17.9228 to 20.3576 lbf. ft.) |
| Green return        | : 4.86 to 5.31 m.daN (35.8456 to 39.1645 lbf. ft.) |
| Yell/Blue pressure  | : 2.43 to 2.76 m.daN (17.9228 to 20.3576 lbf. ft.) |
| Yell/Blue return    | : 4.86 to 5.31 m.daN (35.8456 to 39.1645 lbf. ft.) |
| Yell/Green Pressure | : 2.43 to 2.76 m.daN (17.9228 to 20.3576 lbf. ft.) |
| Yell/Green Return   | : 4.86 to 5.31 m.daN (35.8456 to 39.1645 lbf. ft.) |

**WARNING** : WHEN A HOSE WITH A BEND RADIUS IS REMOVED FROM AN INSTALLATION, CARE SHALL BE TAKEN NOT TO STRAIGHTEN THE HOSE FROM ITS ACQUIRED SHAPE.  
IF REQUIRED FOR RE-INSTALLATION, IT SHALL BE FITTED AS NEAR AS POSSIBLE TO THIS SHAPE WITHOUT ANY UNDUE FORMING.

- (9) Remove safety clip and tag and set circuit breaker.
- (10) Pressurize Green, Blue and Yellow hydraulic tanks (Ref. 29-13-00, Servicing).

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### F. Tests

- (1) Carry out a functional test (Ref. 27-34-53, paragraph 2, Adjustment/Test).
- (2) Upon completion of tests, check shuttle valve for external leaks.
- (3) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access doors.
- (3) Install PFCU fairing and remove access platform.

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## MAINTENANCE MANUAL

### INNER ELEVON POWER FLIGHT CONTROL UNIT - ADJUSTMENT/TEST

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN 24-00-00, SERVICING.

#### 1. General

Test of PFCU (Power Flight Control Unit) operation after Removal/installation

#### 2. Operational Test

##### A. Equipment and Materials

DESCRIPTION	PART NO.
-------------	----------

Electrical ground power unit  
115/200 V - 400 Hz

##### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph
- (2) On overhead panel

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- (a) On Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in OFF INV position and make certain that O & M ELEVONS, IN ELEVONS and RUDDER switches are in MECH position.
- (b) On SERVO CONTROLS unit make certain that the control switches are in NORMAL position
- (c) On RELAY JACK unit, place switch in NORM position
- (3) On circuit breaker panels make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
INNER ELVN CONT. & MON GRN SUP.1	1-213	1C 53	M11
MID & OUTER ELVN CONT & MON GRN SUP.		1C 55	M12
OUTER ELEVON NEUTRLN GRN SUP.		1C 58	M13
INNER ELEVON CONT & MON GRN SUP.2		1C 59	M14
P.F.C.S INV GRN FHIL IND		1C 73	M15
AUDIO WARN SYS SUP.1		W 371	M21
RUDDER CONT & NON GRN SUP.		1C 62	N11
RUDDER MON LOGIC GRN SUP.		1C 63	N12
P.F.C.S ALL SURFACES MON GRN SUP.		1C 54	N13
P.F.C.S INV BLUE FAIL SUP.		1C 67	N14
P.F.C.S INV GRN PROTN CONT		1C 68	N15
RELAY JACK HYD SEL IND & SUP.		C 281	N17
P.F.C IND		C 287	N18
M.W.S SUP.1		W 252	N21
P.F.C.S INV GRN SUP		1G 66	P11
YEU/GRN - GRN FAIL		C 285	P16
YEU/BLUE BLUE FAIL		C 286	P17
YELL L.L.		C 288	P18
FLT CONT POSN IND CONT		C 83	R11
FLT. CONT. POSN. IND. 26V 400Hz SUP	2-213	C 84	B 4
OUTER ELEVON AMP BLUE SUP.		2C 44	C 1
INNER ELEVON BLUE CONT. SUP.		2C 94	C 2
MID ELEVON AMP BLUE SUP.		2C 93	C 3
MID & OUTER ELEVON BLUE CONT. SUP.		2C 92	C 4

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
INNER		2C 47	D 1
MIDDLE & OUTER		2C 46	D 2
RUDDER MON BLUE SUP.		2C 49	D 3
RUDDER BLUE 26V 1800Hz		2C 76	D 4
CONT. SUP.			
P.F.C.S INV. BLUE PROTN.		2C 71	D 5
SUP.			
OUTER ELEVON AMP. GRN.		1C 44	E 1
SUP.			
INNER ELEVON GRN. CONT.		1C 94	F 1
SUP.			
MID. ELEVON AMP. GRN. SUP.		1C 93	F 2
INNER		1C 47	G 1
MIDDLE & OUTER		1C 46	G 2
RUDDER NON. GRN. SUP.		1C 49	G 3
P.F.C.S INV. GRN. PROTN.		1C 71	G 5
SUP.			
MID & OUTER ELEVON GRN.		1C 92	H 5
CONT. SUP.			
RUDDER GRN. 26V. 1800Hz.		1C 76	H 6
CONT. SUP.			
YELL L/LEVEL	3-213	C 282	A 8
YELL/GRN GRN FAIL		C 283	A 9
YELL/BLUE BLUE FAIL		C 284	A10
P.F.C.S INV BLUE SUP.	5-213	2C 66	B14
RUDDER CONT & MON		2C 62	C11
RUDDER MON LOGIC		2C 63	C12
P.F.C.S IN GRN FAIL SUP.		2C 67	C13
P.F.C.S INV BLUE PROTN CONT		2C 68	C14
AUDIO WARN SYS SUP.2		W 372	C17
INNER ELEVON CONT & MON		2C 53	D11
BLUE SUP 1			
MID & OUTER ELEVON CONT &		2C 55	D12
MON BLUE SUP			
OUTER ELEVON NEUTRLN BLUE		2C 58	D13
SUP			
INNER ELEVON CONT & MON		2C 59	D14
BLUE SUP.2			
M.W.S SUP.2		W 251	D15
P.F.C.S INV BLUE FAIL IND		2C 73	E11
P.F.C.S ALL SURFACES MON		2C 54	E12
BLUE SUP.			

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- (4) On panel 2-213, set circuit breaker  
FLT. CONT & NAV. BUS 14XS (X355 Map ref H2)
- (5) Make certain that trim controls are set to zero.
- (6) Connect electrical ground power unit and energize the  
aircraft electrical network (Ref. 24-41-00, Servicing).

NOTE : During test, do not take into account the illumination of indicator and warning lights and aural warnings which are not mentioned.

### C. Test

- (1) Using electric pumps, pressurize yellow hydraulic system (Ref. 29-21-00, Servicing).
- (2) On overhead panel, on SERVO CONTROLS unit place lower switch in GREEN L.PRESS position  
- Elevons must deflect up to position zero
- (3) Slowly operate control column and handwheel from stop to stop in both directions.  
On ICOVOL indicator (Flight control surface position indicator) check that :
  - in Roll, the inner elevons deflect 14° in opposite directions (20 degrees for outer and middle elevons)
  - in Pitch, the 6 elevons deflect 17° in nose up and in nose down direction
- (4) On flight engineer's panel on unit GROUND HYD CHECK OUT place switch in G/B position
- (5) On overhead panel, on SERVO CONTROLS unit place lower switch in NORMAL position
- (6) Repeat above procedure (3)  
- On ICOVOL indicator results must be identical.
- (7) On overhead panel, on SERVO CONTROLS unit, place lower switch in BLUE L.PRESS position
- (8) On GROUND HYD CHECK OUT unit place switch in Y/Y position
- (9) Repeat above procedure (3)  
- On ICOVOL indicator, results must be identical.
- (10) On overhead panel, on Flight Control Unit, place GREEN INVERTER and BLUE INVERTER switches in ON position and

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O & M ELEVONS and IN ELEVONS switches in BLUE position. Press and release the RESET push button located on RH side of each switch.

- On ICOVOL indicator, the 6 magnetic indicators corresponding to elevons must display B.

- (11) On RELAY JACK unit, on overhead panel, place switch in GREEN ONLY position
- (12) Operate control column and handwheel with a deflection value not exceeding 5°
  - Elevons must deflect accordingly
- (13) On overhead panel, carry out the following procedure :
  - (a) On SERVO CONTROLS unit place lower switch in GREEN L.PRESS position
    - On ICOVOL indicator the 8 magnetic indicators must display M
  - (b) On Flight Control Unit place O & M ELEVONS and IN ELEVONS switches in GREEN position, then press and release the RESET push buttons (RH side of switches).
    - On ICOVOL indicator the 6 magnetic indicators corresponding to elevons must display G
  - (c) On RELAY JACK unit place switch in BLUE ONLY position
- (14) Operate flight controls as in (12) above  
The Elevons must deflect accordingly
- (15) On RELAY JACK unit, on overhead panel, place switch in NORM position
- (16) Repeat above procedure (3)
  - identical results
- (17) On overhead panel, carry out the following procedure :
  - (a) On SERVO CONTROLS unit place the lower switch in BLUE L.PRESS position
    - On ICOVOL indicator the 8 magnetic indicators must display M
  - (b) On Flight Control Unit, place O & M ELEVONS and IN ELEVONS switches in BLUE position, then press and release the corresponding RESET push-buttons
    - On ICOVOL indicator the 6 magnetic indicators display B

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- (18) Repeat above procedure (3)  
- identical results

### D. Close-Up

- (1) Shut down pressurization of Yellow hydraulic system (Ref. 29-21-00, Servicing).
- (2) On overhead panel
- (a) On Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position and the 3 switches in MECH position
- (b) On SERVO CONTROLS unit place lower switch in NORMAL position
- (3) De energize the aircraft electrical network and remove electrical ground power unit (Ref. 24-41-00, Servicing).
- (4) On panel 2-213, trip safety and tag circuit breaker : FLT CONT & NAV. BUS 14 XS (X355, Map ref. H2).

### 3. Jamming microswitch functional test

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Tool - JAMMING DETECTOR	ST4 P 285-45-002
Access Platform 9 ft. 8 in. (2,946 m)	
Access Platform 10 ft. 4 in. (3,150 m)	
Circuit Breaker Safety Clips	
Lockwire dia : 0.032 in (0.812 mm)	
Corrosion Resistant Steel	

#### B. Prepare

- (1) This test is carried out without hydraulic power : Depressurize Blue, Green and Yellow hydraulic systems (Ref. 29-12-00, Servicing : 29-11-00, Servicing ; 29-21-00, Servicing).
- (2) On panel 1-213, Trip, safety and tag the following

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circuit breaker  
P.F.C IND (C287, Map ref: N18).

- (3) Open access door 151 DB.
- (4) At zone 151, disconnect connectors C290A and C292A from pressure switches C290 and C292.
- (5) On panel 1-213, remove safety clip and tag and set circuit breaker.  
P.F.C IND (C287, Map ref N 18).
- (6) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFCs INV GRN FAIL IND	1-213	1C 73	M15
AUDIO WARN SYS SUP 1		W 371	M21
PFCs ALL SURFACES MON GRN SUP		1C 54	N13
MWS SUP 1		W 252	N21
AUDIO WARN SYS SUP 2	5-213	W 372	C17
MWS SUP 2		W 251	D15
PFCs INV BLUE FAIL IND		2C 73	E11
PFCs ALL SURFACES MON BLUE SUP		2C 54	E12
ROOF PNL LT TEST SUP	15-216	L1002	D13

- (7) Remove fairing :  
551JB for test of LH inner elevon PFCU spool valve jamming microswitches.  
661JB for test of RH inner elevon PFCU spool valve jamming microswitches.
- (8) On PFCU :
  - (a) Cut and remove lockwire safetying the attachment screws of input lever protective plate.
  - (b) Unscrew and remove screws.
  - (c) Remove protective plate.
- (9) On overhead panel :

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- (a) On Flight Control Unit, place GREEN INVERTER and BLUE INVERTER switches in OFF INV position, and make certain that O & M ELEVONS, IN ELEVONS and RUDDER switches are in MECH position.
- (b) On SERVO CONTROLS unit, make certain that both switches are in NORMAL position.
- (10) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).
  - Gong must Sound

On overhead panel :

- On Flight Control Unit, MECH JAM warning light must illuminate.
- On master warning panel, PFC warning light must illuminate.

NOTE : Do not take into account indications and visual or aural warnings which are not mentioned.

- (11) Press and release PFC warning light.
  - It must go off.
- (12) On overhead panel, on SERVO CONTROLS unit, press and release T push button located below BLUE JAM caption light
  - Gong must sound
  - BLUE JAM caption light must illuminate, then go off.
  - PFC warning light must illuminate.
- (13) Press and release PFC warning light
  - it must go OFF.
- (14) On SERVO CONTROLS unit, press and release T push button located below GREEN JAM caption light.
  - Gong must sound
  - GREEN JAM caption light must illuminate, then go off.
  - PFC warning light must illuminate.
- (15) Press and release PFC warning light
  - It must go off.

### C. Test

- (1) Install equipment ST4 - P 285-45-002 :
  - (a) For Blue spool valve jamming test :

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- (a1) On the rear section of PFCU, on the (Blue) springbox and microswitch assembly.
- (b) For Green spool valve jamming test :
- (b1) On the Front section of PFCU, on the (Green) springbox and microswitch assembly.
- (2) Carefully turn equipment operating handle clockwise up to stop (Maintain in this position for at least one second).
- Gong must sound
  - BLUE JAM (GREEN JAM) caption light must illuminate, on SERVO CONTROLS unit, on overhead panel.
  - PFC warning light must illuminate on overhead panel.
- (3) Turn equipment operating handle counter-clockwise and remove equipment.
- BLUE JAM (GREEN JAM) caption light and PFC warning light must remain illuminated.
- (4) Install test equipment on the second springbox and microswitch assembly.
- (5) Repeat operation (2) above :
- Gong must sound
  - GREEN JAM (BLUE JAM) caption light must illuminate on SERVO CONTROLS unit, (BLUE JAM (or GREEN JAM) caption light and PFC warning light must remain illuminated).
- (6) Turn equipment operating handle counter-clockwise and remove equipment.
- No change occurs in above mentioned indicator and warning lights.
- (7) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER		MAP REF.
PFCs ALL SURFACES MON GRN SUP	1-213	1C	54	N18
PFCs ALL SURFACES MON BLUE SUP	5-213	2C	54	E12

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- When tripping the second circuit breaker, BLUE JAM, GREEN JAM, MECH JAM caption lights and PFC warning light must go off.

(8) Set either of the circuit breakers mentioned above in (7) :

- Gong must sound
- On overhead panel, PFC warning light and MECH JAM warning light must illuminate.

NOTE : Make certain that, on SERVO CONTROLS unit, BLUE JAM and GREEN JAM caption lights remain off.

(9) Set the second circuit breaker mentioned above in (7)  
- No results

### D. Close-up

- (1) On overhead panel, on Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position.
- (2) On panel 1-213, trip safety and tag circuit breaker : PFC IND (C287, Map ref. N18).
- (3) At zone 151, connect connectors C290A and C292A to pressure switches C290 and C292.
- (4) Close access door 151DB.
- (5) On tested PFCU, install input lever protective plate and engage attachment screws.
- (6) Tighten protective plate attachment screws.
- (7) Wirelock above mentioned screws.
- (8) Install and secure tested PFCU fairing.
- (9) On panel 1-213, set circuit breaker :  
PFC IND (C287 Map ref. N18)
  - On SERVO CONTROLS unit, on overhead panel, make certain that BLUE L.PRESS and GREEN L.PRESS caption lights illuminate when above mentioned circuit breaker is set.
- (10) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

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### INNER ELEVON POWER FLIGHT CONTROL UNIT - INSPECTION/CHECK

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The purpose of the following procedure is to check :

- PFCU's (Power Flight Control Unit) for external leakage.
- PFCU's for internal hydraulic leakage between chambers.
- Permissible loads on end of input lever to initiate PFCU forward or rearward movement .
- General condition of PFCU attachments and components by visual inspection.

#### 2. PFCU External Hydraulic Leakage

##### A. Equipment and Materials

DESCRIPTION	PART NO.
-------------	----------

Access Platform 10 ft. 4 in.  
(3.160 m)

##### B. Prepare

- (1) Remove the following fairings.  
551JB, KB and 651JB and KB.

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- (2) Take the precautions described in the previous WARNING paragraph.
- (3) Set Flight Controls in Blue electrical mode (Ref. 27-00-00, Servicing).
- (4) Check that pitch, roll and yaw trim controls are set to zero.

### C. Check

- (1) Check on Flight Engineer's HYDRAULIC MANAGEMENT panel that hydraulic fluid temperature is between 30°C and 70°C (86°F and 158°F). If necessary, deflect elevons in pitch and roll configuration several times to reach the required temperature.
- (2) Wait 3 minutes for stabilization of external leak and proceed with measurement of leak.

NOTE : During check, PFCUs shall remain motionless and approximately at zero position.

- (3) Permissible leak rate for PFCU assembly is 4 drops per minute.
- (4) Set Flight Controls in Green electrical channel and carry out the same operations.

### D. Close-Up

- (1) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in electrical mode).
- (2) Install fairings 551JB, KB and 651JB and KB.
- (3) Remove access platforms.

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### 3. Internal Hydraulic Leakage between Chambers of PFCUs

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 10 ft. 4 in. (3.16 m)	
Ground Power Unit - Hydraulic, Power and Preliminary Testing (Qty 2)	
Flowmeters, 1 for each System (Qty 2) These Flowmeters must have the following characteristics : Flow rate Range : 0 to 25 l/mn Accuracy : 96% in a flow rate range between 4 and 25 l/mn	

#### B. Prepare

- (1) Remove fairings 551JB, KB and 651JB, KB.
- (2) Take the precautions described in the previous WARNING paragraph.
- (3) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).

NOTE : Install flowmeters, listed in equipment and materials paragraph, on Hydraulic ground power units.

- (4) Check that pitch, roll and yaw trim controls are set to zero.

#### C. Check

NOTE : Except Flight Controls no other hydraulic services must operate during this check.

- (1) Check on Flight Engineer's HYDRAULIC MANAGEMENT panel, that hydraulic Fluid temperature is between 30°C and 70°C (86° and 158°F).  
If necessary, deflect elevons in pitch and roll configuration several times to reach the required temperature.
- (2) Wait 3 minutes approximately, then note flow rate per minute of each QB and QG flowmeter. Elevons are in

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neutral position.

- (3) Shut down pressurization of Blue and Green hydraulic systems.
- (4) With elevons in low position, remove actuating rod from LH inner PFCU input lever. Slightly lift elevon in order to allow disengagement of rod.

NOTE : For removing bolts, it is necessary to press plunger on head of bolt in order to free the locking balls.

- (5) Manually position PFCU input lever a few degrees beyond neutral position, towards nose of aircraft. Maintain this position on PFCU during test.
- (6) Pressurize Green and Blue hydraulic systems. Wait two minutes approximately then note flow per minute of each QB1 and QG1 flowmeter. Elevons are in neutral position.
- (7) Difference between flow rates QB1 - QB and QG1 - QG must be smaller than 6 l/mn.
- (8) Shut down pressurization of Green and Blue hydraulic systems.
- (9) Connect actuating rod to input lever of PFCU. Bolt, special washer, flat washer, nut. Torque to between 0.25 and 0.30 mdaN (23 and 26.541 lbf. in.). Safety with cotter pin.
- (10) Repeat operations of above paragraphs (4) (5) (6) (7) (8) and (9) on RH inner PFCU.

### D. Close-Up

- (1) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
- (2) Install fairings 551JB, KB and 651JB, KB.
- (3) Remove access platforms

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### 4. Permissible loads applied to end of PFCU input lever

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Spring Scale From 0 to 20 N (0 to 4.48 lbf.)	
Access Platform 10 ft. 4 in. (3.16 m)	
Rigging Pins - Synchro Pack	D925252000

#### B. Prepare

- (1) Remove fairings 551JB and 651JB.
- (2) Take the precautions described in the previous WARNING paragraph.
- (3) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (4) Check that roll, yaw and pitch trim controls are set to zero.

#### C. Load measurement

- (1) Operate control surfaces in pitch and roll configuration several times.
- (2) Open access door 121FB and immobilize pitch, yaw and roll resolvers with rigging pins D925252001, D925252002 and D925252003.
- (3) Pitch and roll control surfaces being at neutral, disconnect actuating rod from input lever of LH inner elevon PFCU.

NOTE : For removing bolts, it is necessary to press plunger on head of bolt to free the locking balls.

- (4) Proceed with measurements under following conditions :
  - Hydraulic fluid temperature :  
40°C plus or minus 10°C (104°F plus or minus 18°F)
  - Ambient temperature  
20°C plus or minus 15°C (68°F plus or minus 27°F)
  - Load applied to end of lever

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smaller than 6.5N (1.46 lbf.) permissible  
greater than 11N (2.47 lbf.) not permissible  
If load is greater than 6.5N (1.46 lbf.) and smaller than 11N (2.47 lbf.) carry out new measurements under the following conditions :

- Hydraulic fluid temperature  
70°C plus or minus 5°C (158°F plus or minus 9°F)
- Ambient temperature  
20°C plus or minus 10°C (68°F plus or minus 18°F)
- Load applied to end of lever  
Equal to or smaller than 8.5N (1.9 lbf.) permissible.  
Greater than 8.5N (1.9 lbf.) not permissible.

- (5) Connect actuating rod to PFCU input lever.  
Bolt, special washer, flat washer, nut.  
Torque to between 0.25 and 0.30 mdaN (23 and 26.541 lbf. in.). Safety with cotter pin.

- (6) Repeat the same operations on RH inner elevon PFCU.

### D. Close-Up

- (1) Remove rigging pins D925252001, D925252002 and D925252003 from resolvers.
- (2) Shut down pressurization of hydraulic systems  
(Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
- (3) Install fairings 551JB and 651JB.
- (4) Close access doors 151FB.
- (5) Remove access platform.

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### 5. Visual Check of PFCU

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 10 ft. 4 in. (3.16 m)	

#### B. Prepare

- (1) Remove fairings 551JB, KB and MB.  
651JB, KB and MB.

#### C. Check

- (1) Control rods (rods between PFCU and elevon).
  - (a) Check that control rods are not ruptured.
  - (b) Check that they do not foul retaining plate.
  - (c) Apply a load to each end of rod to ensure that it is in working condition.
  - (d) Visually, and, if required, with an inspection mirror, check the following components, without removing them, for cracks.
    - PFCU trunnions
    - Rod ends (PFCU side and elevon side)
    - Rod body
    - Fork end and pick up fitting on control surface.
  - (e) On front attachment point, check for presence of self locking nut and safetying (cotter pin).  
On rear attachment points, check for presence of central nut and safetying.
- (2) PFCU and structural attachment points.
  - (a) Apply a vertical load, at rear attachment point, to piston or to PFCU body to ensure there is no rupture of attachment.
  - (b) Apply a vertical load at front attachment point, (load may be applied to resolver box) to ensure there is no rupture of attachment.
  - (c) Check that PFCU does not jam in track by turning servo control body both ways ; free movement of

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servo control body can thus be checked.

- (d) Visually and, if required, using an inspection mirror, check the following attachment points for cracks :
  - Front and rear attachment fittings on structure.
  - PFCU piston ends (front and rear).
- (e) Check safetying (cotter pins) of front and rear attachments.

### (3) Feedback linkage.

- (a) Visually and, if required, using an inspection mirror check the following components for rupture or cracks :
  - Upper and lower sections of resolver box adjustable lever
  - Upper and lower sections of feedback link and bolt attachment plate to structure.

NOTE : Resolver box adjustable lever must be inspected with the greatest care, as a total rupture of this lever, during flight, may have catastrophic effects.

A typical crack on resolver box adjustable lever is illustrated as an example  
(Ref. Fig. 601 )

- (b) Check safetying and attachments of the following components :
  - Link bolt attachment plate
  - Feedback link between bolt attachment plate and resolver box adjustable lever.
  - Resolver adjustment device
  - Bonding strips

### (4) Electrical wiring and connections.

- (a) Check presence of bonding strips between :
  - Resolver box and adjustable lever
  - Adjustable lever and feedback link
  - Feedback link and bolt attachment plate to structure
  - PFCU forward eye end and structure
  - PFCU aft eye end and structure.
- (b) Make certain that the following connectors are correctly locked :  
LH inner PFCU

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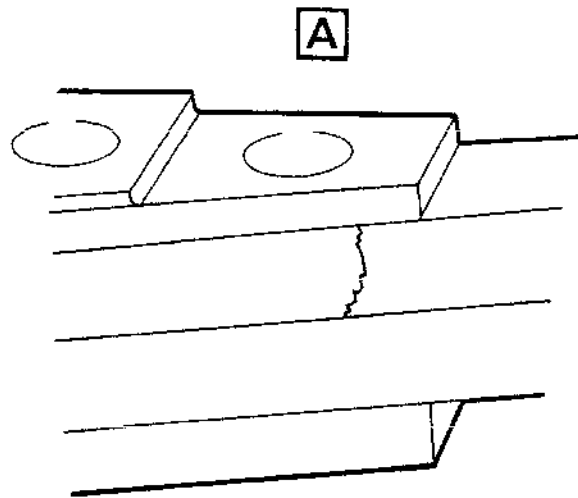
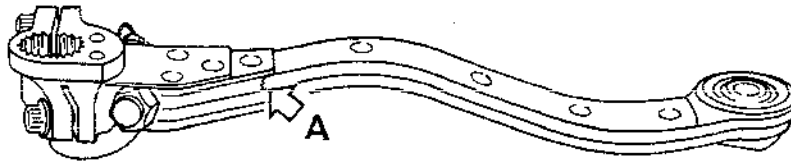
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CMA 27 34 53 6 AAM0

Resolver Box Adjustable Lever Typical Crack.  
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connector C 105 AB  
connector C 105 BB  
connectors : T, D, K, A, B  
RH inner PFCU  
connector C 106 AB  
connector C 106 BB  
connectors : T, D, K, A, B.

- (c) Make certain that cable looms are in good condition (free of chafing, correct attachment).

LH and RH inner PFCU :

Cable looms P 265 450 149

P 265 450 151  
P 265 450 152  
P 265 450 153  
P 265 450 154  
P 265 450 155  
P 265 450 156  
P 265 450 157  
P 265 450 158  
P 265 450 159  
P 265 450 150

### (5) Hydraulic system

- (a) Check that telescopic supply tubes and shuttle valve housings are free of cracks.
- (b) Check that telescopic tubes can move freely ( a few degrees in rotation) and that anti rotation pegs are not peened.
- (c) Check that flexible hoses are not in contact with structure or with other hoses. Check that they are free of chafing or dents.
- (d) On each electrovalve, check that safety disc is still present on side of housing and is not deformed. (Safety disc is of a lighter colour than the electrovalve housing).
- (e) Take the precautions described in the previous WARNING paragraph.  
Set Flight Controls in mechanical mode  
(Ref. 27-00-00, Servicing)  
Check that visible surfaces of telescopic tubes and Servo control piston are in good condition by operating controls in nose up and nose down directions.

D. Close-Up

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- (1) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight Controls in mechanical mode).
- (2) Install fairings 551JB, KB and MB  
651JB, KB and MB.
- (3) Remove access platform.

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## MAINTENANCE MANUAL

### POWER FLIGHT CONTROL UNIT STANDBY SELECTOR VALVE REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The PFCU standby selector valve ensures the servo control hydraulic supply or the tank return.

#### 2. P.F.C.U. Standby Selector Valve

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Hydraulic Fluid Container	
Access Platform Under Fuselage 3,141 m (10 ft. 3 in.)	
Lockwire Dia. 0.8 mm (0.032 in.) (Corrosion Resistant Steel)	
Blanking Plates	
Hydraulic Fluid (Ref. 20-30-00, No.11)	
Circuit Breaker Safety Clips	

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Trip safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD TANKS COMPR CONT	15-215	M 602	D 8
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M 626	F22
YELL/BLUE BLUE FAIL	1-213	C 286	P17
PFC & RELAY JACK 'A' SYS CONT			
YELL/BLUE BLUE FAIL	3-213	C 284	A10
PFC & RELAY JACK 'B' SYS CONT			
YELL/GRN GRN FAIL	1-213	C 285	P16
PFC & RELAY JACK 'A' SYS CONT			
YELL/GRN GRN FAIL	3-213	C 283	A 9
PFC & RELAY JACK 'B' SYS CONT			

- (3) Open door 153BB, depressurize hydraulic tanks.
- (4) Open door 151DB, depressurize the Green, Blue and Yellow hydraulic systems.

**WARNING :** DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, YELLOW AND GREEN HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.  
DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING OPERATION OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

- (5) Close and safety with lockpin the hydraulic tank depressurization valve.

### C. Remove

- (1) Disconnect electrical connectors (3).
- (2) Unsafety selector attaching screws (1).

EFFECTIVITY: ALL

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- (3) Unscrew screws (1) remove washers (2) disconnect the bonding strip.
- (4) Separate selector (5) from manifold (4) and remove it.
- (5) Remove sealing spools (8).
- (6) Install blanking plates.

### D. Preparation of Replacement Component

R Make certain that selector is filled with Product No.011  
R (Ref. 20-30-00).

### E. Install

- (1) Remove blanking plates.
- (2) Clean component mating surfaces.
- R (3) Replace ring seals (6) back-up rings (7 and 9) from sealing spools.
- R NOTE : The thicker back-up ring (9) must be fitted on the spool end bearing a mark (annular groove).
- (4) Install sealing spools (8), with annular groove on manifold side.
- (5) Place selector (5) on manifold (4).
- (6) Install washers (2) bonding strip, screws (1) and tighten.  
Torque to between 0.75 and 0.85 m.daN (66.35 and 75.2 lbf in.). Lockwire.
- (7) Connect electrical connectors (3).
- (8) Clean selector and adjacent area carefully. Check that no trace of hydraulic fluid remains.
- (9) Remove safety clips and tags and reset circuit breakers.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD TANKS COMPR CONT	15-215	M 602	D 8
HYD GRND CHECK OUT SEL	15-216	M 626	F 22

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
VALVE CONT			
YELL/BLUE BLUE FAIL PFC & RELAY JACK "A" SYS CONT	1-213	C 286	P17
YELL/BLUE BLUE FAIL PFC & RELAY JACK "B" SYST CONT	3-213	C 284	A10
YELL/GRN GRN FAIL PFC & RELAY JACK "A" SYS CONT	1-213	C 285	P16
YELL/GRN GRN FAIL PFC & RELAY JACK "B" SYS CONT	3-213	C 283	A 9

### F. Tests

- (1) Carry out a test (Ref. 27-34-54, Adjustment/Test).
- (2) Upon completion of test check that no trace of hydraulic fluid remains.
- (3) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access doors 151DB, 153BB.
- (3) Remove access platform.
- (4) Remove warning notices.

EFFECTIVITY: ALL

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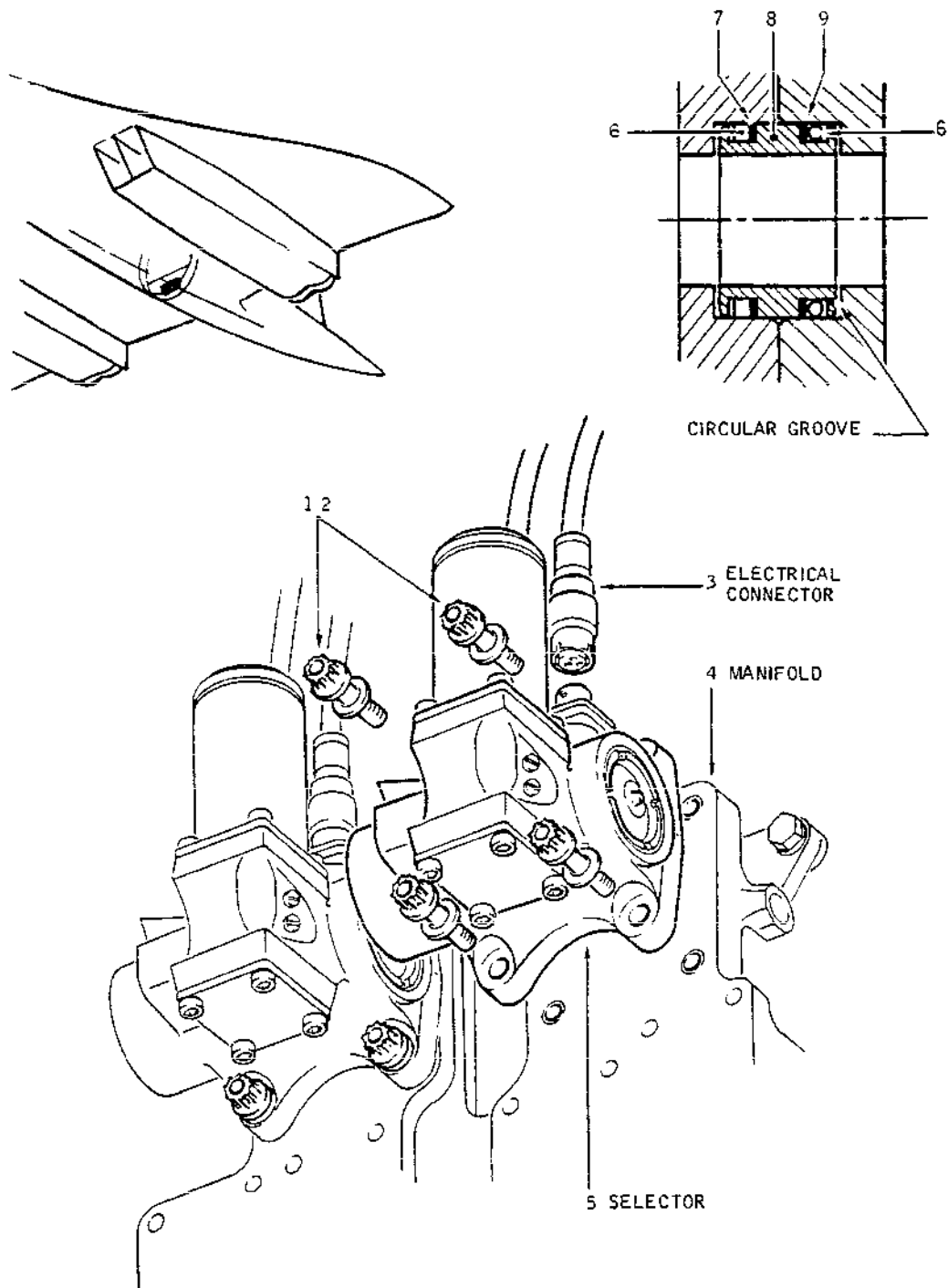
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## MAINTENANCE MANUAL



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P.F.C.U. Standby Selector Valve  
Figure 401

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### POWER FLIGHT CONTROL UNIT STANDBY SELECTOR VALVE ADJUSTMENT/TEST

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The purpose of this test is to check the correct operation of the PFCU standby selector valves.

#### 2. Standby Selector Valve Tests

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Electrical Ground Power Unit	
Ground Power Unit - Hydraulic - Power and Preliminary Testing	EMH398E

##### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- (2) On overhead panel
- (a) On Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in OFF INV position and the three O & M ELEVONS, IN ELEVONS and RUDDER switches in MECH position.
  - (b) On SERVO CONTROLS unit, place both selector switches in NORMAL position.
  - (c) On RELAY JACK unit, place BLUE ONLY - NORM - GREEN ONLY switch in NORM position.
- (3) Make certain that trim controls are set to zero.
- (4) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RELAY JACK HYD SEL IND & SUP	1-213	C 281	N17
PFC IND		C 287	N18
YELL/GRN GRN FAIL )PFC &		C 285	P16
YELL/BLUE BLUE FAIL)RELAY		C 286	P17
YELL L.L. )JACK"A"		C 288	P18
)SYS CONT			
FLT CONT POSN IND CONT		C 83	R11
FLT CONT POSN IND 26V	2-213	C 84	B 4
400 Hz SUP			
FLT CONT & NAV BUS 14XS		X 355	H 2
YELL L/LEVEL )PFC &	3-213	C 282	A 8
YELL/GRN GRN FAIL )RELAY		C 283	A 9
YELL/BLUE BLUE FAIL)JACK"B"		C 284	A10
)SYS CONT			

- (5) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

- (a) On overhead panel, on SERVO CONTROLS unit
  - BLUE L/PRESS and GREEN L/PRESS caption lights must illuminate.
  - Indicator lights under YELLOW-GREEN and YELLOW BLUE are off.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

(b) On First Officer's instrument panel, on ICOVOL indicator (Flight Control Surface Position Indicator) the 8 magnetic indicators must display M.

(6) Connect hydraulic ground power unit to Yellow hydraulic system (Ref. 29-21-00, Servicing).

### C. Test

NOTE : Do not take caption or indicator lights which are not mentioned into account.

(1) Pressurize Yellow hydraulic system (Ref. 29-21-00, Servicing).

(2) On overhead panel, on SERVO CONTROLS unit, place lower selector switch in YELLOW GREEN position (or in YELLOW BLUE position depending on selector valve to be checked).

(a) On SERVO CONTROLS unit  
- The two indicator lights under YELLOW-GREEN (or YELLOW-BLUE) must illuminate.  
- GREEN L PRESS (or BLUE L PRESS) caption light must go off.

(b) Elevons must deflect upwards (check on ICOVOL indicator)

(3) On overhead panel, on SERVO CONTROLS unit, place lower selector switch in NORMAL position.  
- The two indicator lights under YELLOW-GREEN (or YELLOW-BLUE) must go off.  
- GREEN L PRESS (or BLUE L PRESS) caption light must illuminate.  
- Elevons must deflect downwards.

### D. Close-Up

(1) Shut down pressurization of hydraulic systems and disconnect hydraulic ground power unit (Ref. 29-21-00, Servicing).

(2) De-energize the aircraft electrical network and disconnect electrical ground power unit. (Ref. 24-41-00, Servicing).

(3) On overhead panel, on Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position.

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- (4) Trip, safety and tag circuit breaker X355 FLT CONT & NAV BUS 14XS on panel 2-213 Map Ref. H2.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### PRESSURE SWITCH - REMOVAL/INSTALLATION

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

Low pressure switches C289 and C290 are located on Yellow/Green manifold, in zone 151.

Low pressure switches C292 and C293 are located on Yellow/Blue manifold, in zone 152.

#### 2. Pressure Switches

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform 3.251 m (10 ft. 8 in.)	
Circuit Breaker Safety Clips	
Warning Notices	
Lockwire dia. 0.8 mm (0.032 in.)	
Corrosion Resistant Steel	

##### B. Prepare

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- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Open door 151DB, depressurize Blue hydraulic system (29-12-00, Servicing) or Green hydraulic system (29-11-00, Servicing) or Yellow hydraulic system (29-21-00, Servicing), according to the system involved.
- (3) Open door 153BB, depressurize Blue, or Green or Yellow hydraulic tank (Ref. 29-13-00, Servicing) according to the system involved.
- (4) Close and safety tank depressurization valves.
- (5) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFC IND	1-213	C 257	N18

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF HYDRAULIC GROUND POWER UNITS ARE CONNECTED TO THE AIRCRAFT, DISPLAY A WARNING NOTICE ON THESE UNITS PROHIBITING PRESSURIZATION OF THE AIRCRAFT HYDRAULIC SYSTEMS.

### C. Remove

- (1) Disconnect electrical connector (1).
- (2) Unsafety and unscrew pressure switch attachment screws (5).
- (3) Remove pressure switch (4).
- (4) Recover seal (3) and thrust washer (2).

### D. Install

EFFECTIVITY: ALL

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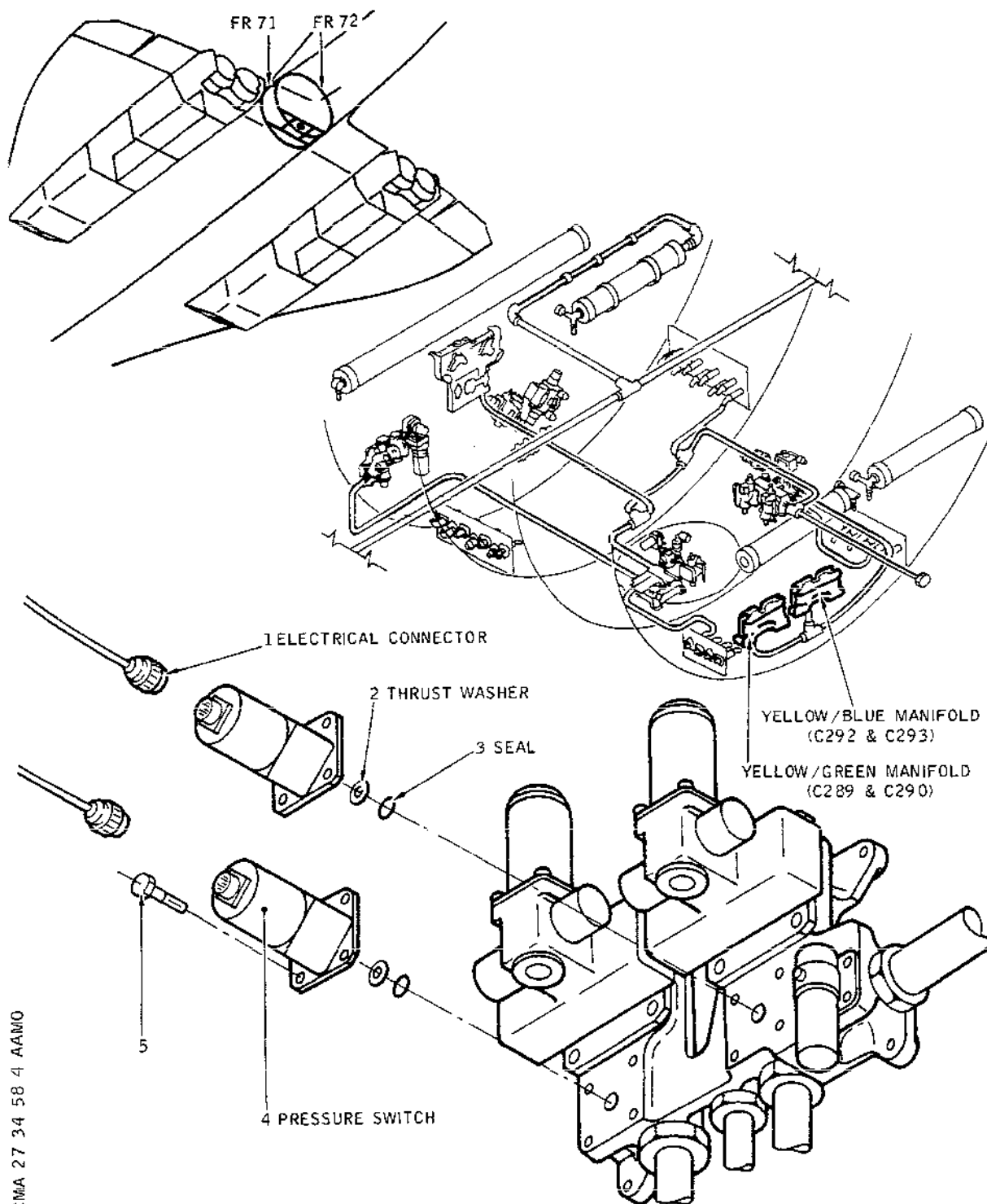
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## MAINTENANCE MANUAL



Pressure Switch Removal  
Figure 401

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- (1) Install seal (3), thrust washer (2) and pressure switch (4).
- (2) Attach pressure switch with screws (5).  
Torque to between 0.45 and 0.55 mdaN (39.8 and 48.6 lbf. in.).  
Safety with lockwire (Ref. 20-21-13).
- (3) Connect electrical connector (1).
- (4) Remove safety clip and tag and set circuit breaker C257, panel 1-213, Map Ref N18.
- (5) Remove warning notices.

### E. Test

- (1) Carry out a test (Ref. 27-34-58, Adjustment/Test)
- (2) Check pressure switches for leakage.

### F. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access doors 151DB and 153BB.
- (3) Remove access platform.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### PRESSURE SWITCH - ADJUSTMENT/TEST

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The purpose of this test is to check the correct operation of a hydraulic pressure switch.

#### 2. Test

##### A. Equipment and Materials

DESCRIPTION	PART NO.
-------------	----------

Electrical Ground Power Unit

##### B. Prepare

(1) Make certain that the following circuit breakers are set :

(a) For test of the Blue (C292) or Yellow/Blue (C293) pressure switch.

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFC IND	1-213	C 287	N18
YEL/BLUE BLUE FAIL - PFC & RELAY JACK "A" SYS CONT		C 286	P17
YELL/BLUE BLUE FAIL - PFC & RELAY JACK "B" SYS CONT	3-213	C 284	A10
(b) For test of the Green (C290) or Yellow/Green (C289) pressure switch :			

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFC IND	1-213	C 287	N18
YEL/GRN GRN FAIL - PFC & RELAY JACK "A" SYS CONT		C 285	P16
YELL/GRN GRN FAIL - PFC & RELAY JACK "B" SYS CONT	3-213	C 283	A 9

(2) On overhead panel :

(a) On Flight Control Unit, make certain that BLUE INVERTER and GREEN INVERTER switches are in PWR OFF position.

(b) On SERVO CONTROLS unit, make certain that both selector switches are in NORMAL position.

(3) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

- On overhead panel, on SERVO CONTROLS unit, the two BLUE L. PRESS and GREEN L. PRESS caption lights must illuminate.

NOTE : Do not take into account aural and visual warnings which are not mentioned.

C. Blue (C292) or Green (C290) pressure switch test.

- (1) Pressurize blue hydraulic system (Ref. 29-12-00, Servicing) or Green hydraulic system (Ref. 29-11-00,

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Servicing)]

- On overhead panel, on SERVO CONTROLS unit, BLUE L. PRESS caption light (or GREEN L. PRESS) must go off.

(2) Shut down pressurization of Blue (or Green) hydraulic system.

- BLUE L. PRESS (or GREEN L. PRESS caption light) must illuminate.

D. Yellow-Blue (C293) or Yellow-Green (C289) pressure switch test.

(1) Pressurize Yellow hydraulic system (Ref. 29-21-00, Servicing).

(2) On overhead panel, on SERVO CONTROLS unit, place lower selector switch towards BLUE L. PRESS (or GREEN L. PRESS) caption light.

- BLUE L. PRESS (or GREEN L. PRESS) caption light must illuminate.

(3) Shut down pressurization of Yellow hydraulic system. BLUE L. PRESS (or GREEN L. PRESS) caption light must illuminate.

E. Close-Up

(1) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

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## MAINTENANCE MANUAL

R POWER FLIGHT CONTROL UNIT HYDRAULIC SUPPLY SELECTOR UNIT  
R (SERVO CONTROLS UNIT) - REMOVAL/INSTALLATION

1. General
2. Selector Unit

### A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	

### B. Prepare

- (1) Trip safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RELAY JACK HYD SEL IND & SUP	1-213	C 281	N17
P.F.C. IND		C 287	N18
YEL/GRN GRN FAIL		C 285	P16
YEL/BLUE BLUE FAIL		C 286	P17
YELL LL		C 288	P18
YELL L/LEVEL	3-213	C 282	A 8
YELL/GRN GRN FAIL		C 283	A 9
YELL/BLUE BLUE FAIL		C 284	A10

- (2) Open overhead panel (quick disconnect attachment).

### C. Remove

- (1) Disconnect both electrical connectors from unit C291.
- (2) On panel front face, unscrew screws attaching SERVO CONTROLS unit.
- (3) Remove SERVO CONTROLS unit.

### D. Install

- (1) Engage unit in panel housing.

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(2) Attach unit by means of attachment screws.

(3) Connect the two connectors to unit.

### E. Close-Up

(1) Close panel.

(2) Lock quick disconnect attachments.

(3) Remove safety clips and tags and reset the circuit breakers tripped in paragraph B.

R (4) Carry out test described in 27-34-71 Adjustment/  
R Test.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### POWER FLIGHT CONTROL UNIT HYDRAULIC SUPPLY SELECTOR UNIT// (SERVO CONTROLS UNIT) - ADJUSTMENT/TEST

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN 24-00-00, SERVICING.

#### 1. Operational Test

##### A. General

The purpose of the following test is to check the PFCU Hydraulic Supply Selector Unit (SERVO CONTROLS UNIT) correct connection to system after Removal/Installation of this unit.

##### B. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Circuit Breaker Safety Clips	
------------------------------	--

##### C. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.

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- (2) Carry out Prepare paragraph of Procedure to set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (3) On panel 3-213, trip, safety and tag the following circuit breaker :  
  
YELL. L/LEVEL (c282, Map ref. A8)
- (4) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
NOSE U/C WEIGHT SW A SYS. SUP	1-213	G 291	M16
R.H. U/C WEIGHT SW A SYS. SUP	1-213	G 295	M18
L.H. U/C WEIGHT SW B SYS. SUP	3-213	G 293	B 8
NOSE U/C WEIGHT SW B SYS. SUP	3-213	G 296	D 8
NOSE WHEEL STEERING CONT.	13-215	G 91	D 8
ROOF PNL INSTS LTS SUP	13-215	L 379	F11
NOSE WHEEL STEERING IND	15-215	G 92	B 6
NOSE WHEEL STEERING SUP	15-216	G 93	A18

- (5) On overhead panel, on Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in OFF INV position.

### D. Test.

NOTE 1 : During the following test, do not take visual or aural warnings that are not mentioned into account.

- (1) On overhead panel, on LIGHTING unit, operate ROOF dimmer switch.
  - Stencils engraved on SERVO CONTROLS unit illuminate ; light intensity must vary when moving dimmer switch
- (2) Return ROOF dimmer switch to OFF position.
  - Stencils are dimmed.
- (3) On overhead panel, place LIGHTS switch in LO position.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- On SERVO CONTROLS unit, intensity of BLUE L. PRESS and GREEN L. PRESS caption lights is reduced.
- (4) Place LIGHTS switch in HI position
  - Intensity of above caption lights returns to neutral
- (5) On overhead panel, on SERVO CONTROLS unit, press and release T push-button located under GREEN JAM caption light.
  - Gong sounds
  - On master warning panel, overhead panel, PFC warning light illuminates.
  - GREEN JAM caption light illuminates then extinguishes when push-button is released.
- (6) Press and release PFC warning light
  - warning light extinguishes.
- (7) On SERVO CONTROLS unit, press and release T push-button, located under BLUE JAM caption light
  - Gong sounds
  - PFC warning light illuminates
  - BLUE JAM caption light illuminates then extinguishes.
- (8) Press and release PFC warning light
  - warning light extinguishes.
- (9) Pressurize Yellow hydraulic system (Ref. 29-21-00, Servicing).
  - No change on elevon position (lower stop)
- (10) On SERVO CONTROLS unit, place lower switch in BLUE L. PRESS (YELLOW/BLUE) position.
  - BLUE L. PRESS caption light extinguishes.
  - The two green indicator lights (under YELLOW-BLUE) and the two green indicator lights (under GREEN ONLY) illuminate.
  - Elevons deflect up to position zero.
- (11) Press and release T push-button located under BLUE L. PRESS caption light.
  - Gong sounds.
  - BLUE L. PRESS caption light illuminates then extinguishes when push-button is released.
  - PFC warning light illuminates (press and release this warning light; it extinguishes).
- (12) Move control column from stop to stop and note load applied.
  - Elevons deflect accordingly (check on ICOVOL indicator) (Flight control surface position indica-

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tor).

- (13) Aircraft being on the ground, with shock absorbers compressed : ON SERVO CONTROLS unit, on overhead panel, press YELLOW LEVEL T push-button and hold it pressed :
  - Gong sounds.
  - On First Officer's instrument panel, on nose wheel steering test indicator, NOSE WHEEL caption light and the two STEERING indicator lights, respectively located on the RH section and the LH section of the glare shield, illuminate.
  - PFC warning light on master warning panel, and BLUE L-PRESS caption light on SERVO CONTROLS unit illuminate.
- (14) Release YELLOW LEVEL T push-button.
  - NOSE WHEEL caption light and STEERING indicator lights remain illuminated.
  - BLUE L-PRESS caption light extinguishes.
- (15) On Nose Wheel steering test indicator, on First Officer's instrument panel, press then release RESET push-button.
  - NOSE WHEEL caption light and STEERING indicator lights extinguish.
- (16) Press and release PFC warning light
  - This light extinguishes.
- (17) On panel 3-213, remove safety clip and tag and set circuit breaker :  
YELL L-LEVEL (C 282, Map. ref. A 8)
  - This action has no effect.
- (18) On panel 1-213, trip safety and tag circuit breaker  
YELL L-LEVEL (C 288, Map. ref. P18).
  - This action has no effect.
- (19) On SERVO CONTROLS unit, place lower switch in GREEN L-PRESS (YELLOW/GREEN) position.
  - Gong sounds.
  - GREEN L-PRESS caption light extinguishes, and BLUE L-PRESS caption light illuminates.
  - The two green indicator lights (under YELLOW GREEN) and the two green indicator lights (under BLUE ONLY) illuminate.
  - PFC warning light illuminates (Press this light to extinguish it).
- (20) Move control column from stop to stop and note load applied.

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- Elevons deflect accordingly.
- (21) Press and release T push button located below GREEN L-PRESS caption light.
  - Gong sounds.
  - GREEN L-PRESS caption light illuminates, then extinguishes when push button is released :
  - PFC warning light illuminates (press this light ; it extinguishes).
- (22) Shut down pressurization of Yellow hydraulic system.
  - Gong sounds.
  - GREEN L-PRESS caption light illuminates.
  - PFC warning light illuminates (press this light to extinguish it).
  - Elevons deflect downwards (after a few seconds)
- (23) Pressurize Blue and Green hydraulic systems.  
(Ref. 29-12-00 and 29-11-00, Servicing).
  - BLUE L-PRESS caption light extinguishes
  - Elevons deflect to neutral position.
- (24) Move control column
  - Elevons deflect accordingly.
- (25) On SERVO CONTROLS unit, place lower switch in BLUE L-PRESS (YELLOW/BLUE) position.
  - Gong sounds
  - GREEN L-PRESS caption light extinguishes
  - BLUE L-PRESS caption light illuminates
  - PFC warning light illuminates  
(Press this light to extinguish it)
  - Green indicator lights below YELLOW BLUE and GREEN ONLY illuminate while green indicator lights below YELLOW GREEN and BLUE ONLY extinguish.
- (26) Move control column
  - Elevons deflect accordingly.

### E. Close-Up

- (1) Stop pressurization of Blue and Green hydraulic systems  
(Ref. 29-12-00 and 29-11-00, Servicing).
- (2) On overhead panel
  - (a) On Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in PWR. OFF position.
  - (b) On SERVO CONTROLS unit, place lower switch in

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NORMAL position.

- (3) On panel 1-213, remove safety clip and tag and reset circuit breaker :  
YELL. L. L (C288, Map Ref. P 18)
- (4) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).
- (5) On panel 2-213, trip, safety and tag circuit breaker :  
FLT CONT & NAV BUS 14XS (X355, Map Ref. H 2).

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## MAINTENANCE MANUAL

### RELAY JACK HYDRAULIC SUPPLY SELECTOR UNIT REMOVAL/INSTALLATION

1. General
2. Relay Jack Hydraulic Supply Selector Unit.
  - A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	-

B. Prepare

- (1) Trip, safety and tag the following circuit breakers:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RELAY JACK HYD. SEL. IND & SUP	1-213	C 281	N17
YELL.L.L		C 288	P18
YELL.L/LEVEL	3-213	C 282	A 8

- (2) Remove panel 216AS to gain access to unit C298 on shelf 10-216.

C. Remove

- (1) Fully loosen screws (1) (captive screws).
- (2) Remove unit pulling it by its handling grip.

- RB (3) Examine rack and unit connectors for:
- RB (a) Bent, damaged or corroded contact pins.
- RB (b) Distorted, displaced or blackened socket contacts.
- RB (c) Pierced, or otherwise damaged dielectric.

EFFECTIVITY: ALL

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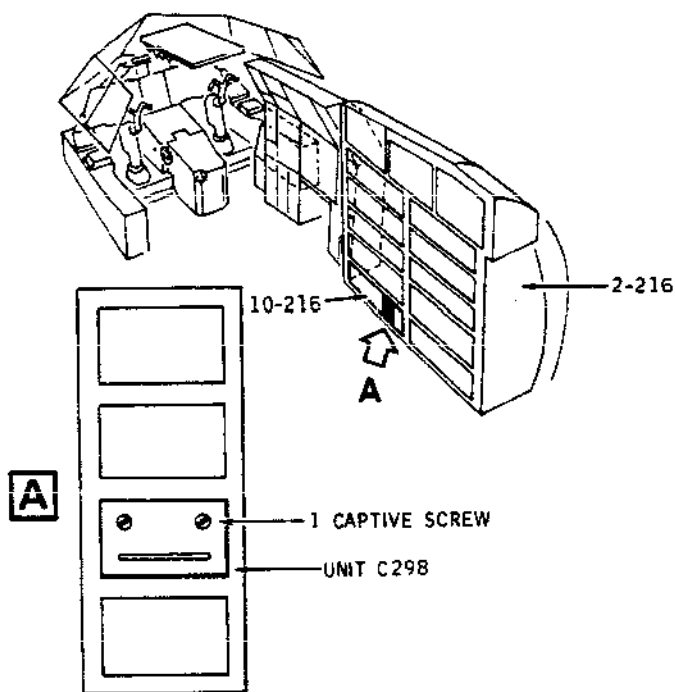
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Relay Jack Hydraulic Supply Selector  
Unit - Location  
Figure 401

RB (d) Connector body free from damaged polarising posts  
RB and keyways.

RB NOTE: If connector is damaged refer to WDM 20-42-71.

### D. Install

(1) Examine unit connector for:

- RB (a) Bent, damaged or corroded contact pins.
- RB (b) Distorted, displaced or blackened socket
- RB contacts.
- RB (c) Pierced, or otherwise damaged dielectric.
- RB (d) Connector body free from damaged polarising posts
- RB and keyways.

RB NOTE: If connector is damaged refer to WDM 20-42-71.

(2) Engage unit in its housing and push it fully home.  
(Proceed with care to avoid damaging connector pins).

(3) Fully tighten screws (1).

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- (4) Remove safety clips and tags and reset circuit breakers.

### E. Test

- (1) Carry out test described in 27-34-72, Adjustment/Test.

### F. Close-up

- (1) Install and lock panel 216AS on shelf 10-216.

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## MAINTENANCE MANUAL

### RELAY JACK HYDRAULIC SUPPLY SELECTOR UNIT - ADJUSTMENT/TEST

WARNING: MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE: DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED: DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN 24-00-00, SERVICING.

#### 1. General

The following test enables only one part of the switching logic operation, effected in this unit, to be checked. The operation of the second part will be checked during test series No.3, carried out by means of the flight control electrical circuits test set, Ref. 31-56-100 (Ref. 27-17-00, Adjustment/Test).

#### 2. Operational Test

##### A. Equipment and Materials

Nil

##### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Carry out "Prepare" paragraph of Procedure to set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).

NOTE: Do not take into account aural or visual warnings which are not mentioned.

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## MAINTENANCE MANUAL

### C. Test

- (1) On overhead panel.
  - (a) On Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in OFF INV position.
  - (b) On SERVO CONTROLS unit, place lower switch in BLUE L.PRESS position.
- (2) Pressurize Yellow hydraulic system (Ref. 29-21-00, Servicing).
  - (a) Elevons must deflect upwards (check on ICOVOL indicator).
  - (b) On overhead panel, on SERVO CONTROLS unit, BLUE L.PRESS caption light must go off.
- (3) On overhead panel, carry out the following operations:
  - (a) On Flight Control Unit, press and release MECH JAM warning light
    - This light must go off.
  - (b) Press and release PFC warning light
    - This light must go off.
  - (c) On RELAY JACK unit press BLUE JAM-TEST push button then release it:
    - Gong must sound
    - BLUE JAM caption light must illuminate, then go off
    - PFC warning light must illuminate (Press and release this light to cancel it).
  - (d) On RELAY JACK unit, press GREEN JAM-TEST push button then release it:
    - Gong must sound
    - GREEN JAM caption light must illuminate, then go off
    - PFC warning light must illuminate.

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- (4) Operate control column in nose down and nose up directions.
- (a) Note load necessary to carry out this operation.
  - (b) Check on ICOVOL indicator that elevons deflect accordingly.
- (5) On overhead panel, on RELAY JACK unit, place switch in GREEN ONLY position.
- (6) Operate control column again
- A strong resistance must be felt  
(Do not attempt to overcome this resistance).
- (7) On overhead panel, on SERVO CONTROLS unit, place lower switch in GREEN L.PRESS position.
- GREEN L.PRESS light must go off, while BLUE L.PRESS caption light must illuminate.
- (8) Operate control column in nose down and nose up directions.
- Note load necessary to carry out this operation.
  - Check on ICOVOL indicator that elevons deflect accordingly.
- (9) On overhead panel, on RELAY JACK unit, place switch in BLUE ONLY position.
- (10) Operate control column again.
- A strong resistance must be felt.  
(Do not attempt to overcome this resistance).
- (11) On SERVO CONTROLS unit, place lower switch in BLUE L.PRESS position.
- (12) On RELAY JACK unit, place switch in GREEN ONLY position.
- (13) Pressurize Blue hydraulic system (Ref. 29-11-00, Servicing).
- (14) On SERVO CONTROLS unit, place lower switch in NORMAL position.
- (15) Shut down pressurization of Yellow hydraulic system (Ref. 29-21-00, Servicing).

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## MAINTENANCE MANUAL

- (16) Operate control column.
- A strong resistance must be felt  
(Do not attempt to overcome this resistance).
- (17) On SERVO CONTROLS unit, place lower switch in GREEN L.PRESS position, then press YELLOW LEVEL T push button and hold pressed.
- (18) With YELLOW LEVEL T push button pressed, operate control column in nose down and nose up directions.
- Elevons must deflect accordingly.
- (19) Stop operating control column and release YELLOW LEVEL T push button.
- (20) On RELAY JACK unit, place switch in BLUE ONLY position.
- (21) On SERVO CONTROLS unit, place lower switch in NORMAL position.
- (22) Shut down pressurization of Blue hydraulic system (Ref. 29-11-00, Servicing) and pressurize Green hydraulic system (Ref. 29-12-00, Servicing).
- (23) Operate control column
- A strong resistance must be felt  
(Do not attempt to overcome this resistance).
- (24) On SERVO CONTROLS unit, place lower switch in BLUE L.PRESS position, then press YELLOW LEVEL T push button and hold pressed.
- (25) With YELLOW LEVEL T push button pressed operate control column in nose down and nose up directions.
- Elevons must deflect accordingly.
- (26) Stop operating control column and release YELLOW LEVEL T push button.
- (27) Carry out operations described in sub-paragraphs (1) to (5) of paragraph 3.G. Capability Caption Lights (Ref. 22-41-00, Adjustment/Test).

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### D. Close-Up

- (1) On overhead panel, on Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position.
- (2) Carry out Close-Up operations of sub-section 22-41-00, Adjustment/Test.

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## MAINTENANCE MANUAL

### RELAY JACK SWITCH - REMOVAL/INSTALLATION

#### 1. General

#### 2. Relay Jack Switch

##### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Circuit Breaker Safety Clips

##### B. Prepare

- (1) Observe electrical safety precautions described in 24-00-00, Servicing.
- (2) Trip safety and tag the following circuit breakers :

---

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RELAY JACK HYD SEL IND & SUP	1-213	C 281	N17
ROOF PNL LT TEST SUP	15-216	L1002	D13

---

##### C. Remove

- (1) On overhead panel, on RELAY JACK unit, loosen and remove red warning light on end of BLUE ONLY-NORM-GREEN ONLY relay jack switch.
- (2) Loosen switch securing nut, using box spanner.
- (3) Open overhead panel (secured by quick attach/detach fasteners).
- (4) On rear of panel, on switch C303 : disconnect attached cables with the aid of insertion-extraction tool.
- (5) Loosen and remove switch securing nut and washer. Remove switch.
- (6) Install washer on removed switch. Tighten securing nut. install and tighten warning light.

EFFECTIVITY: ALL

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### D. Preparation of replacement component

- (1) Loosen and remove red warning light and securing nut on replacement switch. Remove washer

### E. Install

- (1) Engage switch at rear of panel. Check that positioning lug engages in locating hole on panel.
- (2) Install washer on switch, and tighten securing nut.
- (3) Connect cables to switch with the aid of insertion/extraction tool (Refer to WDM 27-34-21 for correct connection).
- (4) Close and secure overhead panel.
- (5) Fully tighten switch securing nut.

### F. Close-up

- (1) Remove safety clips and tags and reset the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RELAY JACK HYD SEL IND & SUP	1-213	C 281	N17
ROOP PNL LT TEST SUP	15-216	L1002	D13

- (2) Carry out an operational test as described in 27-34-73, Adjustment/Test.

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## MAINTENANCE MANUAL

### RELAY JACK SWITCH - ADJUSTMENT/TEST

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN 24-00-00, SERVICING.

#### 1. General

This test enables the correct operation of the relay jack switch to be checked after replacement.

#### 2. Operational test

##### A. Equipment and Materials

##### B. Prepare

(1) Observe the safety precautions described in previous WARNING paragraph.

(2) Carry out procedure to set flight controls in mechanical mode (Ref. 27-00-00, Servicing).

##### C. Test

NOTE : Any visual or aural indications which are not mentioned below must be disregarded.

(1) Pressurize yellow hydraulic system (Ref. 29-21-00,

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Servicing).

- (2) On overhead panel
  - (a) On Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in OFF INV position. On ICOVOL indicator, (flight control surface position indicator) pointers corresponding to elevon position must be at lower stop.
  - (b) On SERVO CONTROLS unit, move lower selector switch towards BLUE L. PRESS caption light (YELLOW/BLUE position).  
The elevons must move up to their zero position (confirmed on ICOVOL).
  - (c) On Flight Control Unit, press and release MECH JAM warning light.  
  
- Warning light must extinguish
- (3) Operate control column slowly in nose down and nose up directions.  
  
- Elevons must deflect accordingly
- (4) On RELAY JACK unit, place switch in GREEN ONLY position
- (5) Make certain that a strong resistance is felt when operating control column (but do not try to overcome this resistance).
- (6) On RELAY JACK unit, place switch in NORM position
- (7) Operate control column slowly in nose down and nose up position  
  
- Elevons must deflect accordingly
- (8) On overhead panel, on SERVO CONTROLS unit, move lower selector switch towards GREEN L. PRESS caption light
- (9) Repeat operation described in (7) above.  
  
- Identical results
- (10) On RELAY JACK unit, place switch in BLUE ONLY position
- (11) Make certain that a strong resistance is felt when operating control column (do not try to overcome this resistance).

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(12) On RELAY JACK unit, place switch in NORM position

(13) Again carry out operation (7) described above

- Identical results

(14) On overhead panel, on SERVO CONTROLS unit, place lower selector switch in NORMAL position

### D. Close-Up

(1) Depressurize the Yellow hydraulic system  
(Ref. 29-21-00, Servicing).

(2) De-energize the aircraft electrical network and disconnect electrical ground power unit

(3) On overhead panel, on Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in PWR OFF position

(4) On panel 2-213, trip, safety and tag circuit breaker FLT CONT and NAV BUS 14 X S (position H2).

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## MAINTENANCE MANUAL

### R RELAY JACK JAMMING CAPTION LIGHTS - REMOVAL/INSTALLATION

#### 1. General

### R 2. Relay Jack Jamming Caption Lights

#### A. Equipment and Materials

---

##### DESCRIPTION

##### PART NO.

---

Circuit Breaker Safety Clips

#### B. Prepare

(1) Take the electrical safety precautions described in 24-00-00, Servicing.

(2) Trip, safety and tag the following circuit breakers :

---

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RELAY JACK HYD SEL IND & SUP	1-213	C 281	N17
ROOF PNL LT TEST SUP	15-216	L1002	D13

---

(3) Open upper part of overhead panel (attached by quarter-turn fasteners).

#### C. Remove

R (1) Using appropriate tool, disconnect connectors on caption light C305 (or C306) (on the lower LH part of the panel, viewed from the rear).

R (2) Separate the two side plates (1) holding caption light module. Slide module clear of retaining springs.

(3) Extract module from its housing in front face of the panel. Recover module clamp from rear of panel.

R (4) Remove caption light module and module clamp.

#### D. Preparation of Replacement Component

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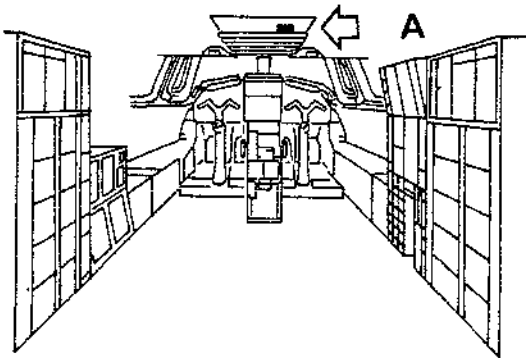
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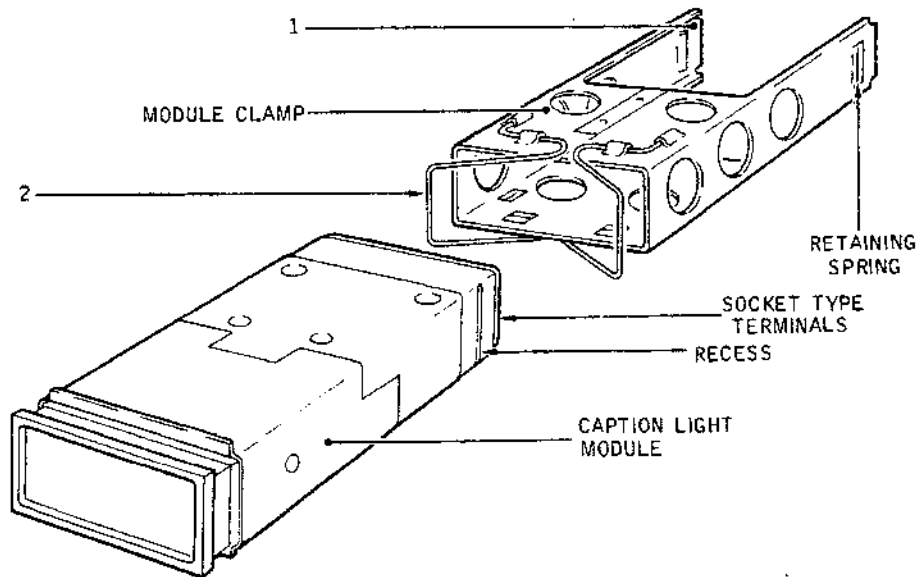
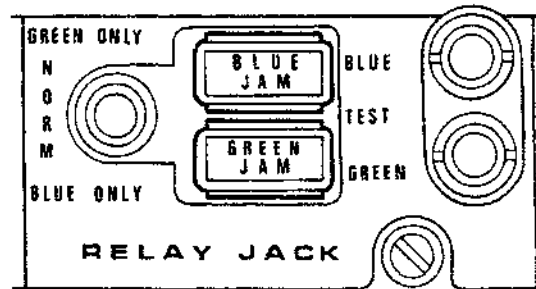
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**A**



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Jamming Caption Lights - Installation  
Figure 401

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### E. Install

- R
- (1) Position caption light module in its housing (in front face of panel).
  - (2) On rear face of panel, position module clamp on module, having first positioned springs (2).
  - (3) Holding module at front face, slide module clamp onto module until retaining springs engage recess in module.
- R
- (4) Using appropriate tool, connect connectors on caption light module (Ref. WDM 27-34-21 for correct hook-up).
  - (5) Close and attach overhead panel.

### F. Close-Up

- (1) Remove safety clips and tags and reset the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RELAY JACK HYD SEL IND & SUP	1-213	C 281	N17
ROOF PNL LT TEST SUP	15-216	L1002	D13

- (2) Carry out functional test as detailed in 27-34-74, Adjustment/Test.

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## MAINTENANCE MANUAL

### RELAY JACK JAMMING CAPTION LIGHTS - ADJUSTMENT/TEST

#### 1. General

The purpose of this test is to check the correct operation of the caption lights after installation.

#### 2. Operational Test

##### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Electrical Ground Power Unit 115/200  
Volts 400 Hz.

##### B. Prepare

- (1) Make certain that the following circuit breakers are set :

---

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RELAY JACK HYD SEL IND & SUP	1-213	C 281	N17
ROOF PNL LT TEST SUP	15-216	L1002	D13

---

- (2) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

NOTE : Indicator or caption lights not mentioned are not taken in account.

- (3) On Master Warning Panel on overhead panel, press and release PFC warning light.  
- This light extinguishes.

R

##### C. Test

- (1) On overhead panel, on RELAY JACK unit, press and hold BLUE (or GREEN) TEST push-button on RH side of BLUE JAM (or GREEN JAM) caption light.  
- single stroke gong sounds

R  
R  
R  
R

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- R - BLUE JAM (or GREEN JAM) caption light illuminates  
R  
R - PFC warning light, on master warning panel  
R (on overhead panel) illuminates
- R (2) On overhead panel, place LIGHTS switch in LO position.  
R - light intensity of BLUE JAM (or GREEN JAM)  
R caption light is reduced
- R (3) Place LIGHTS switch in HI position.  
R - light intensity of caption light returns to  
R normal
- R (4) Release TEST push-button  
R - BLUE JAM (or GREEN JAM) caption light extinguishes.  
R  
R - PFC warning light extinguishes.

### D. Close-Up

- (1) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

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## MAINTENANCE MANUAL

### 26 V, 1800 Hz GENERATION - DESCRIPTION AND OPERATION

#### 1. General

- An electrical generation system reserved solely for the supply of flight control electrical channels is necessary for the following reasons :
  - To provide a 26 V-1800 Hz AC current. This frequency is that which enables the resolvers on the various control and monitoring channels to operate at optimum performance.
  - To be independent of engine failure.
  - To be free from voltage fluctuations in the main aircraft network.
  - To avoid possible interference with the 400 Hz aircraft network.

This electrical generation is common to the 3 axes : pitch, roll and yaw.

- Two electrical control and monitoring channels are used ; each totally independent of and able to replace the other. Two 26 V-1800 Hz networks (Blue and Green) also totally independent of each other, though identical, are installed in the aircraft.

#### 2. Description (Ref. Fig. 001 )

- A 26 V-1800 Hz AC generation system consists of :
  - An inverter supplied with 28 VDC from the essential bus bars and produces 26 VAC 1800 Hz. The Blue and Green inverters supply the Blue and Green 26 V-1800 Hz bus bars respectively.
  - A protection unit which, in the event of over voltage, under voltage, over frequency or under frequency ;
    - Cuts off the power supply to the inverter
    - Changes control channel (Ref. 27-16-00 and 27-17-00)
    - Operates the warning system (warning lights and aural warnings).
  - A control and indicating unit common to the two systems is located on the overhead panel in the flight compartments and consisting of :
    - A control switch and a FAIL caption light for each of the the Blue and Green inverters.  
(Pressing the FAIL caption light operates the aural and luminous warnings : "Test" function).
    - Indicating relays which operate the FAIL caption light for a failed inverter and set off the master warnings (luminous and aural).

EFFECTIVITY: ALL

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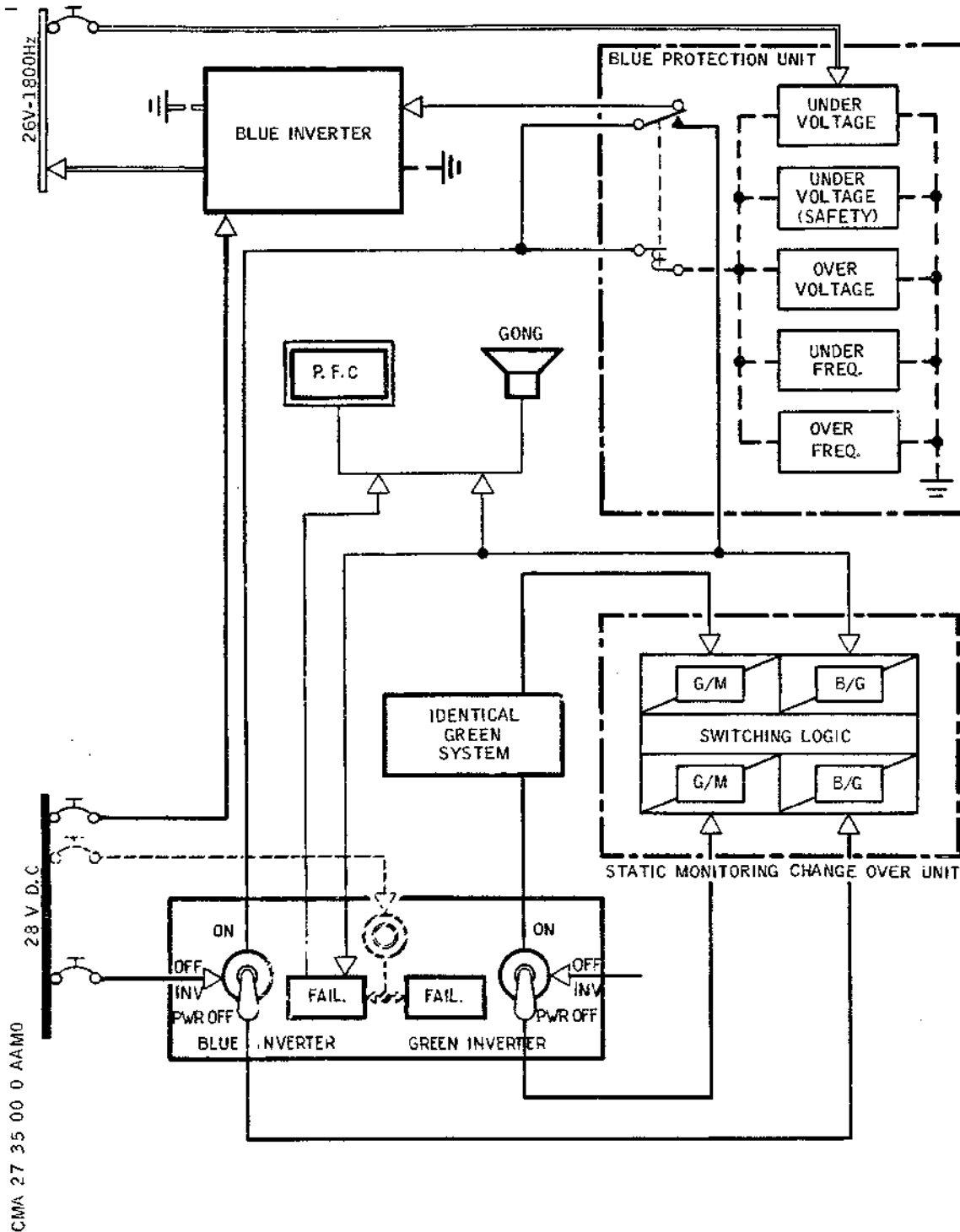
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# Concorde

## MAINTENANCE MANUAL



26 V, 1800 Hz AC Generation - Block Diagram  
Figure 001

R EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### 3. Static Inverters

An inverter, of entirely static design, is supplied with 28 VDC from an essential bus bar. It delivers a nominal 300 VA at 26 VAC and 1800 Hz (single phase).

- For a supply voltage varying between 22 V and 30 VDC, the output voltage remains between 25.6 and 26.4 volts for a given power of between 75 and 150 VA.  
The frequency, under these circumstances, remains between 1782 Hz and 1818 Hz ( $1800 \pm 18$  Hz) for these conditions.

An inverter can provide 450 VA for a period of 5 mins, or 600 VA for a period of 10 seconds.

The level of conduction interference and spurious emission is reduced to a level which conforms to specification MIL.I.26600.

The general principles of operation are as follows :

The conversion from DC to AC voltage is achieved using two switching transistors and a transformer consisting of a centre-tapped primary winding and a secondary winding. The transistors receive alternate conduction and blocking signals in such a manner that the current passing through the two halves of the primary windings produce an AC voltage of square waveform at the secondary winding. After wave forming, the voltage is sent to the distribution bar, (bus bar).

### 4. Protection Units

A protection unit is associated with each inverter, each unit consisting essentially of :

- a transformer, the primary winding of which is supplied by the inverter and the secondary windings in turn power the modules which detect :
  - an under voltage of  $20.5 \pm 0.5$  volts
  - an over voltage of  $30 \pm 0.4$  volts
  - an over frequency of  $1870 \pm 10$  Hz
  - an under frequency of  $1730 \pm 10$  Hz
  - an under voltage (safety) of  $18 \pm 1$  volts
- Two detection relays, one or other of which is energized when one of the above faults is detected.

### 5. Control Unit

This unit forms part of the Flight Control Unit.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

It includes two control switches, BLUE INVERTER and GREEN INVERTER, each having three positions, ON, INV OFF and PWR OFF : also two FAIL caption lights which indicate the failure of one or other of the networks.

Various relays in the unit are controlled by signals from the protection unit and which in turn cause the FAIL caption light to illuminate or extinguish.

### 6. Operation (Ref. Fig. 002 )

- The BLUE INVERTER (GREEN INVERTER) control switch has three positions :
  - In PWR OFF position, the switch isolates the Blue system (Green system) 28 VDC bus bar and only supplies the Blue (Green) control and monitoring channels using this voltage. This position, used on the ground only, avoids the necessity of leaving the circuits not in use energized while the A/C network is energized by a ground power supply unit. For this position, the corresponding FAIL indicator light is illuminated.
  - In OFF INV position the Blue system (Green system) 28 VDC bus bar is supplied but the corresponding inverter does not operate.
- By placing BLUE INVERTER (GREEN INVERTER) control switch in "ON", the inverter is supplied with 28 VDC if the Blue (or Green) protection unit so permits. This 28 VDC power can only be supplied if the voltage and frequency monitoring modules in the protection unit detect no fault in the 1800 Hz generation system. The protection unit is therefore supplied from the bus bar which supplies the inverter, in order to monitor voltage and frequency. When a fault occurs, the relays in the protection unit close and cause :
  - The 28 VDC inverter control supply to be cut off.
  - The operation of the "Green (Blue) electrical generation system fault" logic circuit in the static monitoring change-over unit : this causes a changeover of control channel.
  - Blue channel to Green channel if the Green inverter operates
  - Green channel to mechanical system if the Green inverter is inoperative.

This control channel changeover is indicated by "G" or "M" displayed on the magnetic indicators of the flight control surface position indicator (ICOVOL).

- The supplying of Blue (Green) system indicating relays of the control and indicating unit, which causes :
  - FAIL - BLUE INVERTER (GREEN INVERTER) caption light to illuminate.

EFFECTIVITY: ALL

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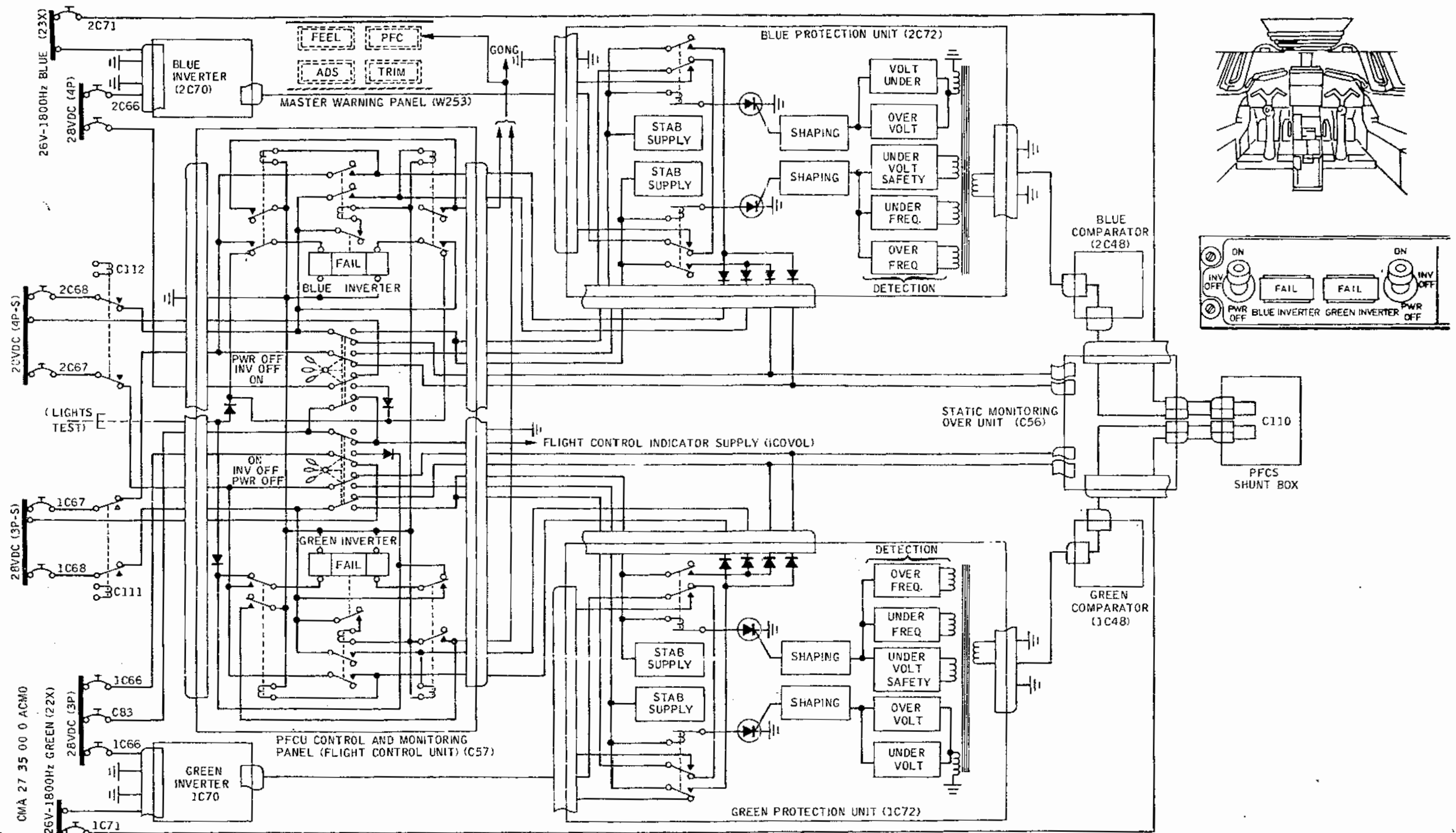
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## MAINTENANCE MANUAL



Blue and Green 26 V, 1800 Hz Generation -  
Schematic  
Figure 002

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## MAINTENANCE MANUAL

- The gong to sound.
- PFC warning light to illuminate on the master warning panel.

The 26 V 1800 Hz supply to the protection unit is possible only if the monitoring comparator and the static monitoring change-over unit are plugged in.

This safety precaution prevents the flight control electrical generation from being operated, if the corresponding monitoring channel is not operating.

### 7. Electrical Power Supply

The Blue and Green system inverters are supplied with essential 28 VDC busbars.

The control system of each inverter is supplied with a 28 VDC bar (one for each inverter) ; this bar supplies only the flight control system.

Each inverter supplies a distribution bar with 26 V - 1800 Hz current.

Details of supply and distribution busbars with their location are given in the following Table.

SERVICE	BUSBAR		C/B PANEL
Blue Inverter Power Supply	28 VDC	B.ESS.4P	5-213
Green Inverter Power Supply	28 VDC	A.ESS.3P	1-213
Blue Inverter Control System Power Supply	28 VDC	B.ESS.4P.S	5-213
Green Inverter Control System Power Supply	28 VDC	B.ESS.3P.S	1-213
Blue Distribution Bar	B. FLYING CONTROL 26 VAC - 1800 Hz	23X	2-213
Green Distribution Bar	A. FLYING CONTROL 26 VAC - 1800 Hz	22X	2-213

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## MAINTENANCE MANUAL

### 26V, 1800Hz GENERATION - TROUBLE SHOOTING

#### R 1. General

R The 26V, 1800 Hz generation networks are common to the three  
R axes (pitch yaw and roll). Trouble shooting is detailed in Chap-  
R ter 27-15-00, Trouble Shooting.

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## MAINTENANCE MANUAL

### 26 V, 1800 Hz GENERATION - ADJUSTMENT/TEST

#### R 1. General

R 26V 1800Hz Blue and Green power generation networks supply the  
R Flight Control system in Blue and Green electrical modes.  
R Therefore, tests of 26V 1800Hz power generation are common to  
R the three Flight Control axes (Roll, Pitch and Yaw)  
R They are dealt with once only :  
R refer to topic 27-15-00, Adjustment/Test.

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## MAINTENANCE MANUAL

R 26 V . 1800 Hz INVERTER - REMOVAL/INSTALLATION

R 1. General

R The static inverters (electrical identifiers 1C70 and 2C70) are  
R respectively mounted on shelves 2-215 and 2-216 on LH and RH  
R electronics racks.

R Locating pins are provided on connectors to prevent unit repla-  
R cement with a unit of a different type.

R Removal/Installation procedures of the two static inverters are  
R identical ; therefore only one procedure is described.

R Only circuit breakers associated with the unit to be removed  
R must be tripped.

R 2. Static Inverter

R A. Equipment and Materials

---

DESCRIPTION

PART NO.

---

R Circuit Breaker Safety Clips

R Access Platform 4.47 m (14 ft. 8 in.)

R B. Prepare

R (1) Observe the electrical safety precautions described in  
R 24-00-00, Servicing.

R (2) Trip, safety and tag the following circuit breakers :

R (a) For removal of the Blue static inverter (2C70) :

---

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
---------	-------	--------------------	-------------

---

R	PFCS INV BLUE SUP	5-213	2C 66	B14
R	PFCS INV BLUE FAIL IND		2C 73	E11

R (b) For removal of the Green static inverter (1C70) :

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## MAINTENANCE MANUAL

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFCS INV GRN FAIL IND	1-213	1C 73	M15
PFCS INV GRN SUP		1C. 66	P11

(3) Remove access panel:

- (a) 216CS to gain access to the Blue static inverter (2C70).
- (b) 215CS to gain access to the Green static inverter (1C70).

C. Remove

- (1) On inverter 2C70 (or 1C70), unscrew the two retaining nuts (6) and disengage latches downwards.
- (2) Remove unit by pulling handle.

(3) Examine rack and unit connectors for:

- (a) Bent, damaged or corroded contact pins.
- (b) Distorted, displaced or blackened socket contacts.
- (c) Pierced, or otherwise damaged dielectric.
- (d) Connector body free from damaged polarising posts and keyways.

NOTE: If connector is damaged refer to WDM 20-42-71.

D. Preparation and Replacement Component

- (1) Check that unit seating is clean.

(2) Examine unit connector for:

- (a) Bent, damaged or corroded contact pins.
- (b) Distorted, displaced or blackened socket contacts.

EFFECTIVITY: ALL

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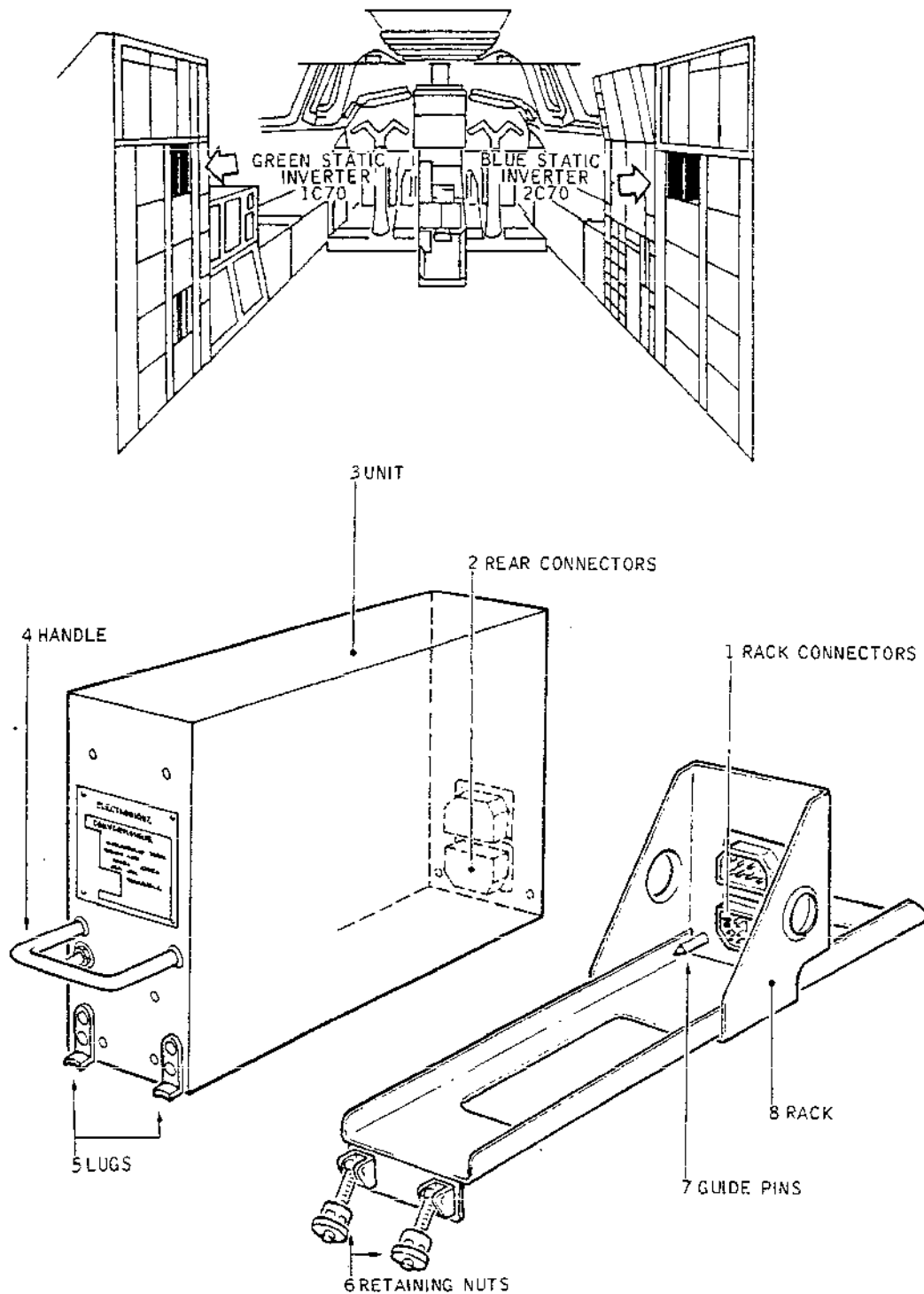
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## MAINTENANCE MANUAL



26 V 1800 Hz Inverter - Location and Removal  
Figure 401

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## MAINTENANCE MANUAL

RB (c) Pierced, or otherwise damaged dielectric.

RB (d) Connector body free from damaged polarising  
RB posts and keyways.

RB NOTE: If connector is damaged refer to WDM 20-42-71.

### E. Install

- (1) Engage unit on guiding rails through and push it fully home (Take care not to damage electrical connector pins).
- (2) Engage latches in lugs and fully tighten the two retaining nuts.
- (3) Remove safety clips and tags and reset the circuit breakers tripped previously.

### F. Test

- (1) Carry out test described in 27-35-11, Adjustment/Test.

### G. Close-Up

- (1) Position and secure access panel 216CS (215CS).
- (2) Remove access platform.

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## MAINTENANCE MANUAL

### 26 VOLT 1800 HZ INVERTER - ADJUSTMENT/TEST

#### R 1. General

R The purpose of the following tests is to check the operation of  
R a 26V 1800 Hz inverter after replacement.

#### R 2. Test

##### R A. Equipment and Material

R DESCRIPTION

PART NO.

R Electrical Ground Power Unit

##### R B. Prepare

R (1) At overhead panel, on Flight Control Unit make certain  
R that O & M ELEVONS, INNER ELEVONS and RUDDER switches  
R are in MECH position and BLUE INVERTER and GREEN INVER-  
R TER switches are in PWR OFF position.

R (2) Make certain that the following circuit breakers are  
R set :

R (a) For testing blue inverter 2C70 :

R	R	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
R		PFCS INV BLUE FAIL SUP	1-213	1C 67	N14
R		PFCS INV BLUE PROTN SUP	2-213	2C 71	D 5
R		PFCS INV BLUE SUP	5-213	2C 66	B14
R		PFCS INV BLUE PROTN CONT		2C 68	C14
R		PFCS INV BLUE FAIL IND		2C 73	E11

R (b) For testing green inverter 1C70 :

R	R	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
R		PFCS INV GRN FAIL IND	1-213	1C 73	M15
R		PFCS INV GRN PROTN CONT		1C 68	N15

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R							
R		SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.		
R		PFCS INV GRN SUP		1C 66	P11		
R		PFCS INV GRN PROTN SUP	2-213	1C 71	G 5		
R		PFCS INV GRN FAIL SUP	5-213	2C 67	C13		
R	(3)	Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).					
R		- At overhead panel, on Flight Control Unit, the two					
R		FAIL warning lights must illuminate.					
R	C.	Test					
R		At overhead panel, on Flight Control Unit.					
R	(1)	Place BLUE INVERTER (or GREEN INVERTER) switch in INV					
R		OFF position.					
R		The corresponding FAIL warning light must go off.					
R	(2)	Place BLUE INVERTER (or GREEN INVERTER) switch in ON					
R		position.					
R		Make certain that the corresponding FAIL warning light					
R		remains off.					
R	(3)	Place BLUE INVERTER (or GREEN INVERTER) switch in PWR					
R		OFF position.					
R		The corresponding FAIL warning light must illuminate.					
R	D.	Close-Up					
R		De-energize the aircraft electrical network and disconnect					
R		electrical ground power unit (Ref. 24-41-00, Servicing).					

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## MAINTENANCE MANUAL

### INVERTER PROTECTION UNIT - REMOVAL/INSTALLATION

#### R 1. General

R The protection units (electrical identifiers 1C72 and 2C72) are  
R respectively mounted on shelves 2-215 and 2-216 on LH and RH  
R electronics racks.

R Locating pins are provided on connectors to prevent unit repla-  
R cement with a unit of a different type

R Removal/Installation procedures of the two protection units are  
R identical ; therefore only one procedure is described.

R Only circuit breakers associated with the unit to be removed  
R must be tripped.

#### R 2. Inverter Protection Unit

##### R A. Equipment and Materials

DESCRIPTION	PART NO.
-------------	----------

Circuit Breakers Safety Clips	
-------------------------------	--

Access Platform 4.47 m (14 ft. 8 in.)	
---------------------------------------	--

##### R B. Prepare

R (1) Observe the electrical safety precautions described in  
R 24-00-00, Servicing.

R (2) Trip, safety and tag the following circuit breakers :

R (a) For removal of the Blue protection unit (2C72).

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFCS INV BLUE SUP	5-213	2C 66	B14
PFCS INV BLUE FAIL IND		2C 73	E11

R (b) For removal of the Green protection unit (1C72)

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## MAINTENANCE MANUAL

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFCS INV GRN FAIL IND	1-213	1C 73	M15
PFCS INV GRN SUP		1C 66	P11

(3) Remove access panel:

(a) 216CS, to gain access to the Blue protection unit (2C72).

(b) 215CS, to gain access to the Green protection unit (1C72).

C. Remove

(1) Slacken captive screws (1).

(2) Remove unit by pulling handle.

RB (3) Examine rack and unit connectors for:

RB (a) Bent, damaged or corroded contact pins.

RB (b) Distorted, displaced or blackened socket  
RB contacts.

RB (d) Connector body free from damaged polarising posts  
RB and keyways.

RB NOTE: If connector is damaged refer to WDM 20-42-71.

D. Preparation of Replacement Component

(1) Check that unit seating is clean.

RB (2) Examine unit connector for:

RB (a) Bent, damaged or corroded contact pins.

RB (b) Distorted, displaced or blackened socket  
RB contacts.

RB (d) Connector body free from damaged polarising posts  
RB and keyways.

RB NOTE: If connector is damaged refer to WDM 20-42-71.

EFFECTIVITY: ALL

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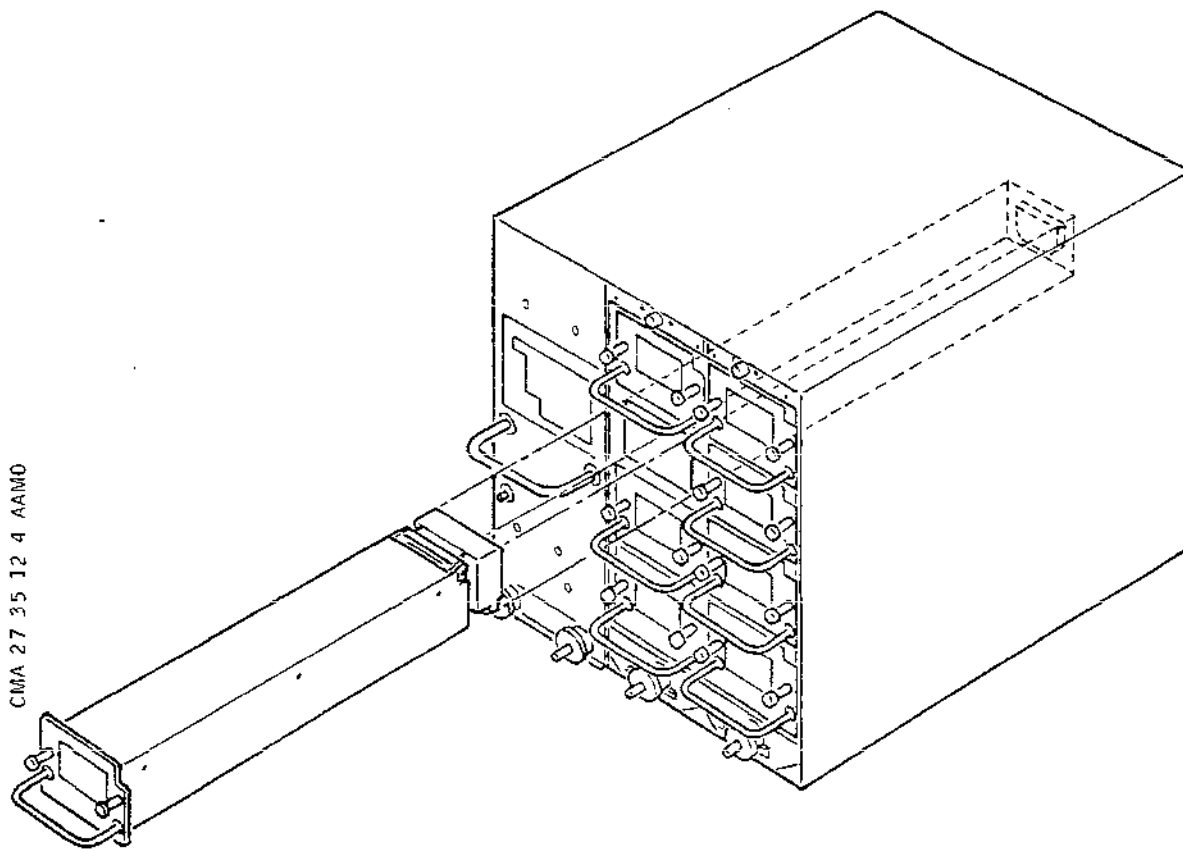
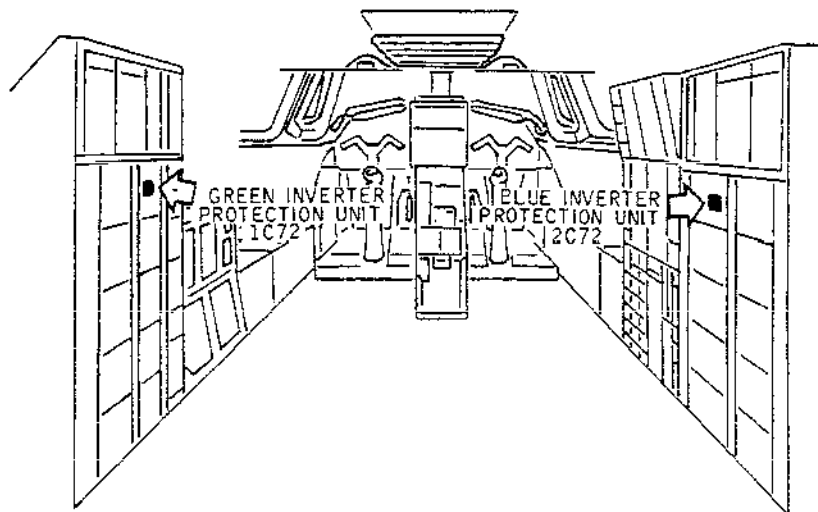
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Inverter Protection Unit. Location and Removal  
Figure 401

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- (3) Visually check that unit is in correct condition (no dents).

### E. Install

- (1) Engage unit in its housing, then push it fully home taking care not to damage electrical connector.
- (2) Fully tighten captive screws (1).
- (3) Remove safety clips and tags and reset circuit breakers tripped previously.

### F. Test

- (1) Carry out tests described in 27-35-12, Adjustment/Test.

### G. Close-Up

- (1) Position and secure access panel 216CS (215CS).
- (2) Remove access platform.

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## MAINTENANCE MANUAL

### INVERTER PROTECTION UNIT - ADJUSTMENT/TEST

#### 1. General

Cursory check of protection unit after replacement.

**NOTE :** The following test does not check all the protections ensured by the unit.

The efficiency of these protections will be checked as soon as the Flight Controls Electrical Circuits Test Set, P/N 31-56-100, is available, and at the latest, during the next scheduled inspection. This test will be carried out as detailed in 27-37-00, Adjustment/Test, paragraph 3.

#### 2. Test

##### A. Equipment and Materials

DESCRIPTION	PART NO.
-------------	----------

Electrical Ground Power Unit

##### B. Prepare

(1) On overhead panel, on Flight Control Unit, make certain that O & M ELEVONS, IN ELEVONS and RUDDER switches are in MECH position and BLUE INVERTER and GREEN INVERTER switches are in PWR OFF position.

(2) Make certain that the following circuit breakers are set :

(a) For test of Blue protection unit (2C72)

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFCS INV BLUE FAIL SUP	1-213	1C 67	N14
PFCS INV BLUE PROTN SUP	2-213	2C 71	D 5
PFCS INV BLUE SUP	5-213	2C 66	B14
PFCS INV BLUE PROTN CONT		2C 68	C14
PFCS INV BLUE FAIL IND		2C 73	E11

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(b) For test of Green protection unit (1C72)

	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
R	PFCs INV GRN FAIL IND	1-213	1C 73	M15
R	PFCs INV GRN PROTN CONT		1C 68	N15
R	PFCs INV GRN SUP		1C 66	P11
R	PFCs INV GRN PROTN SUP	2-213	1C 71	G 5
R	PFCs INV GRN FAIL SUP	5-213	2C 67	C13
R	(3) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).			
R	- On overhead panel, on Flight Control Unit, the two FAIL (BLUE INVERTER and GREEN INVERTER) warning lights must illuminate.			
R	C. Test			
	(1) On overhead panel, on Flight Control Unit, place BLUE INVERTER (or GREEN INVERTER) switch in ON position.			
R	- The corresponding FAIL warning light must go off.			
R	(2) On circuit breaker panel 2-213, trip circuit breaker PFCs INV BLUE PROTN SUP 2C71 (Map Ref. D5) (or circuit breaker PFCs INV GRN PROTN SUP 1C71 (Map Ref. G5)).			
R	- The corresponding FAIL warning light must illuminate. (Do not take into account other visual or aural warnings).			
R	(3) Reset circuit breaker previously tripped			
R	- FAIL warning light must remain illuminated.			
	(4) Place BLUE INVERTER (or GREEN INVERTER) switch in INV OFF position.			
R	- Corresponding FAIL warning light must go off.			
	(5) Place BLUE INVERTER (or GREEN INVERTER) switch in ON position.			
R	- Corresponding FAIL warning light must remain off.			

R EFFECTIVITY: ALL

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(6) Place BLUE INVERTER (or GREEN INVERTER) switch in PWR OFF position.

R - The corresponding FAIL warning light must illuminate.

R D. Close-Up

(1) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

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## MAINTENANCE MANUAL

### ELECTRICAL CONTROL CHANNELS - DESCRIPTION AND OPERATION

#### 1. General

The six elevons, each actuated by a Power Flight Control Unit (PFCU), carry out the pitch and roll orders.

- two electrical channels (Blue channel and Green channel) and a mechanical mode channel are available to control the PFCU's, however one channel alone is sufficient to operate the PFCU's.

The Blue channel is defined as the normal control channel ; in the event of faulty operation this channel is overridden by the Green channel and the mechanical channel overrides the Green channel if it, in turn, fails.

An electrical channel converts the deflection of the flight controls into electrical signals which are transmitted to the servo valve of each PFCU. The servo valve causes the PFCU to be displaced proportionally to and in the direction ordered by the flight controls.

#### A. Principle (Ref. Fig. 001 )

For each channel :

In pitch control, the control column drives the rotor of a CX resolver supplied with 26V - 1800 Hz.

The output signals of this CX resolver, proportional to the control column deflection, are applied to the stator of a CDX differential resolver the rotor of which is driven by the control wheel.

When no roll orders are given, the rotor of the CDX resolver remains motionless and this CDX resolver may be considered as a 1 : 1 transformer.

The CDX resolver input signals are therefore present at the output terminals of this resolver.

These signals are then applied to the stator of a CT resolver, the rotor of which is driven by the displacement of the PFCU.

- If the PFCU (and thus the elevon) is not in a position corresponding to that ordered by the flight controls, a signal is generated at the output terminals of the CT resolver.

This signal is amplified, then applied to the corresponding servo valve of the PFCU.

The PFCU moves and drives the rotor of the CT resolver when the rotor reaches a position corresponding to that of the CX resolver rotor, driven by the control column, the signals at the stator terminals of the CT resolver are nullified : the servo valve being no longer supplied, the PFCU stop at the position ordered.

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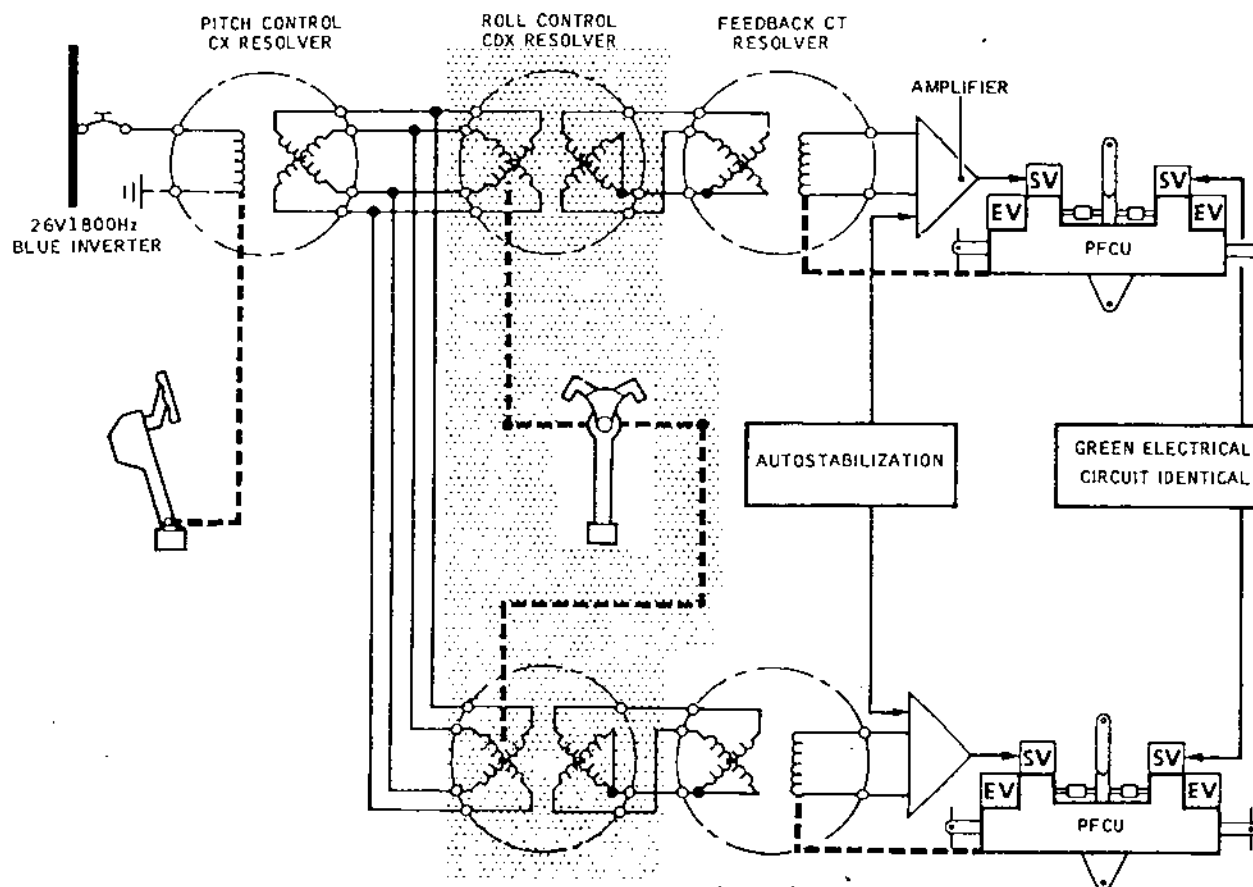
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Control Channel for Two Symmetrical Elevons  
Block Diagram  
Figure 001

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## MAINTENANCE MANUAL

### 2. Description (Ref. Fig. 002 )

The aircraft having six elevons, their control should normally need six CX resolvers for pitch orders (as well as 6 CDX resolvers for roll orders).

However the solution adopted for the deflection of these elevons is such that the number of the CX (and CDX') resolvers has been reduced : two CX resolvers for each channel sufficient to control the six PFCU's.

- within the normal flight envelope, outer and middle elevons of each wing deflect by the same value when a control column order is given : thus, one CX resolver is sufficient to control the four elevons.

A second CX resolver is necessary to control the deflection of the inner elevons which is different from that of outer and middle elevons.

When the control column is deflected, the output signals of each CX resolver are applied respectively to :

- the two outer and middle elevon CDX resolvers (one for each wing).
- the two inner elevon CDX resolvers (one for each wing)

The output signals of the CDX resolvers are directly applied to the corresponding CT resolvers ; the CDX resolvers can be considered as 1 : 1 transformer, when no roll order is given, therefore it can equally be considered that the signals from the CX resolvers are directly applied to the CT resolvers.

When a pitch order is given, the PFCU's do not respond immediately : each CT resolver generates a signal for its output terminal. The signal from each CT resolver is applied to an amplifier where it is summed with an autostabilization signal.

The output signal of the amplifier is then applied to the PFCU servovalve, thus displacing the PFCU.

However, when the aircraft speed exceeds VMO by 25 knots (VC - VMO equal to or greater than 25 kts) a neutralization computer is triggered.

This computer generates a signal of equal amplitude but opposite sign to that given out by the outer and middle elevon CDX resolvers of each wing and which represents the pitch order (eventually summed with the roll order.) This signal is then progressively applied to the amplifier of each outer elevon PFCU in such a way as to oppose the control signal from the CDX resolver (which represents the sum of pitch and roll control signals).

The displacement of these two PFCU's stops then changes direction until the PFCU's return to neutral position.

- This outer elevon neutralization avoids any control inversion due to wing deformation.

EFFECTIVITY: ALL

**27-36-00**

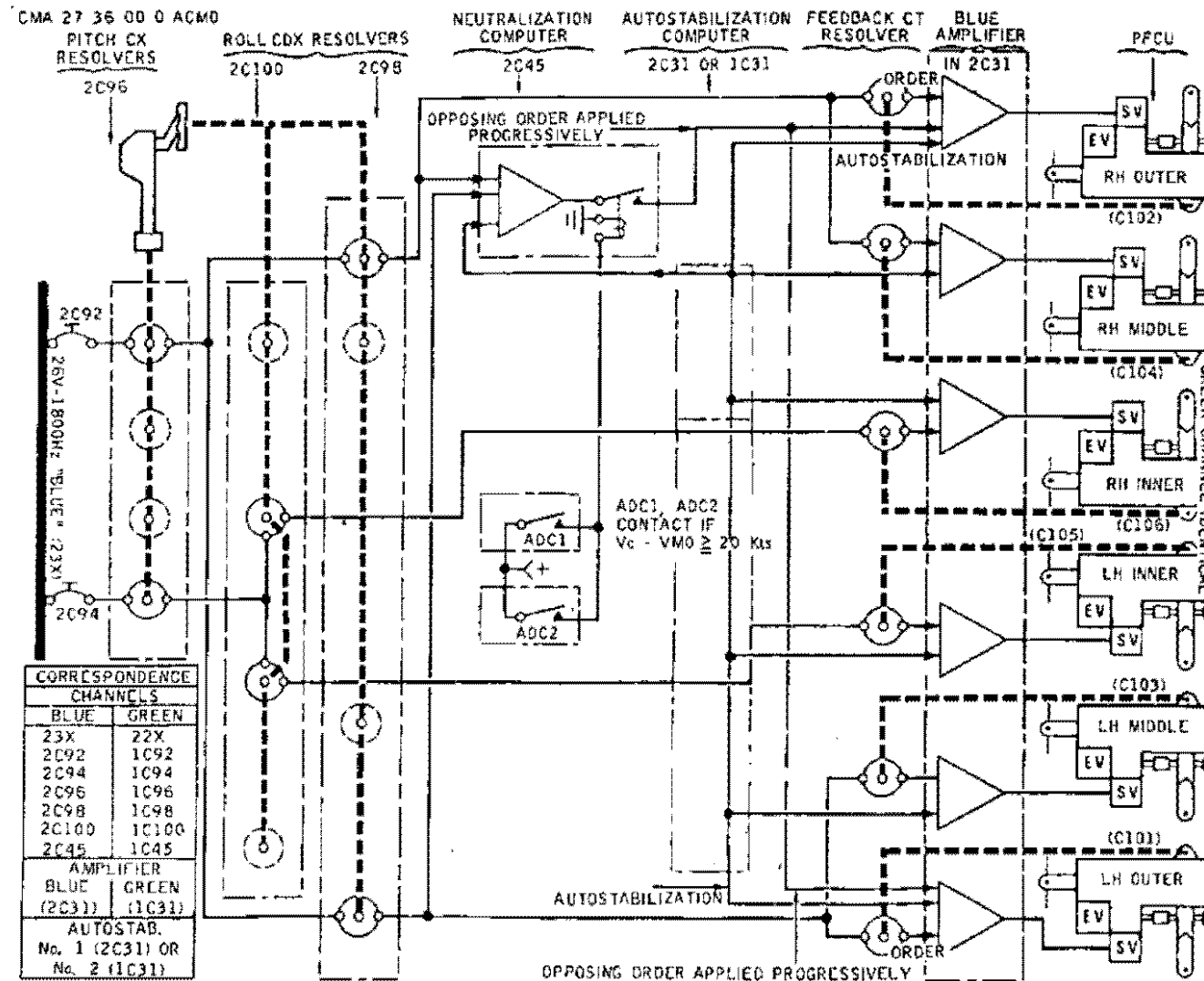
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## MAINTENANCE MANUAL



Elevon Control Blue Electrical Channel  
Composition (Identical with Green Channel)  
Figure 002

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

- The electrical control channels are activated from a unit located on overhead panel in flight compartment. The ICOVOL indicator (Flight Control Surface Position Indicator) informs the crew of elevon position and indicates which channel is operative.

### 3. Synchro Pack - Pitch (Ref. Fig. 003 )

For each channel, a single unit contains the outer and middle elevon control CX resolver and the inner elevon control CX resolver ; this same unit also contains the two CX resolvers assigned to the corresponding monitoring channel (Ref. 27-37-00). The four CX resolvers housed in each unit are driven by a common spindle.

Each of these units are installed on the flange of a chassis known as the pitch synchro pack ; the two flanges are installed opposite one another. The two single units being mounted opposite one another the two groups of resolvers are driven by the linkage connected to the control column.

EFFECTIVITY: ALL

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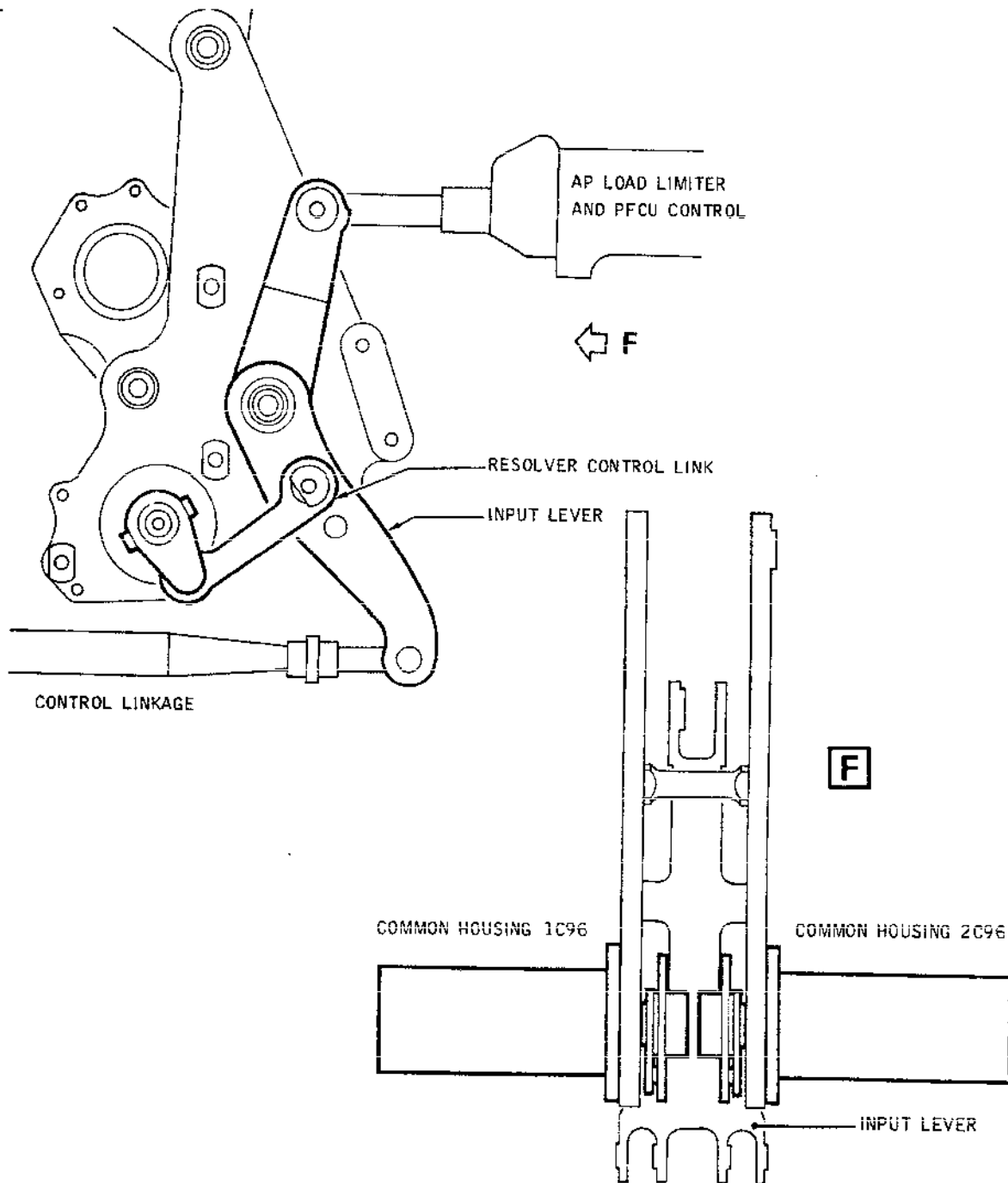
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CMA 27 36 00 0 AEM0

Pitch Synchro Pack  
Figure 003

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## MAINTENANCE MANUAL

### 4. CT Resolvers on PFCU's

The CT resolvers of the Blue and Green channels are housed in a unit integral with the body of each PFCU. This unit also encloses an elevon position transmitter resolver driven by the PFCU and assigned to the ICVOL indicator circuit. Finally, two further "pan cake" resolvers located in this unit, are associated with the monitoring channels (Ref. 27-37-00).

- The spindles of these resolvers are simultaneously driven, when the PFCU moves, by a system of levers and a link rod, one end of which is attached to the aircraft structure.

### 5. Amplifiers

The Blue and Green CT resolvers of each of the elevon PFCU's are each connected to an amplifier.

The signals from the autostabilization computer in operation are also applied to this amplifier. In addition the outer elevon amplifiers receive the signals from the neutralization computer corresponding to the control channel with which it is associated.

The eight amplifiers for each channel (six for the elevons and two for the rudders) are grouped in a housing which also encloses an autostabilization computer.

### 6. Computers - Neutralization

A neutralization computer is assigned to each channel. This computer sends to the outer elevon PFCU's an order of equal amplitude but opposite sign to the control order when, the aircraft going out of its normal flight envelope, the difference between its speed ( $V_C$ ) and the maximum operational speed ( $V_{M0}$ ) reaches or exceeds 25 knots.

The outer elevons return to neutral if they had received a deflection order or stay to neutral if they receive, at this moment, a deflection order.

- When the aircraft returns to its normal flight envelope, i.e.: when  $V_C - V_{M0}$  is equal to or less than 20 knots (the 5 knots variation between  $V_C - V_{M0}$  equal to or greater than 25 knots and  $V_C - V_{M0}$  equal to or less than 20 knots avoids successive activations and de-activations of neutralization when the aircraft speed is within this range) the neutralization order is cancelled. The outer elevons return to the ordered position if there was an order, or are ready to carry out this order if they receive it.
- $V_C - V_{M0}$  signal is supplied by each AIR DATA COMPUTER. The computer detects whether  $V_C - V_{M0}$  is greater than or equal to 25 knots or less than or equal to 20 knots. It compares  $V_C - V_{M0}$  signals from the ADC to a  $V_C - V_{M0}$  signal which it generates. When the  $V_C - V_{M0}$  signal from the ADC is

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equal to the VC - VMO signal generated by the computer, the latter activates or suppresses neutralization. For activation or suppression of neutralization by the computer it is necessary that :

- If the two ADC are operating (normal case) :
  - the two ADC deliver the same VC - VMO signal and the computer detects that the two VC - VMO signals are greater than or equal to 25 kts (or that the two VC - VMO signals are less than or equal to 20 kts). If there is a variation between the two signals, the computer makes no decision.
- If only one ADC is operating (the second being stopped or defective) the signal Vc - VMO, from the ADC which operates normally, is processed by the computer.
- If the two ADC are defective, there cannot be a neutralization order. The outer and middle elevon control signal (from the CDX resolvers assigned to these elevons) and the pitch and roll autostabilization signal are applied to the computer. These signals are summed in the computer. When the computer activates or suppresses neutralization, the signal resulting from the summing (which is identical with the control signal) is changed in sign, then formed into a staircase wave form, then applied, during an adjustable period of time between 2.55 and 10.2 seconds (at present adjusted to 5.1 seconds) to the outer elevon PFCU amplifiers. This signal equal and opposite to the control signal, annuls progressively the latter and causes the progressive cancellation of the amplifier output signal.  
The outer elevons then return to neutral position (or the signal opposite to the control signal is progressively suppressed, thus enabling the outer elevons to return to the controlled position).
- the neutralization decision stage is duplicated. At the output of this second stage the neutralization activation (or suppression) signal is fed to the comparator of the monitoring channel in operation (Ref. 27-17-00, Description and Operation).
- In the indicating unit, on the front panel of the computer, the following controls are grouped to carry out the outer elevon neutralization system test :
  - two indicators displaying neutralization order on each outer elevon.
  - two ADC1 and ADC2 three-position switches used to simulate :
    - . operation of ADC1 or/and ADC2 (position ON)
    - . transmission by ADC1 or/and ADC2 of a VC-VMO normal greater than or equal to 25kts (Position VC>VMO)
  - A TEST - LT TEST switch to check correct operation of the indicator lights described below (Position LT - TEST) or to supply the + 28 VDC Test circuit

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(Position TEST)

- two LOGICS C and M indicator lights which confirm actuation of neutralization. The neutralization orders are sent to the outer elevon control channel amplifier (illumination of indicator light C) or to the monitoring comparator of the monitoring channel in operation (illumination of indicator light M).

### 7. Panel - PFCU Control and Monitoring (Flight Control Unit) (Ref. Fig. 004 )

This unit common to elevons and rudders is located on the overhead panel in Flight Compartment. It also carries the 26V 1800Hz generation system controls (Ref. 27-35-00).

Two selector switches, O.8 M ELEVONS and IN. ELEVONS, each having three positions BLUE, GREEN and MECH, determine in the BLUE position, the control channel designated as the normal channel (Blue channel). The GREEN and MECH position are used to confirm the automatic change-over to the Green channel or mechanical channel, after detection of a Blue or Green channel fault by the monitoring channels (Ref. 27-37-00).

A RESET push button located to the right of each switch must be pressed to return to blue channel after disappearance of the fault which caused the channel change-over.

EFFECTIVITY: ALL

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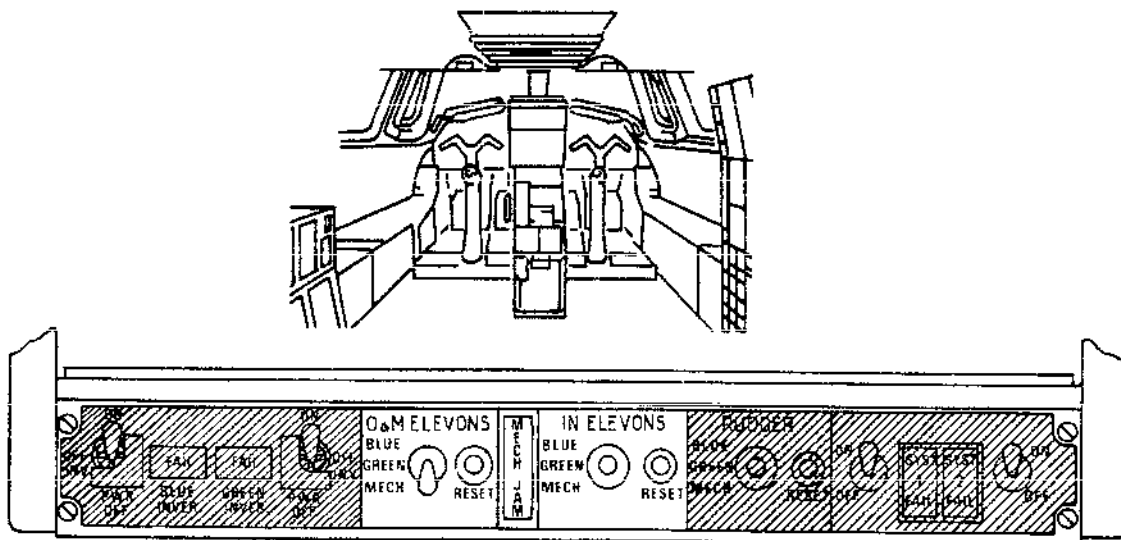
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## MAINTENANCE MANUAL



PFCU Control and Monitoring Panel (Flight Control Unit)  
Figure 004

A MECH JAM warning light, located between the O & M ELEVONS and IN. ELEVONS and IN. ELEVONS switches, illuminates when an abnormal stiffness is detected in the linkage actuated by the roll or pitch relay jack.

At the same time, the PFC warning light illuminates on the overhead panel and the gong sounds.

- for test purposes, pressing the warning light causes its illumination.
- illumination of this warning light (due to the development of stiffness in the control linkage), is ensured by a self holding circuit even if the fault that caused illumination disappears.

The stiffness of each linkage (roll or pitch) is detected by a microswitch actuated by a jam detection strut.

### 8. Indicator - Flight Control Surface Position. (ICOVOL) (Ref. Fig. 005 )

The Flight control surface position indicator (icovol indica-

EFFECTIVITY: ALL

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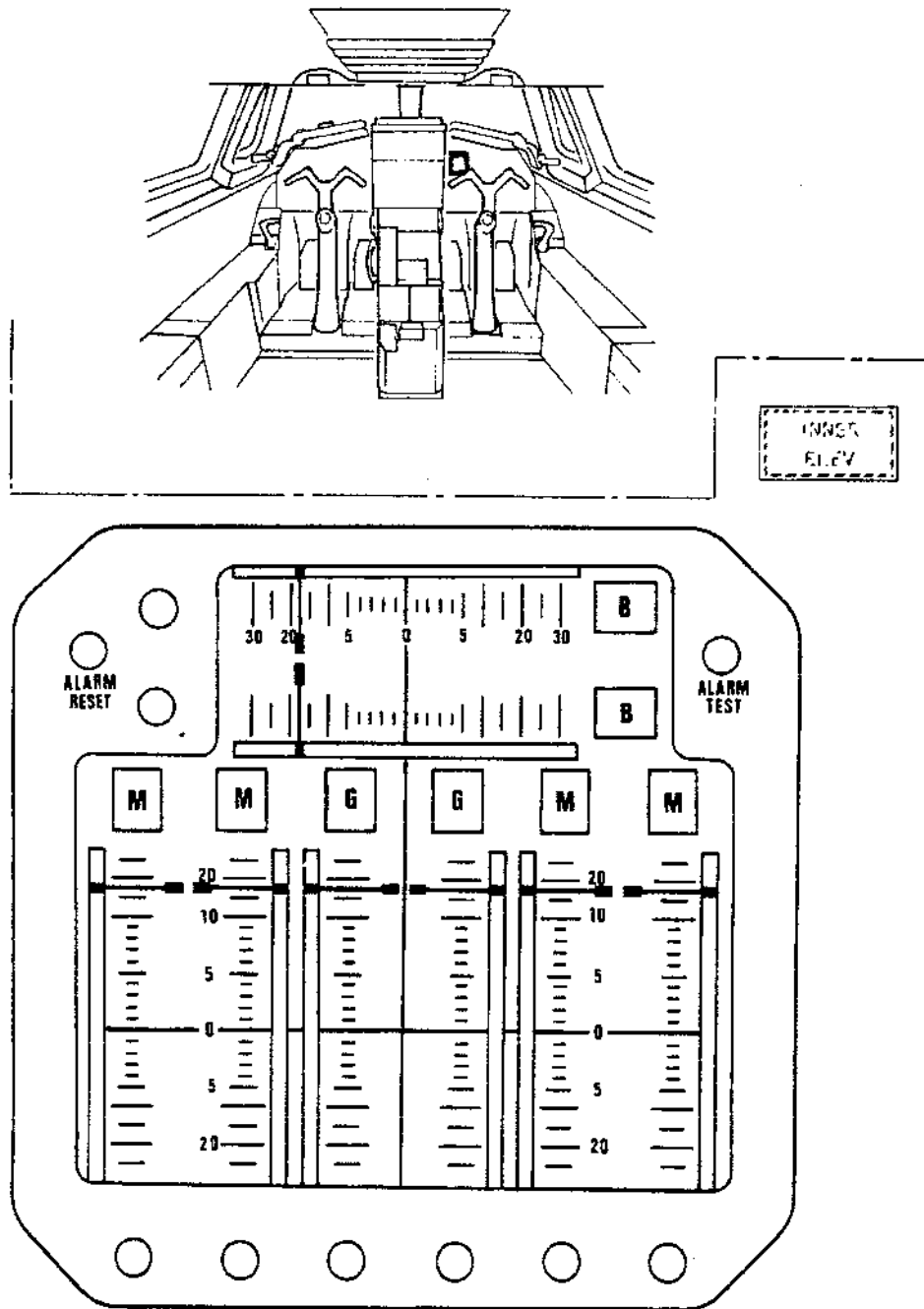
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CMA 27 36 00 0 AJM0

Flight Control Surface Position Indicator  
(ICOVOL)  
Figure 005

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tor), located on First Officer's instrument panel informs the crew of :

- the position of each elevon
- the control channel in operation
- a control channel change-over due to an incorrect deflection of the elevons
- vibrations at one or more of the elevons

The magnitude and direction of deflection of each elevon can be checked on the six scales graduated in degrees.

- a magnetic indicator indicates for each elevon which control channel is in operation.
- a white B on a Blue background for the Blue channel.
- a white G on a green background for the Green channel.
- a white M on a red background for the mechanical channel.

Due to monitoring system design (Ref. 27-37-00) the magnetic indicators associated with the four outer and middle elevons always display the same colour. The same condition applies to the inner elevons magnetic indicators.

- when a channel change-over due to incorrect elevon deflection occurs, the corresponding red warning lights illuminate. These warning lights remain extinguished if the channel change-over is due to either a drop in hydraulic pressure or to a failure of the 26V - 1800 Hz power supply.
- if vibrations above the 8 Hz level are detected on one (or more) elevon(s), the red warning lights associated with this (these) elevon(s) and the symmetrical elevon(s), flash at a frequency of approximately 2Hz.
- an ALARM TEST push-button enables the condition of the warning light lamps as well as various items inside the ICOVOL indicator to be checked.  
The 8 red warning lights flash during the time the button is pressed. When the button is released, these lights remain illuminated.
- an ALARM RESET push button allows cancellation of the red warning lights either after a channel change-over which has caused their illumination or after action on the ALARM TEST push-button.

Electrical supply to the ICOVOL indicator is provided by :

- the 28VDC network for activation of the warning lights and the magnetic indicators as well as the internal relays.
- the 115V - 400 Hz network ; to supply the six resolvers the rotor of which actuates the elevon position indicating pointers (and also the two resolvers associated with the rudders).

### 9. Electrical Power Supply

The resolvers of the ICOVOL synchro detection channel are supplied with 26 V - 400 Hz. The resolvers of each channel (Blue, Green) and the associated amplifiers are supplied from a dis-

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tinct 26 V - 1800 Hz busbar for each channel.  
The following table gives the distribution of these busbars,  
for each channel, in the various circuit breaker panels.

SERVICE	BUSBAR	C/B PANEL
ICOVOL Synchro	26 VAC A ESS 14X	2-213
Detection Channel Supply	28 VDC A ESS 3P=S	1-213
Blue Control Channel	B, FLYING/CONTROL	2-213
Amplifier and Resolver	26 VAC - 1800Hz	
Supply	PFCS 2 - 23X	
Green Channel Amplifier	A. FLYING CONTROL	2-213
and Resolver Supply	26 VAC - 1800 Hz	
	PFCS 1 - 22X	

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## MAINTENANCE MANUAL

### ELECTRICAL CONTROL CHANNELS - TROUBLE SHOOTING

#### 1. General

This trouble shooting being common to the three sections (Roll, Yaw and Pitch), it is dealt with only once.

Refer to topic 27-16-00, Trouble Shooting

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## MAINTENANCE MANUAL

### ELECTRICAL CONTROL CHANNELS - ADJUSTMENT/TEST

#### 1. General

R Electrical control channel adjustment/test procedures being  
R common to all three axes (roll, pitch and yaw) a typical  
R procedure is described in 26-16-00, Adjustment/Test.

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## MAINTENANCE MANUAL

### SYNCHRO PACK - REMOVAL/INSTALLATION

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The synchro packs transmit electrical orders to the Power Flight Control Units (PFCU) :  
located in zone 121, access can be obtained through panel 121FB

#### 2. Synchro Pack

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Zero Rigging Device - Relay Chassis	E925019000
Rigging Pins - Synchro Pack	D925252000
Rigging Template - Integral Trim	D921250000
Access Platform 3.22 m (10 ft. 7 in.)	
Circuit Breaker Safety Clips	

##### B. Prepare

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## MAINTENANCE MANUAL

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFC5 INV GRN FAIL IND	1-213	1C 73	M15
PFC5 INV GRN SUP		1C 66	P11
PFC5 INV BLUE SUP	5-213	2C 66	B14
PFC5 INV BLUE FAIL IND		2C 73	E11
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M626	F22

- (3) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (4) Make certain that roll and pitch trim controls are in zero position.
- (5) Remove access panel 121FB, immobilize resolvers (pitch, roll) with rigging pins D925252001, D925252003.
- (6) Remove access panel 121GB, install items of equipment E925019010 and E925019012 on pitch linkage.
- (7) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing. Procedure to set Flight Controls in mechanical mode).
- (8) Open door 151DB, depressurize Green, Blue and Yellow hydraulic systems.

**WARNING :** DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THIS UNIT PROHIBITING PRESSURIZATION OF THE AIRCRAFT

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### HYDRAULIC SYSTEMS.

(9) Remove access panel 121DB, immobilize the pitch artificial feel input lever with rigging pin of equipment 0921250000.

(10) Remove the AP force limiter (4) (Ref. 27-31-17, Removal/installation).

#### C. Remove (Ref. Fig. 401 )

(1) Disconnect electrical connectors, loosen bundle attachment clamps on the chassis.

(2) Remove pins, loosen nuts (5), remove washers (6), bolts (7) disconnect rods (8).

NOTE : For removing or installing attachment bolts it is necessary to press plunger on head of bolt to free the locking system balls.

(3) Remove pin, loosen nut (9), remove washer (10). Press edge of retaining spring blade and remove bolt (11).

(4) Remove pin, loosen nut (1), remove washer (2).

(5) Support pack, press edge of retaining spring blade and remove bolt (5), remove pack.

CAUTION : THIS EQUIPMENT IS TO BE HANDLED WITH CARE.

#### D. Preparation of Replacement Component (Ref. Fig. 402 )

Make certain that the following clearances have been kept during assembly of synchro pack.

(1) Clearance A. Between input lever and deflection limiting spacer :

Nominal clearance	0.1181 in. (3 mm)
Minimum clearance	0.0591 in. (1.5 mm)

(2) Clearance B. Between head of cotter pin and mounting flange :

Nominal clearance	0.1181 in. (3 mm)
Minimum clearance	0.0799 in. (2.03 mm)

(3) Clearance C. Between resolver control links and moun-

EFFECTIVITY: ALL

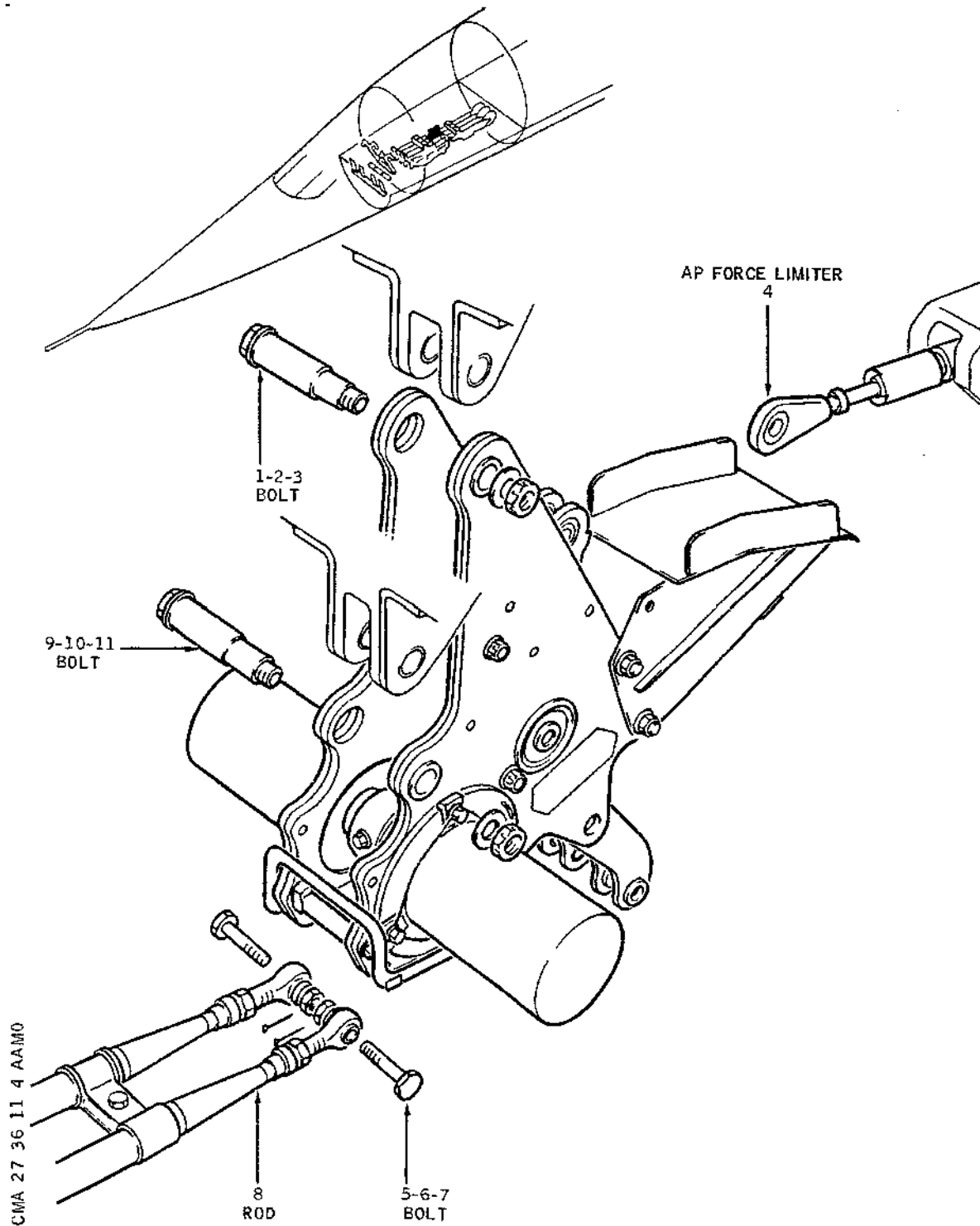
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Synchro Pack  
Figure 401

EFFECTIVITY: ALL

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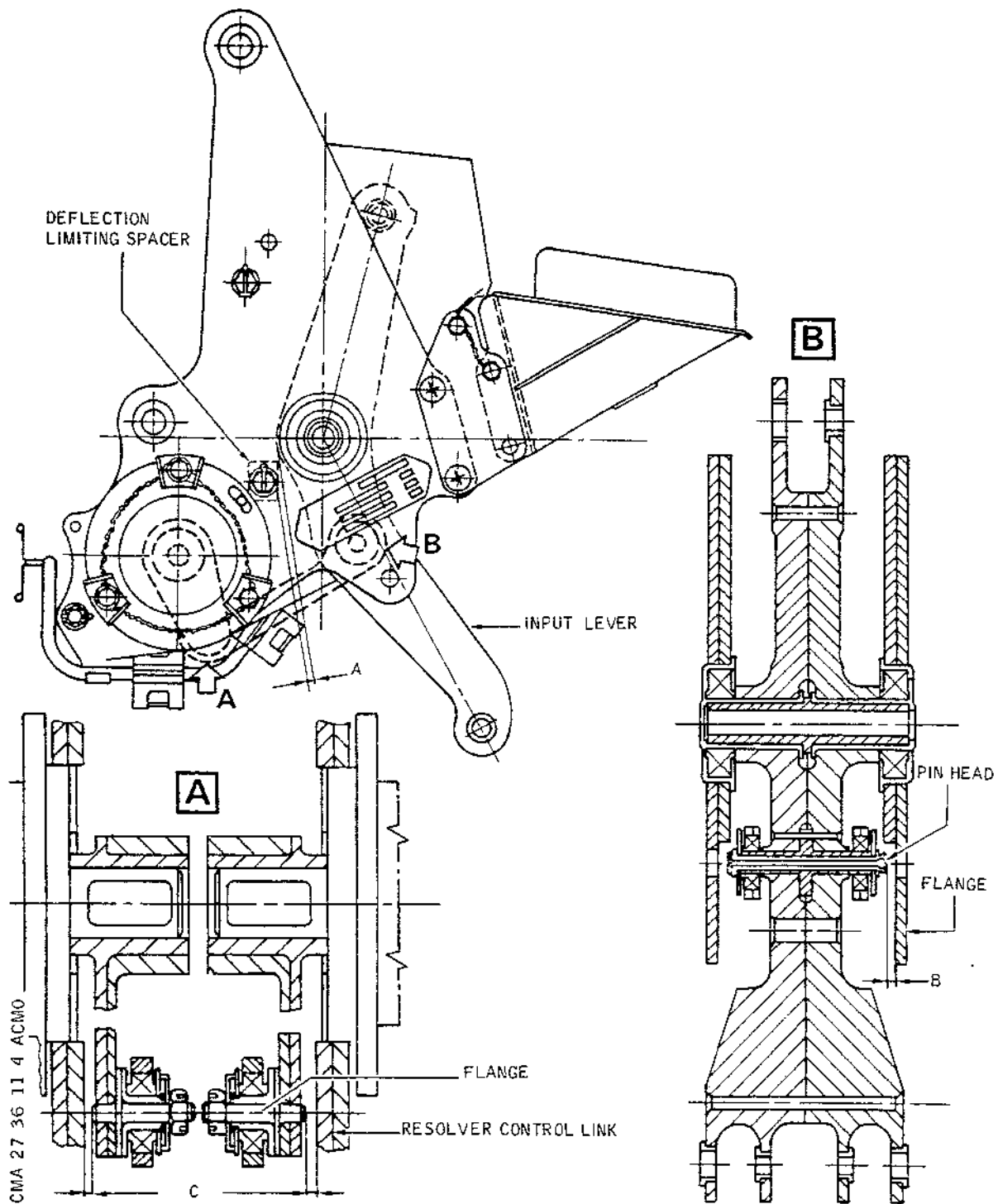
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## MAINTENANCE MANUAL



Synchro Pack Assembly  
Figure 402

EFFECTIVITY: ALL

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ting flanges :

Nominal clearance	0.1181 in. (3 mm)
Minimum clearance	0.0858 in. (2.18 mm)

- (4) Check that retaining spring blades are in correct condition.

### E. Install

- (1) Position pack, engage bolts (3 and 11) from left to right, install washers (2 and 10), tighten nuts (1 and 9).

Torque to between 75 and 85 lbf.in. (0.85 and 0.95 m.daN). Install pin.

NOTE : In order to engage bolts, press edge or retaining spring blades.

- (2) Immobilize synchro pack on zero position with rigging pins D925252003.
- (3) Couple rods (8), engage bolts (7), install washers (6), tighten nuts (5).  
Torque to between 27 and 32 lbf.in. (0.30 and 0.36 m.daN). Safety with cotter pin. If necessary, adjust length of rods until they can be connected to synchro pack easily. Tighten and safety rod ends.
- (4) Install AP force limiter (4) (Ref. 27-31-17, Removal/installation).
- (5) Tighten the bundle attachment clamps on the chassis, connect electrical connectors.
- (6) Make certain that the rigging pin of equipment D921250000 on the artificial feel input lever can be removed easily (if necessary adjust rods (8)). Remove equipment D921250000.
- (7) Remove warning notices.
- (8) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (9) Remove items of equipment E92501912 and E925019010, remove pins D925252001 and D925252003 from resolvers.
- (10) Shut down pressurization of hydraulic systems. (Ref. 27-00-00. Servicing, Procedure to set Flight Controls in mechanical mode).

EFFECTIVITY: ALL

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### F. Tests

- (1) Carry out operational tests (Ref. 27-36-00, Adjustment/Test).
- (2) Before closing access doors and panels, carry out a double inspection of work performed and area affected as per instructions detailed in 05-55-11.

### G. Close-Up

- (1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (2) Close access doors and panels 121FB, 121GB, 151DB, 121DB.
- (3) Remove safety clips and tags and reset the following circuit breakers.

---

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFCS INV GRN FAIL IND	1-213	1C73	M15
PFCS INV GRN SUP	1-213	1C66	P11
PFCS INV BLUE SUP	5-213	2C66	B14
PFCS INV BLUE FAIL IND	5-213	2C73	E11
HYD GRND CHECK OUT SEL VALVE CONT	15-216	M626	F22

---

- (4) Remove access platforms.

EFFECTIVITY: ALL

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**MAINTENANCE MANUAL**  
**SYNCHRO PACK - INSPECTION/CHECK**

1. General

The purpose of the following procedure is to check the pitch channel synchro pack.

2. Synchro Pack

A. Equipment and Materials

DESCRIPTION	PART NO.
-------------	----------

Access Platform 3.672 m (12 ft)

B. Prepare

(1) Open door 121FB, giving access to synchro pack.

C. Check

(1) Check AP force limiter attachment to synchro pack bellcrank for absence of end play.

(2) Check synchro pack attachment to structure for absence of end play.

(3) Check twin rod attachment to synchro pack bellcrank for absence of end play.

(4) Check electrical routing attachment on the unit.

D. Tests

E. Close-Up

(1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2) Close door 121FB.

(3) Remove access platform.

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## MAINTENANCE MANUAL

### FLIGHT CONTROL SURFACE POSITION INDICATOR (ICOVOL INDICATOR) REMOVAL/INSTALLATION

R

#### 1. General

The Flight Control Surface Position indicator (ICOVOL indicator) (electrical identifier C82) is located on First Officer's instrument panel (2-212).

NOTE : The Removal/Installation of the INNER ELEV caption light (electrical identifier C404), secured by the ICOVOL retaining plate, is dealt with in this topic at the same time as that of the ICOVOL indicator.

#### 2. ICOVOL indicator

##### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Circuit Breaker Safety Clips

Access Platform 4.47 m (14 ft. 8 in.)

##### B. Prepare

(1) Observe the electrical safety precautions described in 24-00-00, Servicing.

(2) Trip, safety and tag the following circuit breakers :

(a) For removal of the ICOVOL indicator :

---

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT POSN IND CONT	1-213	C 83	R11
FLT CONT POSN IND 26V 400 Hz SUP	2-213	C 84	B 4
RH DASH INST LTS SUP	13-216	L 371	E 9

---

(b) For removal of INNER ELEV caption light :

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFCS ALL SURFACES MON GRN SUP	1-213	1C 54	N13
PFCS ALL SURFACES MON BLUE SUP	5-213	2C 54	E12
PLTS LT TEST SUP	15-215	L1001	E14

### C. Remove

- (1) On front face of First Officer's instrument panel, remove the 4 attaching screws securing ICOVOL indicator and INNER ELEV caption light retaining plate.
- (2) Remove retaining plate
- (3) For removal of INNER ELEV caption light :
  - (a) Carefully disengage caption light from its housing
  - (b) Identify electrical wires.
  - (c) Disconnect electrical wires.
  - (d) Remove caption light.
- (4) For removal of ICOVOL indicator :
  - (a) Gain access to ICOVOL connector (beneath and at the rear of First Officer's instrument panel).
  - (b) Unlock and remove movable connector.
  - (c) Remove ICOVOL indicator.

### D. Preparation of Replacement Component.

- (1) Check instrument panel electrical connector for correct condition (no signs of corrosion).
- (2) Check ICOVOL indicator and INNER ELEV caption light for correct external condition (no dents) and that electrical connector is undamaged and free from corrosion.

### E. Install

EFFECTIVITY: ALL

# 27-36-13

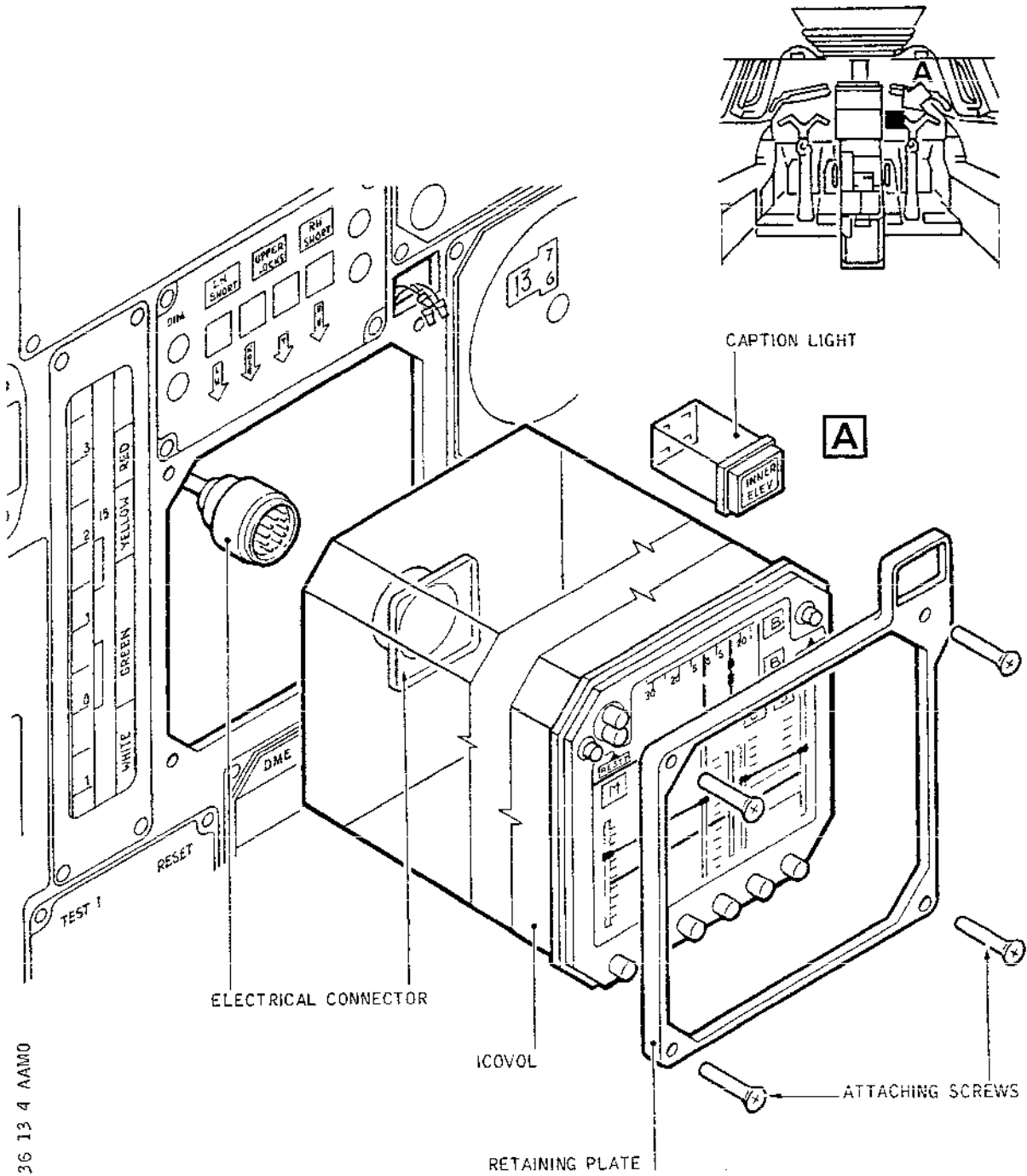
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CMA 27 36 13 4 AAM0

ICOVOL indicator and INNER ELEV caption light  
Location and Removal  
Figure 401

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## MAINTENANCE MANUAL

- (1) For installation of INNER ELEV caption light :
  - (a) Connect electrical wires and check that connections are made in accordance with wire identifications and the corresponding wiring diagram.
  - (b) Engage caption light in housing.
- (2) For installation of ICOVOL indicator :
  - (a) Engage indicator in housing on First Officer's instrument panel.
  - (b) Gain access to indicator connector, (beneath and at the rear of First Officer's instrument panel) ; connect and lock.
- (3) Position retaining plate.
- (4) Fully tighten retaining plate attaching screws.
- (5) Remove safety clips and tags and reset circuit breakers tripped previously.

### F. Test

- (1) Carry out tests described in 27-36-13, Adjustment/Test.

### G. Close-Up

- (1) Remove access platform.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### FLIGHT CONTROL SURFACE POSITION INDICATOR (ICOVOL) ADJUSTMENT/TEST

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The purpose of this test is to check the ICOVOL indicator correct operation after removal/installation.

#### 2. Test

##### A. Equipment and Materials

DESCRIPTION	PART NO.
-------------	----------

Electrical Ground Power Unit

##### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Carry out Prepare paragraph operations for Procedure to set Flight Controls in mechanical mode. (Ref. 27-00-00, Servicing).

##### C. Test

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- (1) On ICOVOL indicator (First Officer's instrument panel) press TEST push-button during a few seconds, then release it.
  - the 8 red warning lights must flash during the time push-button is pressed, then remain illuminated when push-button is released.
- (2) On ICOVOL indicator, press RESET push-button.
  - the 8 red warning lights must go off.
- (3) Make certain that trim controls at centre console are set to zero.
- (4) Pressurize Yellow hydraulic system (Ref. 29-21-00, Servicing).
- (5) At overhead panel, on SERVO CONTROLS unit, place lower selector switch in BLUE L-PRESS (YELLOW BLUE) position.
  - On ICOVOL indicator, the pointers corresponding to elevons must indicate zero (as also those corresponding to rudders).
- (6) Fully deflect the three flight controls.
  - Make certain that, on ICOVOL indicator, the pointers indicate :
    - (a) When turning control handwheel :  $14^{\circ}$  for inner elevons and  $20^{\circ}$  for outer and middle elevons (in both directions of control handwheel deflection).
    - (b) When deflecting rudder pedals :  $30^{\circ}$  for rudder deflection (in both directions).
    - (c) When deflecting the control column :  $17^{\circ}$  nose up and nose down for the 6 elevons (in nose up, it is necessary to exert an additional load after  $15^{\circ}$  in order to compress the spring pot assembly).
- (7) At overhead panel
  - (a) On Flight Control Unit.
    - (a1) Place BLUE INVERTER and GREEN INVERTER switches in ON position.
    - (a2) Place the three O & M ELEVONS, IN ELEVONS and RUDDER switches in BLUE position.
    - (a3) Press and release each of the 3 RESET push-buttons, located on RH side of each switch.
      - When pressing each push-button, the ICOVOL

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corresponding magnetic indicators must display B.

- (b) On SERVO CONTROLS unit
  - (b1) Place lower selector switch in NORMAL position.
    - The 8 magnetic indicators must display M.
  - (b2) Place lower selector switch in GREEN L. PRESS (YELLOW GREEN) position.
- (c) On Flight Control Unit, press and release each of the 3 RESET push-buttons.
  - When pressing each push-button, the ICOVOL corresponding magnetic indicators must display G.
- (d) On SERVO CONTROLS unit, place lower selector switch in NORMAL position.
  - On ICOVOL indicator, the 8 magnetic indicators must display M ; the pointers corresponding to the elevons must slowly move to the lower stop.
- (e) On Flight Control Unit, place the BLUE INVERTER and GREEN INVERTER switches in PWR OFF position, then place the 3 switches in MECH position.

### D. Close-Up

- (1) Shut down Yellow hydraulic power (Ref. 29-21-00, Servicing).
- (2) Carry out Prepare paragraph operations for Procedure to set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).

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## MAINTENANCE MANUAL

### P.F.C.U. CONTROL AND MONITORING PANEL (FLIGHT CONTROL UNIT) REMOVAL/INSTALLATION

#### 1. General

The P.F.C.U. control and Monitoring Panel (electrical identification C57) is located on overhead panel).

#### 2. P.F.C.U. Control and Monitoring Panel (Flight Control Unit)

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Access Platform 4.47 m (14 ft. 8 in.)	

##### B. Prepare

(1) Observe safety precautions described in 24-00-00, Servicing.

(2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
P.F.C.S. INV GRN FAIL IND	1-213	1C 73	M15
FLT CONT POSN IND CONT		C 83	R11
SAFETY FLT CONT No.1 SUP		1C 651	S20
AUTO STAB 1 COMP SUP	2-213	1C 37	E 5
SAFETY FLT CONT No.2 SUP		2C 651	D17
P.F.C.S. INV BLUE FAIL IND		2C 73	E11
ROOF PNL INST LTS SUP	13-215	L 379	F11
AUTOSTAB 2 COMP SUP	13-216	2C 37	D17
ROOF PNL TEST SUP	15-216	L1002	D13

##### C. Remove (Ref. Fig. 401 )

EFFECTIVITY: ALL

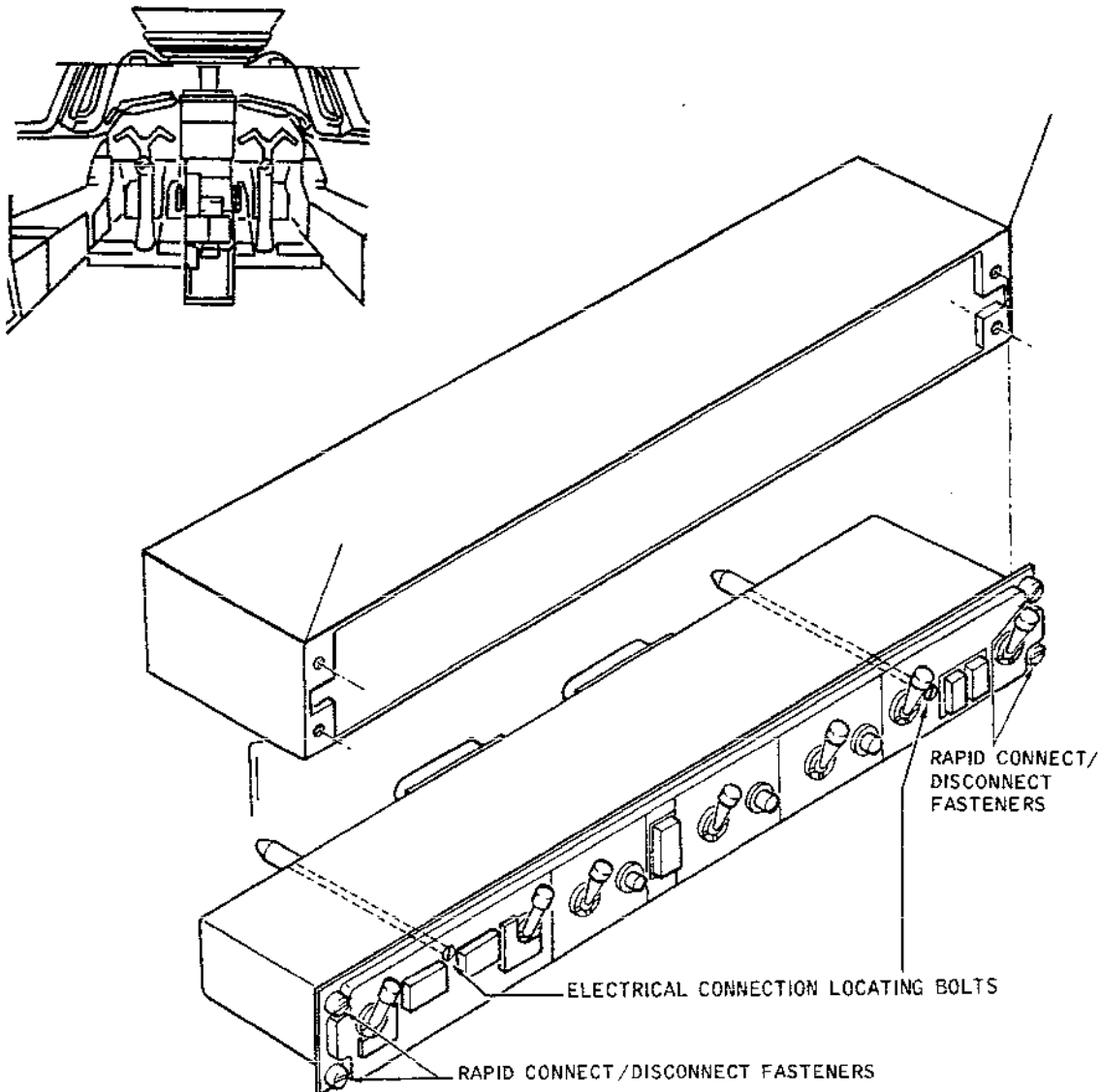
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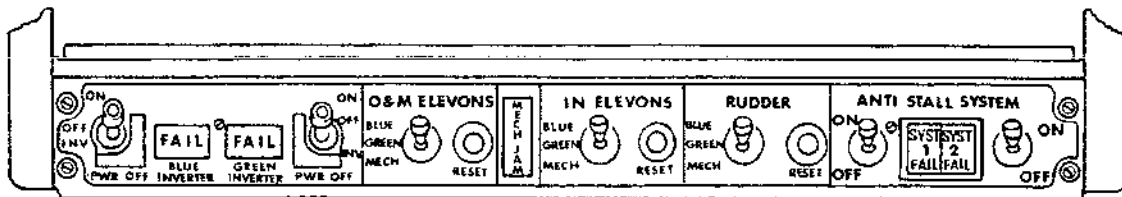
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CMA 27 36 15 4 AAM0



Flight Control Unit Removal  
Figure 401

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- (1) Unscrew unit quick attach/detach fasteners.
- (2) Unscrew locating bolts to disconnect electrical connectors.
- (3) Remove unit from its housing.

### D. Preparation of Replacement Component

- (1) Make certain that unit is free from external damage and corrosion, especially at electrical sockets.

### E. Install

- (1) Install unit in its housing and push it fully home. (Proceed with care in order not to damage electrical connectors).
- (2) Tighten locating bolts to connect electrical connectors
- (3) Tighten quick attach/detach fasteners.
- (4) Remove safety clips and tags and reset circuit breakers

### F. Test

- (1) Carry out tests described in 27-36-15, Adjustment/Test.

### G. Close-Up

- (1) Remove access platform.

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### P.F.C.U. CONTROL AND MONITORING PANEL (FLIGHT CONTROL UNIT) ADJUSTMENT/TEST

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

The tests described below enable the operation of the PFCU Control and Monitoring panel to be checked.

#### 2. Test

##### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Electrical Ground Power Unit	
------------------------------	--

Circuit Breaker Safety Clips	
------------------------------	--

##### B. Prepare

(1) Take the precautions described in the previous WARNING paragraph.

(2) Check that the following circuit breakers are set :

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ADC 1 28 V SUP	1-213	1F 74	P12
SAFETY FLT CONT No.1 SUP		1C 651	S20
ADC 1 26 V SUP	2-213	1F 78	A 2
LAT ACCELMTR 1 26 V SUP		1C 42	A 4
AUTOSTAB 1 COMP SUP		1C 37	E 5
ADC 1 115 V SUP		1F 73	F 3
SAFETY FLT CONT No.2 SUP	5-213	2C 651	D17
ADC 2 28 V SUP		2F 74	F12
SAFETY FLT CONT COMP No.1 115 V SUP	13-215	1C 652	E 6
SAFETY FLT CONT COMP No.1 26 V SUP		1C 653	F 6
LAT ACCELMTR 2 26 V SUP	13-216	2C 42	B16
SAFETY FLT CONT COMP No.2 26 V SUP		2C 653	C16
SAFETY FLT CONT COMP No.2 115 V SUP		2C 652	C17
AUTOSTAB 2 COMP SUP		2C 37	D17
ADC 2 26 V SUP		2F 78	F14
ADC 2 115 V SUP		2F 73	F15
(3) Carry out Prepare paragraph operations of Procedure to set Flight Controls in Blue electrical mode (Ref. 27-00-00, Servicing).			
(4) Trip, safety and tag the following circuit breakers :			

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW "A" SYS SUP	1-213	G 292	M17
RH UC WEIGHT SW & DOWNLOCK "A" SYS SUP		G 295	M18
LH UC WEIGHT SW & DOWNLOCK "B" SYS SUP	3-213	G 293	B 8
RH UC WEIGHT SW "B" SYS SUP		G 294	B 9

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- (5) On ADC control panel (centre console) check that :
  - (a) Both switches are in OFF position.
  - (b) Both TEST selector switches are in NORM position.

### C. Test

NOTE : Take only visual and aural warnings which are mentioned into account.

- (1) Pressurize Blue and Green hydraulic systems (Ref. 29-12-00 and 29-11-00, Servicing).
  - (a) On SERVO CONTROLS unit, BLUE L-PRESS and GREEN L-PRESS indicator lights must go off.
  - (b) Elevons must deflect upwards.
- (2) On overhead panel, on Flight Control Unit :
  - (a) Place BLUE INVERTER and GREEN INVERTER switches in ON position.
    - (a1) FAIL corresponding warning lights must go off.
    - (a2) On First Officer's instrument panel, the ICOVOL (Flight Control Surface Position Indicator) indicates position of elevons and magnetic indicators display M.
  - (b) Place O & M ELEVONS, IN ELEVONS and RUDDER switches in BLUE position then press and release the 3 RESET push-buttons.

On First Officer's instrument panel, the ICOVOL magnetic indicators must display B.
  - (c) Place O & M ELEVONS, IN ELEVONS and RUDDER switches in GREEN position then in MECH position.

On First Officer's instrument panel, the ICOVOL magnetic indicators must display G then M.
  - (d) Press then release MECH JAM warning light. It must go off.
  - (e) Place O & M ELEVONS, IN ELEVONS and RUDDER switches in BLUE position, then press and release the 3 RESET push-buttons.

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On First Officer's instrument panel, the ICOVOL magnetic indicators must display B.

- (3) On ADC control panel (centre console) place ADC 1 and ADC 2 switches in ON position.

If the amber ADC 1 and ADC 2 warning lights illuminate, extinguish them by pressing them.

- (4) On overhead panel,

- (a) On Flight Control Unit, place both ANTI STALL SYSTEM switches in ON position.

The 2 SYST 1 FAIL and SYST 2 FAIL warning lights must illuminate.

- (b) On AUTOSTAB No.1 and AUTOSTAB No.2 units, engage PITCH switches.

Both SYST 1 FAIL and SYST 2 FAIL indicator lights must go off (on Flight Control Unit).

- (c) On Flight Control Unit, place both ANTI STALL SYSTEM switches in OFF position.  
On AUTOSTAB No.1 and AUTOSTAB No.2 units, PITCH switches must disengage.

- (5) On overhead panel, on Flight Control Unit, place the 2 BLUE INVERTER and GREEN INVERTER switches in OFF INV position.

On First Officer's instrument panel, the ICOVOL magnetic indicators must display M.

### D. Close-Up

- (1) On ADC control panel (Centre console) place ADC 1 and ADC 2 switches in OFF position.
- (2) Carry out operations of close-up paragraph for procedure to set flight controls in electrical mode (Ref. 27-00-00, Servicing).
- (3) Remove safety clips and tags and reset circuit breakers.

EFFECTIVITY: ALL

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### OUTER ELEVON NEUTRALIZATION COMPUTER - REMOVAL/INSTALLATION

#### 1. General

Neutralization computers (electrical identifiers 1C45 and 2C45) are respectively mounted on shelves 8-215 and 8-216 of RH and LH electronics rack.  
Locating pins are provided on connector to prevent computer replacement with a computer of a different type.  
Removal/Installation procedures are identical for the two computers ; therefore only one procedure is dealt with.  
Only circuit breakers associated with the computer to be removed, must be tripped.

#### 2. Outer Elevon Neutralization Computer

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Access Platform 4.47 m (14 ft. 8 in.)	

##### B. Prepare

- (1) Observe the electrical safety precautions described in 24-00-00, Servicing.
- (2) Trip, safety and tag the following circuit breakers :
  - (a) For removal of the Blue neutralization computer (2C45) :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
MID & OUTER ELEVON BLUE	2-215	2C 92	C 4
MID & OUTER ELEVON CONT & MON BLUE SUP	5-213	2C 55	D12
OUTER ELEVON NEUTRLN BLUE SUP		2C 58	D13

- (b) For removal of the Green neutralization computer (1C45).

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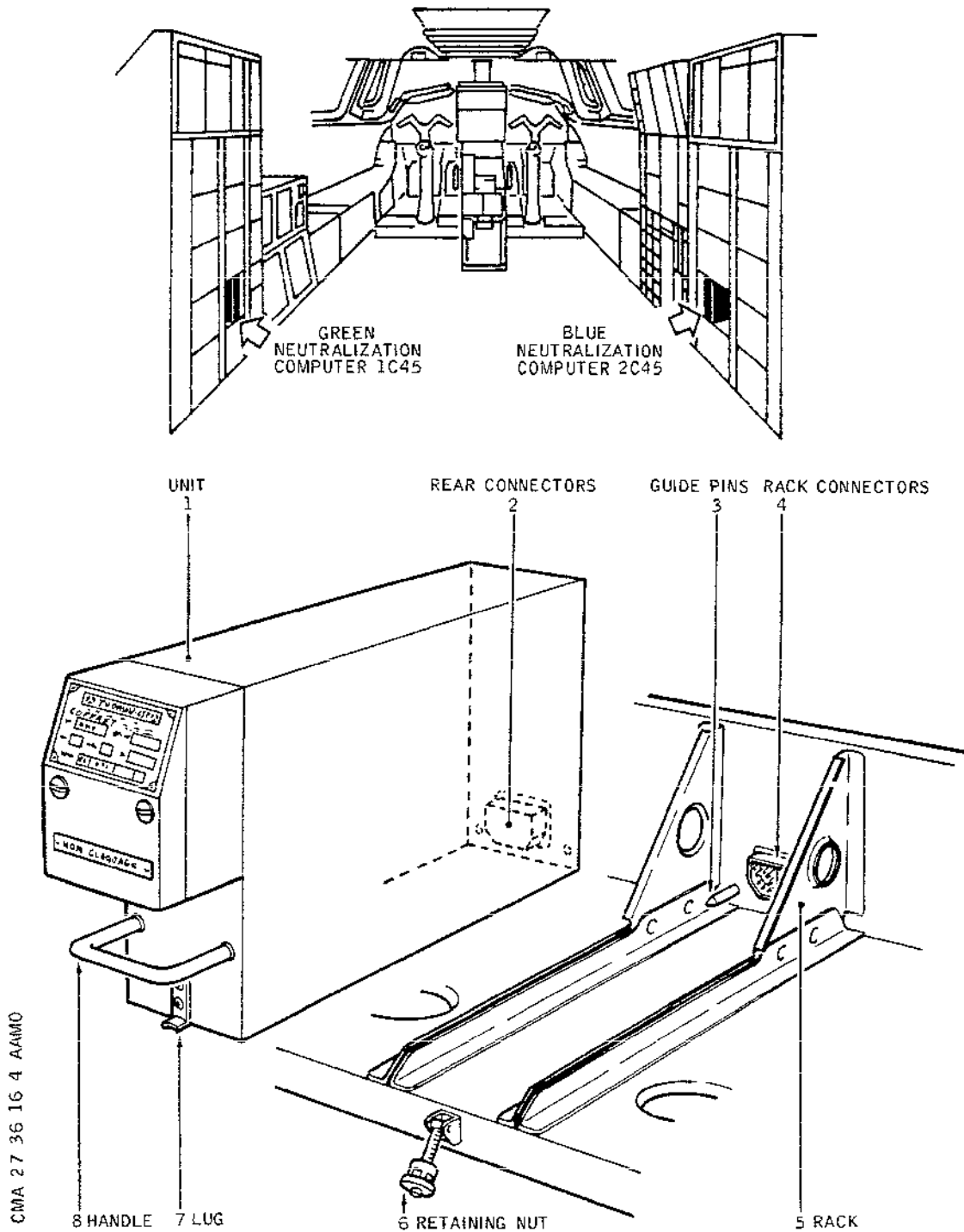
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Neutralization Computers - Location and Removal  
Figure 401

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- R trical connectors).
- R (3) Engage latch in lug and tighten retaining nut.
- R (4) Remove safety clips and tags and reset circuit breakers  
R mentioned above.
- R F. Test
- R (1) Carry out Outer Elevon Neutralization Test detailed in  
R 27-16-00, Adjustment/Test.
- R G. Close-Up
- R (1) Position and secure access panel 216AS (or 215AS)
- R (2) Remove access platform.

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### POWER FLIGHT CONTROL SYSTEM SHUNT BOX - REMOVAL/INSTALLATION

#### 1. General

R The power flight control system shunt box (electrical identifier  
R C110) is located on shelf 8-216 in RH electronics rack.

R Locating pins are provided on connectors to prevent unit repla-  
R cement with a unit of a different type.

R NOTE : Removal/Installation of the shunt box is carried out  
R whenever tests are carried out on the Flight Control  
R Electrical Circuits Test Set (Ref. 31-56-100).

#### R 2. Power Flight Control System Shunt Box (C110)

##### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Circuit Breaker Safety Clips

R Access Platform 4.47 m (14 ft. 8 in.)

##### B. Prepare

R (1) Observe the electrical safety precautions described in  
R 24-00-00, Servicing.

R (2) Trip, safety and tag the following circuit breakers :

---

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFCS INV GRN FAIL IND	1-213	1C 73	M15
PFCS INV GRN SUP		1C 66	P11
PFCS INV BLUE SUP	5-213	2C 66	B14
PFCS INV BLUE FAIL IND		2C 73	E11
PFCS TEST UNIT DC SUP	13-215	C 113	A 6
PFCS TEST UNIT AC SUP	15-215	C 114	A 5

---

R (3) Remove access panel 216AS.  
R

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### C. Remove

R (1) On shunt box C110, unscrew the two retaining nuts (6)  
R and disengage latches downwards.

R (2) Withdraw and remove box (pulling it by its handle).

### R D. Preparation of Replacement Component

R (1) Make certain that box seating is clean and that rack  
R connectors are in correct condition (no corrosion).

R (2) Visually check shunt box for correct external condition  
R (no dents) and check that rear connectors are undamaged  
R and free from traces of corrosion.

### R E. Install

R (1) Position shunt box on guide rails.

R (2) Push shunt box fully home (take care not to damage  
R electrical connectors).

R (3) Engage latches in lugs and tighten retaining nuts.

R (4) Remove safety clips and tags and reset circuit breakers.  
R

### R F. Tests

R (1) Carry out tests described in 27-16-00, Adjustment/Test  
R (Flight Controls System Test and Outer Elevon Neutralization Test).  
R

### R G. Close-Up

R (1) Position and attach access panel 216AS.

R (2) Remove access platform.

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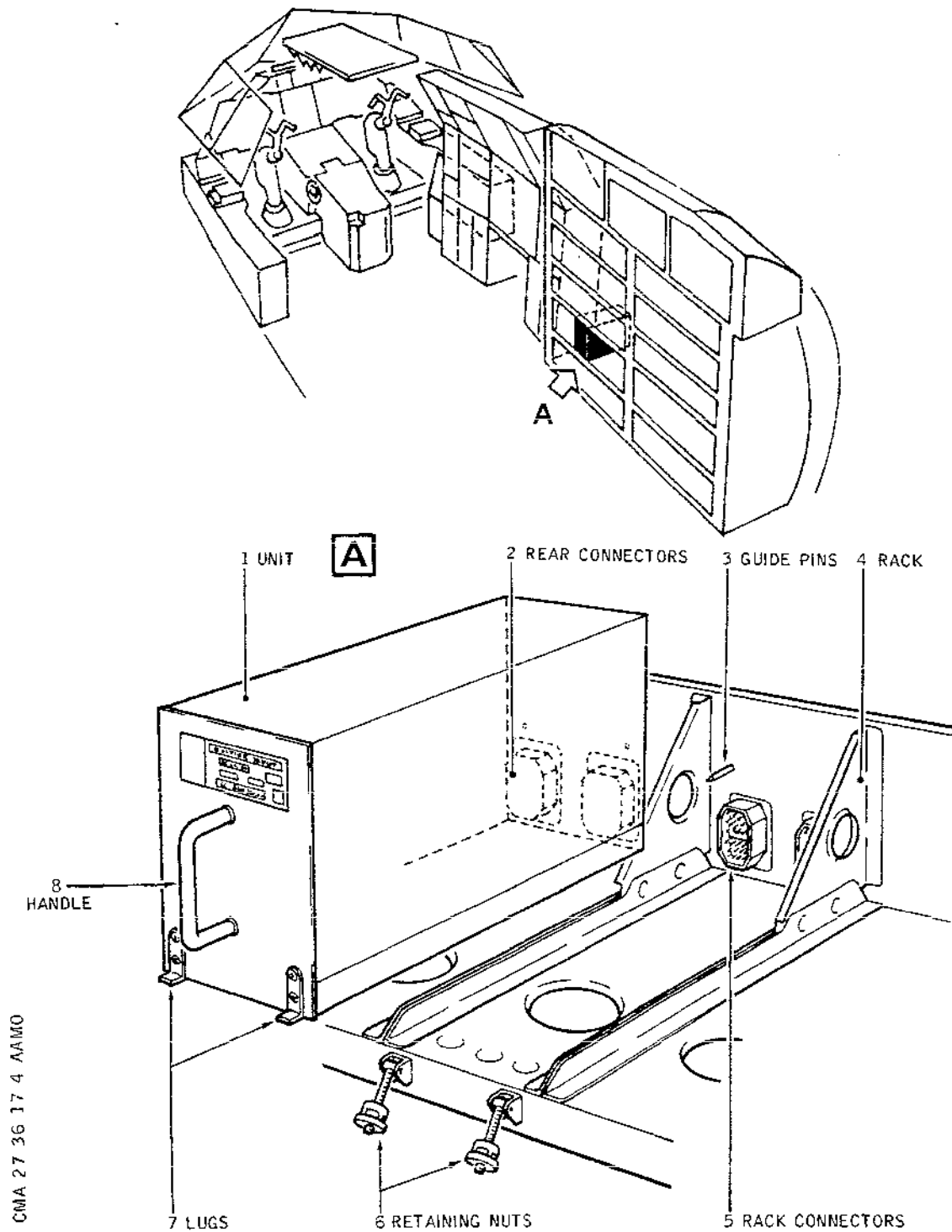
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PFCS Shunt Box - Location and Removal  
Figure 401

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### ELECTRICAL MONITORING CHANNELS - DESCRIPTION AND OPERATION

#### 1. General

##### A. Purpose

Two electrical monitoring channels (Blue channel and Green channel) are associated with the control channels.

The purpose of the monitoring channel is to detect a fault in the associated control channel and to cause a channel change-over. This channel change-over only affects the associated control surface assembly i.e : outer and middle elevons, or inner elevons or rudders.

The faults likely to affect a control channel are due to

- faulty operation of electric or electronic components resulting in failure of elevons to achieve the order given by the flight controls.
- pressure drop of hydraulic system associated with the control channel in operation.
- a fault in the 26V 1800 Hz generation network associated with the control channel in operation.

In the first case :

The Blue monitoring channel is operative when the Blue control channel operates : if the latter is faulty, the monitoring channel closes the Blue electrovalves and opens the Green electrovalves of the associated control surface assembly PFCU's affected by the fault.

In the other two cases :

The monitoring channel closes the Blue electrovalves and opens the Green electrovalves of all PFCU's

The Green monitoring channel is operative when the Green control channel operates : if the latter is faulty, the monitoring channel closes the Green electrovalves (the Blue ones being closed).

The electrical channels are then inhibited and the PFCU's are actuated in mechanical mode.

##### B. Principle

- In the event of a pressure drop in the Blue or Green hydraulic system or a fault in the Blue or Green 26 V - 1800 Hz generation network, the Blue (or Green) monitoring channel closes the Blue (or Green) electrovalves on all the PFCU's (2 rudders and 6 elevons). The closing order is transmitted through the static monitoring change-over circuits controlled by :
  - a low pressure switch in Blue (or Green) hydraulic system.
  - a fault relay in the Blue (or Green) 26 V, 1800 Hz net-

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work. (At the same time, opening of Green electrovalves is controlled if Blue control channel is the active channel).

- In the case of a discrepancy between the position of the control column and that of at least one of the four outer and middle elevons or the two inner elevon assemblies, the Blue (or Green) electrovalves are closed on all the PFCU's of the associated control surface. However a  $2^{\circ} 75$  tolerance is permissible.
- The detection of any angular discrepancy is achieved by a synchro detection channel consisting of CX resolvers (driven by the control column), CDX differential resolvers driven by the control wheel) and CT resolvers, (driven by the PFCU's).  
If one CT resolver (i.e. the PFCU) is in the same position as the CX resolver (i.e. the control column), then no signal is present at the output terminals of the CT resolver.
- If not, then the signal thus appearing at CT output terminals is applied to a comparator which controls a channel change-over by sending a signal to the static monitoring change-over unit.  
This unit sends :
  - a signal which closes the Blue electrovalves and opens the Green electrovalves (if the Blue control channel is faulty).
  - a signal which closes the Green electrovalves, (the Blue electrovalves remain closed), if the Green control channel is faulty).

### C. Application of Principle (Pitch Mode Only)

#### (1) Outer and Middle Elevons (Ref. Fig. 001 )

A monitoring channel checks that the angular displacement of the outer and middle elevons corresponds to that of the control column.  
Under normal flight conditions, (the speed of the aircraft being below the maximum operational speed) (VMO), the outer and middle elevons on each wing deflect equally and in the same direction.  
For each channel, the rotor of a CX resolver, (common to the four outer and middle elevons), is driven by the control column (deflection).  
This CX, (the rotor of which is supplied with 26 V - 1800 Hz by the generation network associated with the monitoring channel of which it forms a part), gives out a signal proportional to the angular displacement of the control column.

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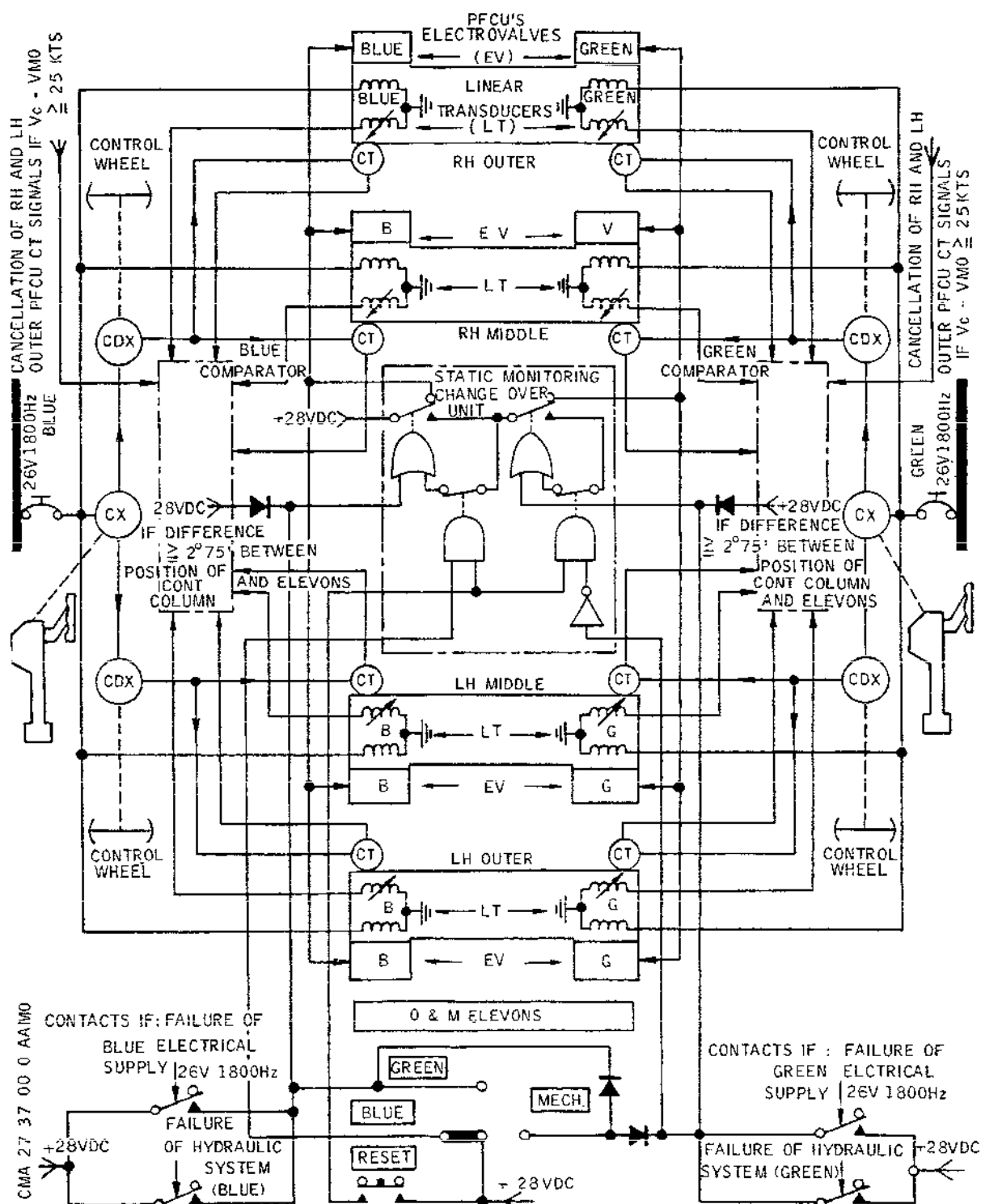
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Outer and Middle Elevons - Control Channel  
Switching Effected by Monitoring Channels  
Figure 001

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- The CX signal is applied in parallel to the rotor of each of the two CDX resolvers driven by the control handwheel ; (one CDX resolver per wing). In the absence of roll order, a CDX resolver may be considered as a 1:1 transformer.
- The output signal of each CDX is thus applied in parallel to the stator of the CT resolvers driven by the outer elevon PFCU and the middle elevon PFCU.
- If the displacement of the four PFCU's is, in fact, the position ordered by the control column, no signal is generated at the output terminals of the CT.
- If the displacement of at least one of the four PFCU's differs from the others, a signal is generated at the terminals of the associated CT. This signal is fed to a comparator which checks that the signal is above the  $2^{\circ} 75$  tolerance between the control column and PFCU positions (which determines the angular displacement of the elevons).
- If this signal is above the tolerance, a switching signal is sent to the static monitoring change-over unit. This unit then causes the Blue electrovalves (or Green electrovalves) of the four PFCU's of the outer and middle elevons to close and, at the same time the Green electrovalves to open (if the faulty channel is the Blue channel).

In the event of outer elevon neutralization due to the VMO being exceeded (Ref. 27-16-00), a signal generated by the neutralization computer is fed into a comparator. This signal is intended to annul the fault detected by the comparator. In fact, in the event of outer elevon neutralization, these elevons no longer being in the position demanded by the pilot order, the comparator would detect this as a fault and would cause a control channel change-over.

### (2) Inner Elevons (Ref. Fig. 002 )

The principle of monitoring the inner elevons is similar to that for the outer and middle elevons.

For each channel, control column deflection drives the rotor of a CX resolver supplied with 26 V - 1800 Hz (by the generation network associated with the monitoring channel of which it forms a part).

- The output signal from this CX resolver, proportional to the control column deflection is applied in parallel to each rotor of the two differential CDX resolvers driven by the control wheel (one CDX resol-

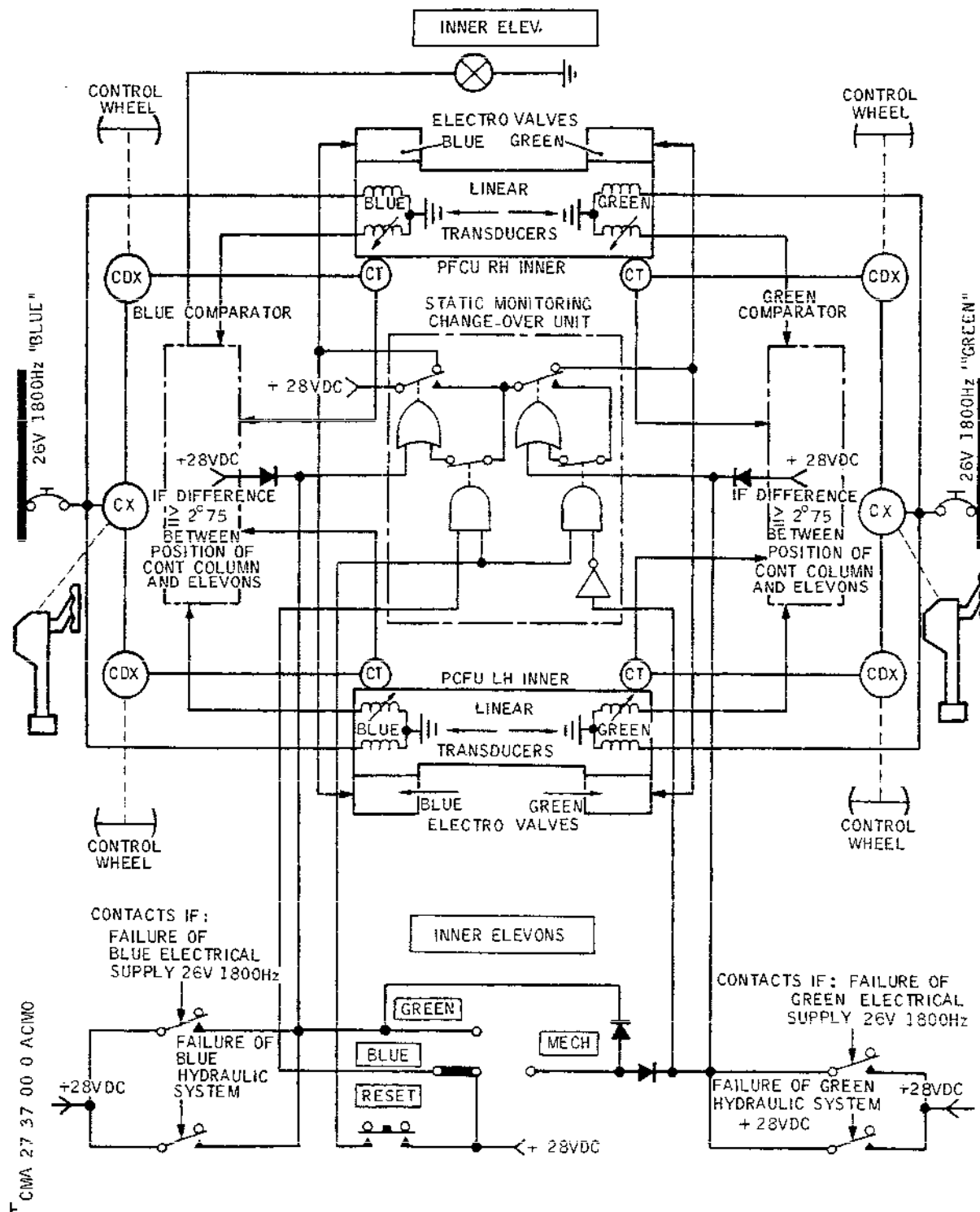
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Inner Elevons - Control Channel Switching Effected  
By Monitoring Channels  
Figure 002

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ver for each inner elevon). Since, in the absence of roll, a CDX resolver may be considered as a 1:1 transformer, the CX resolver signal is transmitted to the output terminals of each of the two CDX resolvers. This output signal from each CDX resolver is then applied to the stator of each CT resolver, the rotors of which are driven by the inner elevon PFCU's.

- If the inner elevons (actuated by the PFCU's) are in the position ordered by the control column, the output signal from each of the 2 CT resolvers is nul.
- If at least one of the inner elevons (therefore at least one PFCU) is in a different position from that ordered by the control column, a signal is present at the output terminals of the PFCU.  
This CT signal is applied to a comparator which checks that the signal is above the  $2^{\circ} 75$  tolerance.
- If so, a switching signal is sent to the static monitoring change-over unit which causes the Blue (or Green) electrovalves of the inner elevon PFCU's to close. At the same time as the Blue electrovalves close, the Green electrovalves open, (if the Blue channel is faulty).

## 2. Description (Ref. Fig. 003 )

### A. Monitoring Channel Make-Up

The monitoring channel is composed of similar detector (resolvers) components as the control channel.

- The outer and middle elevon CX resolver and the inner elevon CX resolver of each channel are located in a single unit which is mounted on the pitch resolver pack.  
Each CX is electrically connected to :
  - the RH wing outer and middle elevon CDX resolver and, in parallel, to its equivalent for the LH wing.
  - the RH wing inner elevon CDX resolver and its equivalent for the LH wing.
- The CDX resolver of the RH wing outer and middle elevons (and similarly that of the LH wing), is connected in parallel to the CT resolver of the outer elevon PFCU and to the CT resolver of the middle elevon PFCU.
- The RH inner elevon CDX resolver is connected to the CT resolver of the RH inner elevon PFCU.  
Similarly the LH inner elevon CDX resolver is connected to the LH inner elevon PFCU CT resolver.  
If one of the 6 PFCU's fails to displace to the position ordered by the control column, the signal present at the terminals of the CT resolver of the PFCU concerned is ap-

EFFECTIVITY: ALL

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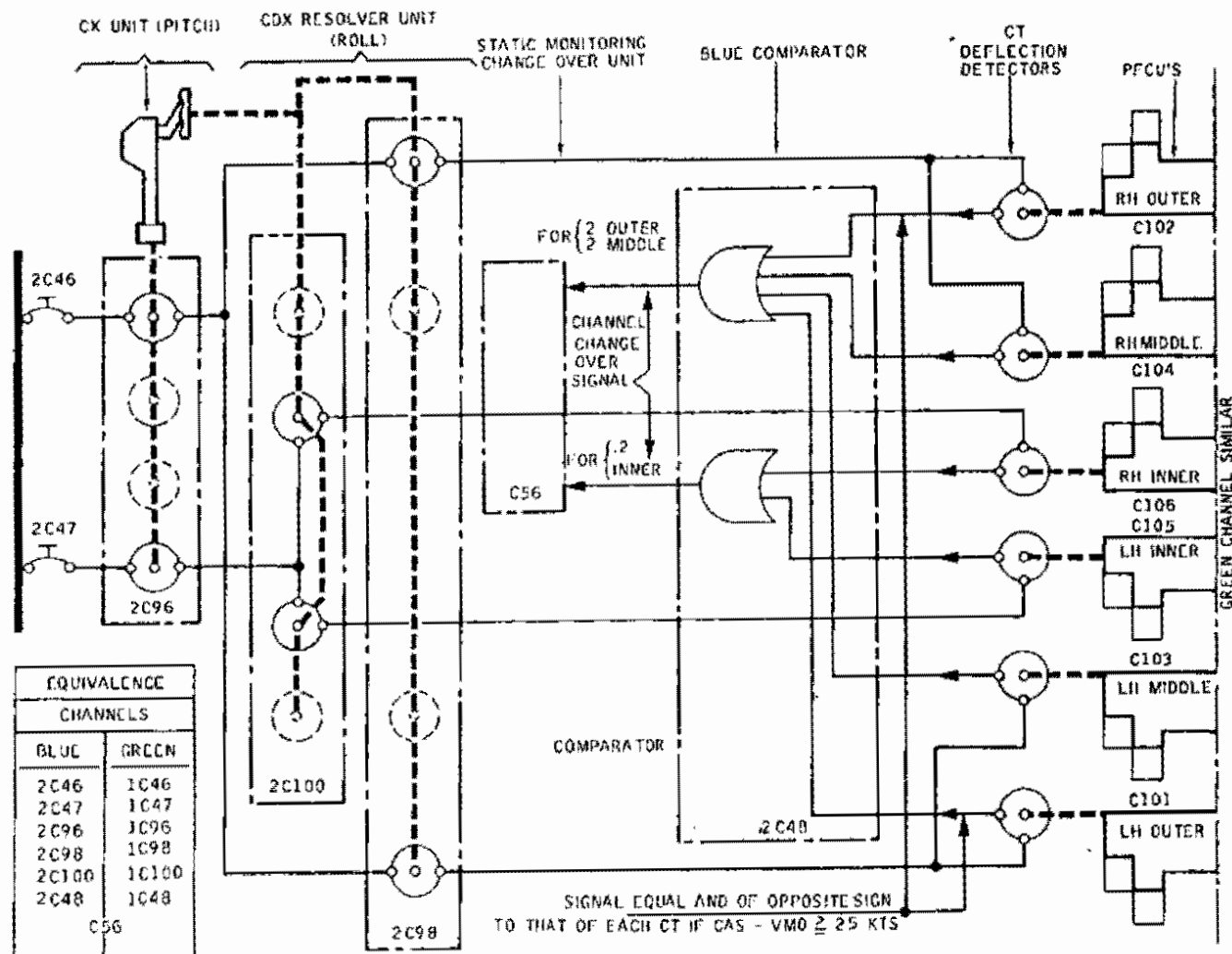
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Blue Monitoring Channel -  
Diagram (Green Channel Identical)  
Figure 003

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plied to the stage of the comparator assigned to the outer and middle elevons, or to that assigned to the inner elevons. The stage of the comparator concerned checks that the signal from the CT resolver is above the  $2^{\circ} 75$  tolerance permitted between the position of the control column and the elevon (i.e. the PFCU) concerned.

- In this case, a switching signal is sent to the appropriate stage of the static monitoring change-over unit (one stage of which is assigned to each associated control surface assembly). From this stage is sent the signal which causes the electrovalves concerned in the faulty channel to close (and the Green electrovalves to open, if the Blue channel is the faulty channel).

### B. Controls and Indicating

A control channel change-over induced by the associated monitoring channel is signalled by :

- operation of the gong.
- a change in the state of the magnetic indicators of the ICOVOL, (located on First Officer's instrument panel), corresponding to the PFCU's concerned by the channel change-over.
- the illumination of the red warning lights of the ICOVOL which correspond to the PFCU's concerned by the channel change-over, but only if the change-over is caused by a fault in PFCU displacement.
- In addition, if vibrations in excess of 8 Hz are detected at one elevon, the red warning light corresponding to that elevon, as well as the red warning light corresponding to the symmetrically opposite elevon on the other wing, flashes at a frequency of approx. 2 Hz.
- the illumination of the PFC warning light on the overhead panel.

If the fault which provoked the control channel change-over disappears, it is possible to return to the original (Blue) control channel.

In order to achieve this :

The switch, corresponding to the elevons concerned by the channel change-over, must be moved, or moved back, to BLUE, then the RESET push-button, located on the switch right side, must be pressed (on flight control unit, on overhead panel).

### 3. Resolvers

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### A. Pitch Synchro Pack (Ref. Fig. 004 )

The pitch synchro pack is a chassis composed of two flanges facing each other.

On each flange is mounted the single unit assigned to a channel (Blue or Green).

Each unit contains four CX resolvers, the rotor spindles of which are coupled :

- Two CX resolvers are assigned, one to the monitoring channel of the outer and middle elevons, and the other to the monitoring channel of the inner elevons.
- Two other CX resolvers are assigned to the associated control channel.

The two single units are assembled facing each other. This enables the resolvers of these two units to be controlled by a link connected to the control bellcrank which is operated by the linkage of the control column.

EFFECTIVITY: ALL

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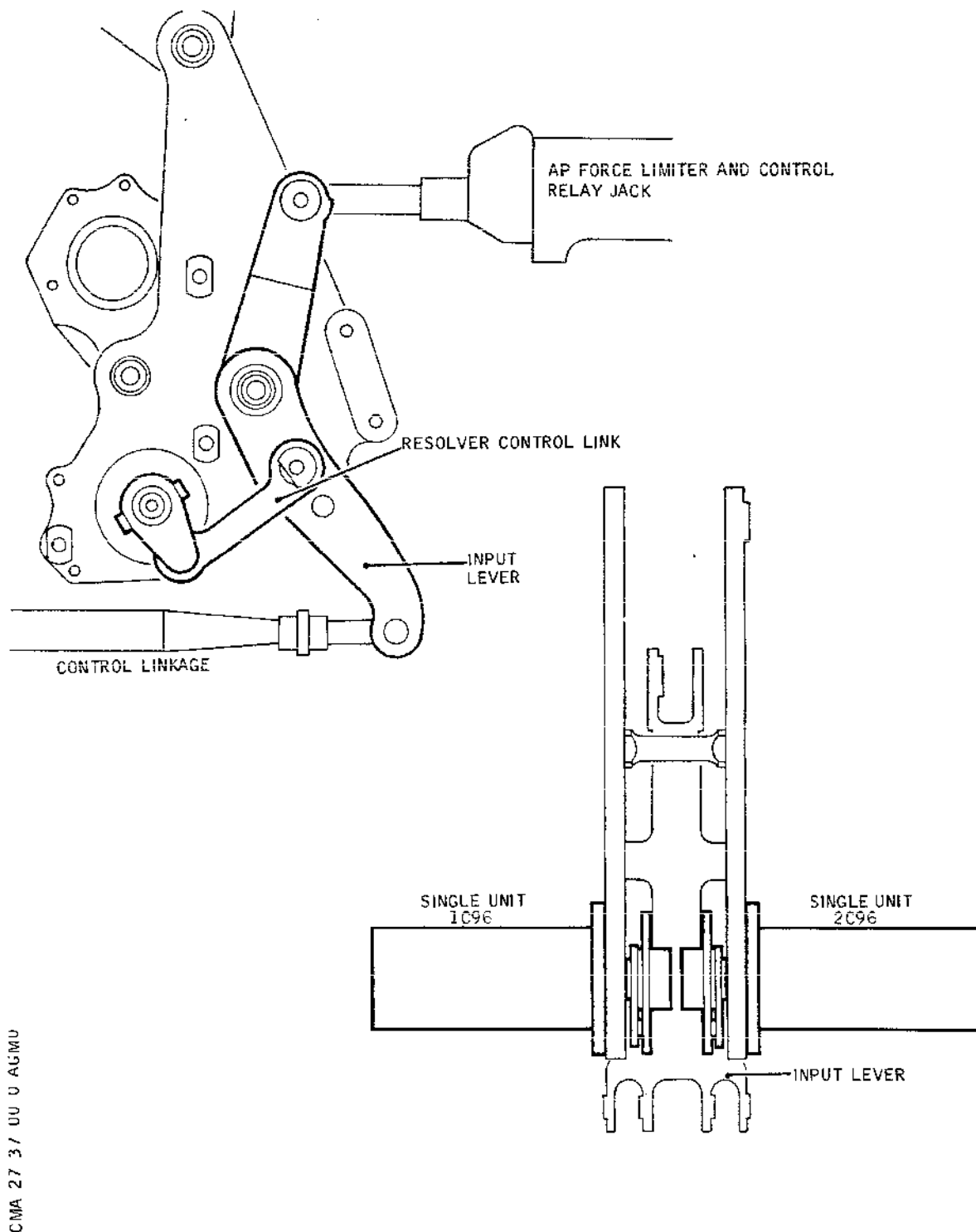
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Pitch Synchro Pack  
Figure 004

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### B. CT Resolvers on PFCU's

On each PFCU is mounted a unit containing 5 resolvers.

- The two CT resolver detectors corresponding to the Blue and Green monitoring channels are stacked (pancake type installation).
  - The two other CT resolvers correspond to the Blue and Green monitoring channels.
  - The remaining resolver corresponds to the ICOVOL indicator
- During the PFCU displacements, the resolvers spindles are operated by a rod and lever assembly. One end of the rod is attached to the aircraft structure.

### 4. Transducers - Linear Displacement

Two linear displacement transducers (one for each channel) are incorporated in each PFCU.

A linear displacement transducer is an inductance, the value of which changes according to the corresponding spool valve displacement.

The role of the linear displacement transducers is :

- to anticipate a channel change-over during the detection of a variation between an elevon position and the position of the control component), above the 2° 75' tolerance.
  - to prevent a control channel change-over in the event of a position discrepancy due to excessive aerodynamic loads on an elevon.
  - for the inner elevons, only :
  - to deliver a signal in the event of a mechanical linkage failure between the two spool valves of each elevon PFCU. This signal causes the illumination of the INNER ELEV. caption light located above the ICOVOL.
- The signals delivered by each linear displacement transducer are applied to a card of the comparator where they are "summed" with the signals of the associated CT resolver (CT which is driven by the PFCU with which are associated the transducer and the CT resolver).

### 5. Comparators (Ref. Fig. 005 )

A monitoring comparator is assigned to each channel. The Blue comparator (2C 48) is located on shelf 8-216 and the Green comparator (1C 48) on shelf 8-215.

Each comparator controls channel change-over : the Blue comparator causes the change-over from Blue control channel to Green control channel when a fault is detected in the Blue channel. The Green comparator causes change-over from Green channel to mechanical mode when a fault is detected in the Green control

EFFECTIVITY: ALL

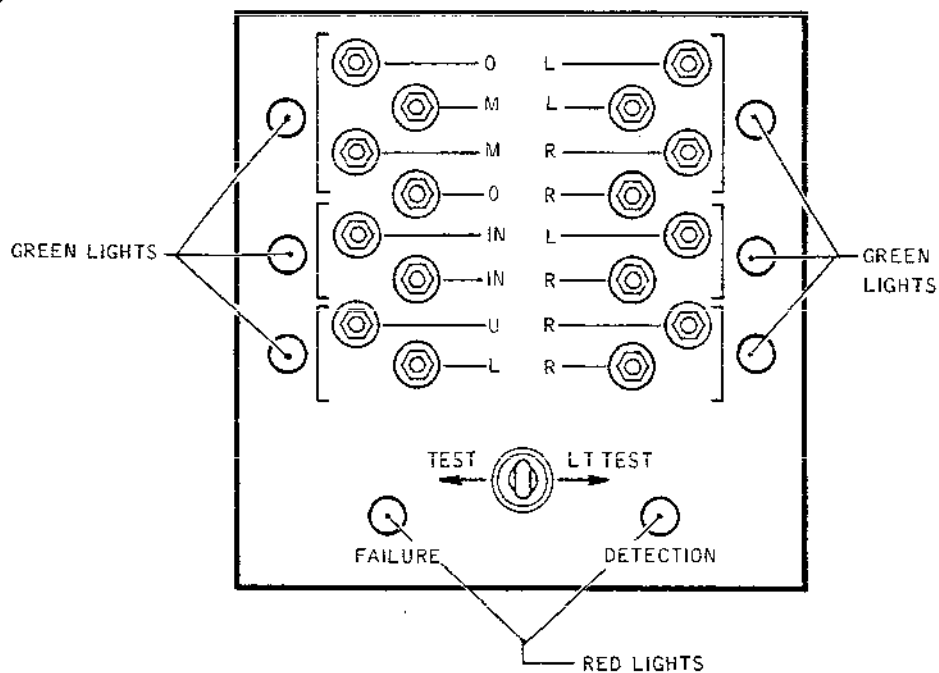
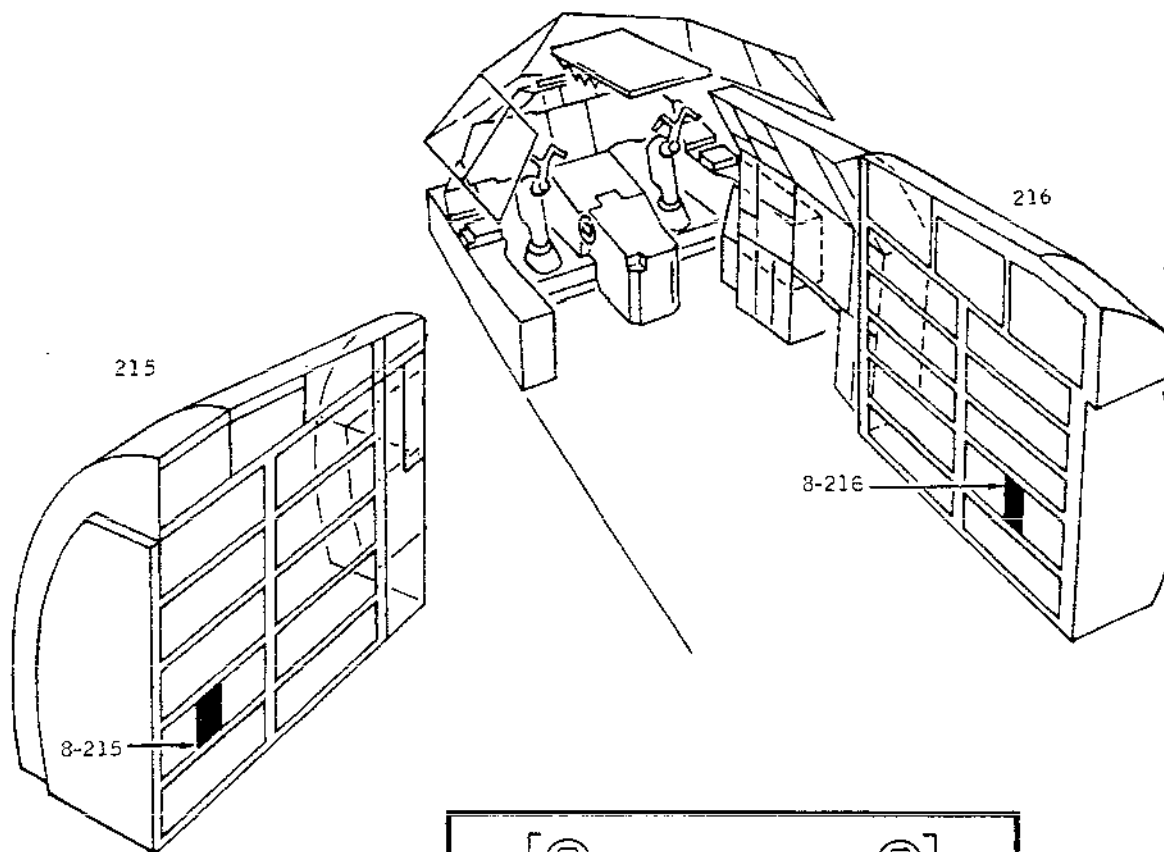
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Comparators - Location - Front View  
Figure 005

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channel.

Each comparator contains electronic cards :

- Two cards adapt the aircraft 28VDC voltage to the supply of the comparison cards, and process the comparison card output signals before sending them to the static monitoring change-over unit.
- Three cards modulate the autostabilization signals by a 1800 Hz signal. These signals are then applied to the comparison cards.
- Sixteen comparison cards (twelve for the elevons) ; as a safety measure two cards are assigned to each elevon (and to each rudder)

Each of these cards sums the signals, from the CT resolver and the linear transducer of the elevon or rudder PFCU to which it is associated, and the autostabilization signal modulated by 1800 Hz.

If the resulting signal is greater than that (generated by each card) which would correspond to a variation of  $2^{\circ}75$  (deviation tolerance) between order given by the control column and position of one, at least, of the two inner elevons, or of one, at least, of the four outer and middle elevons, a control channel change-over order is sent to the static monitoring change-over unit.

- Other cards are used :

- For processing the signal from the neutralization computer associated with the comparator (Ref. 27-36-00, Description and Operation)

This signal neutralizes the channel change-over signal (for outer and middle elevons) which would be generated by the comparator if a pitch (or roll) order was given ; when VMO is exceeded by 25 Knots or more, the deflection order is cancelled for outer elevons.

The comparator would thus "perceive" the cancellation of this order as a fault and would send a signal to the static monitoring change-over unit to change the channel for outer and middle elevons.

- For processing the signals from the Blue linear transducers of each inner elevon PFCU (only for Blue comparator). The signal resulting from this processing causes the illumination of the INNER ELEV warning light (above the ICOVOL indicator) indicating a de-synchronization of the inner elevon PFCU spool valves. Illumination of INNER ELEV warning light triggers the PFC warning light and causes the gong to sound.

- Inside the indicating unit, mounted on the front panel of the comparator, are arranged the following items :

- 6 Green indicator lights associated to 16 push-buttons.
- 1 three-position switch with a self-holding intermediate position and two manually-held TEST and LT TEST positions.
- One red FAILURE and one red DETECTION warning light.

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Four green indicator lights and twelve push-buttons are assigned to the elevons : two indicator lights and six push-buttons for each wing.

A visual check of the lights before and after manual action on the push-buttons enables to determine whether a control channel change-over is due to a defect in the comparator or to a malfunction of another monitoring channel component. When the selector switch is placed in LT TEST position, all the indicator lights must illuminate. When holding the selector switch on TEST and depressing successively each push-button one checks the correct operation of the two comparison cards associated to each elevon, identified by the illumination of the green indicator light corresponding to the associated control surfaces.

### 6. Change-Over Unit - Static Monitoring (Ref. Fig. 006 )

The purpose of this unit is to carry out the switchings necessary to close the electrovalves of one (or more) associated control surface assembly(ies), when it receives signals coming from :

- the Blue or Green comparators.
- the PFCU Blue or Green jamming microswitch.
- the low pressure switches in the Blue or Green hydraulic system.
- the protection units of the Blue or Green inverters.

(In the two last cases above, the channel change-over is effective on the 6 elevon PFCU's and the 2 rudder PFCU's).

This unit (C56) is located on shelf 8-216

- The unit consist of 14 electronic cards :

- Blue power supply card.
- Green power supply card.
- Middle and outer elevon logic card.
- Inner elevon Blue logic card.
- Rudder Blue logic card.
- Middle and outer elevon Green logic card.
- Inner elevon Green logic card.
- Rudder Green logic card.
- Jam detection card.
- Outer and middle elevon power card.
- Inner elevon power card.
- Rudder power card.
- ICOVOL card.
- Indicator light control card.

- The Blue and Green power supply cards receive respectively 28 VDC supplies from Blue and Green bars (4PS and 3PS) assigned only to the flight control circuits.

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- Two logic cards (one Blue and one Green) are assigned to each associated control surface assembly : outer and middle elevons, inner elevons, and rudders.

Each card receives the fault signals listed at the beginning of this paragraph. Each develops output signals which are then applied to the ICOVOL card, on the power card of the associated control surface assembly and to the stage of the indicator light control card.

- From the ICOVOL card is sent, to the ICOVOL, the channel change-over indicating signals (magnetic indicators and eventually illumination of the red warning lights).
- From one of the three power cards is sent the signal closing the Blue and Green electrovalves of the associated control surface assembly.

- On the front panel of the unit, inside the indicating unit, 12 indicator lights identify the opening signals of the PFCU electrovalves : 6 indicator lights for the Blue electrovalves and 6 indicator lights for the Green electrovalves, disposed as follows :

- 1 indicator light for the electrovalves of the LH and RH outer elevon PFCU's.
- 1 indicator light for the electrovalves of the LH and RH middle elevon PFCU's.
- 1 indicator light for the electrovalve of the RH inner elevon PFCU.
- 1 indicator light for the electrovalve of the LH inner elevon PFCU.
- 1 indicator light for the electrovalve of the lower rudder PFCU.
- 1 indicator light for the electrovalve of the upper rudder PFCU.

Near these indicator lights, a test push-button allows to check filament of these indicator lights.

### R 7. Indicator - Flight Control Surface Position (ICOVOL) (Ref. Fig. 007 )

The ICOVOL indicator, located on First Officer's instrument panel, is an indicating unit which, by its magnetic indicators and its indicator lights, keeps the crew informed at all times of the correct operation of the monitoring channels.

A discrepancy in an associated control surface assembly deflection, detected by the Blue (or Green) monitoring channel, causes the magnetic indicators, corresponding to these control surfaces, to change and the red indicator lights to illuminate. However, an operation fault of a Blue or Green 26 V, 1800 Hz generation network, or a pressure drop in Blue or Green

R EFFECTIVITY: ALL

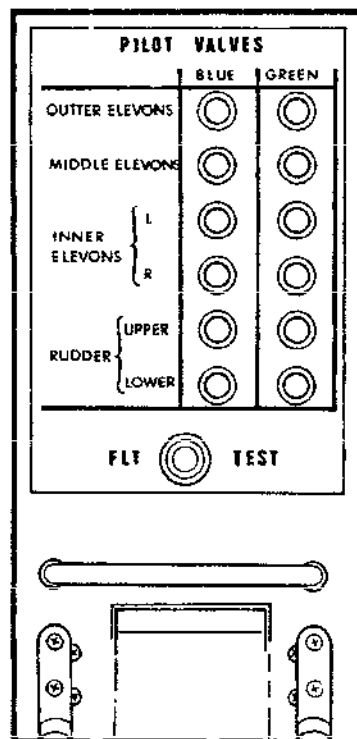
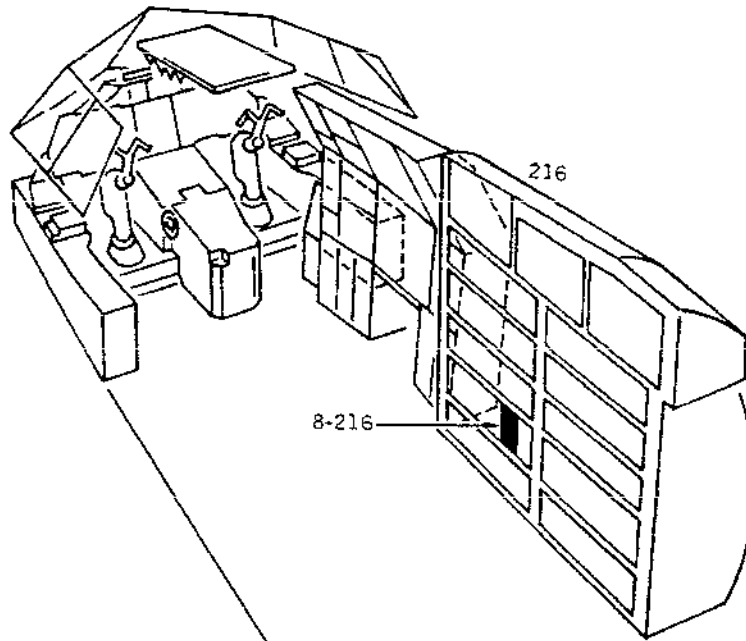
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Static Monitoring Change-Over Unit  
Figure 006

R EFFECTIVITY: ALL

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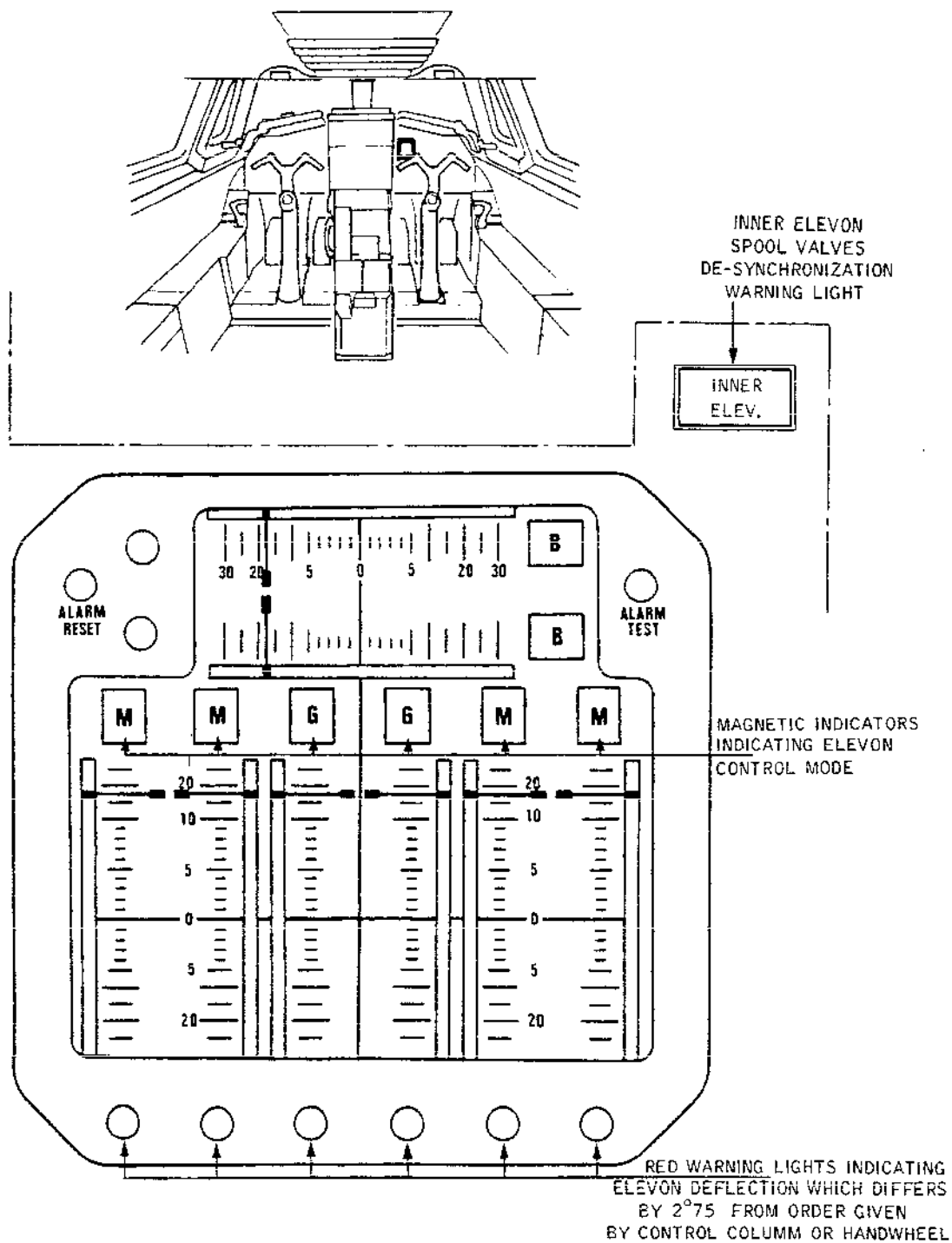
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ICOVOL View - Inner Elevon Desynchronization  
Indicator Light  
Figure 007

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hydraulic system cause the 8 magnetic indicators to change, but the red warning lights do not illuminate.

- If vibrations exceeding 8 Hz are detected at one of the elevons of an associated control surface assembly, the red warning lights of the ICOVOL (corresponding to this control surface assembly) flash at a frequency of approx. 2 Hz.
- Above the ICOVOL, the INNER ELEV. caption light informs the crew of de-synchronisation of the inner elevon PFCU spool valves.

### 8. Electrical Supply

The resolvers in each Blue or Green monitoring channel are powered by means of 26 VAC, 1800 Hz busbars.

The Blue and Green comparators and the static monitoring change-over unit are powered by means of two 28 VDC busbars.

The resolvers in the ICOVOL synchro-detection channel are powered by means of a 26 VAC, 400 Hz busbar.

The ICOVOL indicator also receives a 28 VDC supply.

The following table gives the various locations of the busbars in circuit breaker panels.

SERVICE	BUSBAR	C/B PANEL
ICOVOL indicator	"A" ESSENTIAL 28 VDC, 3P	1-213
Green comparator and static monitoring change-over unit	"A" ESSENTIAL 28 VDC, 3PS	1-213
Resolvers in Green monitoring channel	"A" FLYING CONTROL 26 VAC 1800 Hz, 22X	2-213
Resolvers in Blue monitoring channel	"B" FLYING CONTROL 26 VAC 1800 Hz, 23X	2-213
Resolvers in ICOVOL channel	"A" ESSENTIAL 26 VAC 400 Hz, 14X	2-213
Blue comparator and static monitoring change-over unit	"B" ESSENTIAL 28 VDC, 4PS	5-213

EFFECTIVITY: ALL

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### MONITORING CHANNELS - TROUBLE SHOOTING

#### 1. General

This trouble shooting is common to both Roll and Pitch axes; it shall be carried out by referring to 27-17-00, Trouble shooting.

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### R MONITORING CHANNELS - ADJUSTMENT/TEST

#### R 1. General

R Adjustment/Test procedures of Monitoring Channels are descri-  
R bed in 27-17-00, Adjustment/Test.

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## MAINTENANCE MANUAL

### FLIGHT CONTROL SURFACE MONITORING COMPARATOR REMOVAL/INSTALLATION

#### 1. General

The flight Control Surface Monitoring Comparators (electrical identifier : 1C48 and 2C48) are respectively located on shelves 8-215 and 8-216 in LH and RH electronics racks.

Locating pins are provided on connectors to prevent computer replacement with a computer of a different type.

Removal/Installation procedure being identical for both comparators, only one procedure is described :  
Only circuit breakers associated with the comparator to be removed, must be tripped.

#### 2. Flight Control Surface Monitoring Comparator

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Access Platform 4.47 m (14 ft. 8 in.)	

##### B. Prepare

- (1) Observe the electrical safety precautions described in 24-00-00, Servicing.
- (2) Trip, safety and tag the following circuit breakers :
  - (a) For removing Blue comparator (2C48)

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PFCS INV BLUE SUP	5-213	2C 66	B14
PFCS INV BLUE FAIL IND		2C 73	E11

- (b) For removing Green comparator (1C48)

EFFECTIVITY: ALL

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SERVICE					PANEL	CIRCUIT BREAKER		MAP REF.
R	PFCS INV GRN FAIL IND					1-213	1C 73	M15
R	PFCS INV GRN SUP						1C 66	P11
R	(3) Remove							
R	(a) Access panel 216AS to gain access to Blue compa-							
R	rator (2C48) on shelf 8-216.							
R	(b) Access panel 215AS to gain access to Green compa-							
R	rator (1C48) on shelf 8-215.							
R	C. Remove							
R	(1) On unit 2C48 (or 1C48) unscrew the two retaining nuts							
R	and disengage latches downwards.							
R	(2) Withdraw and remove unit (pulling it by its handle).							
R	D. Preparation of Replacement Component.							
R	(1) Make certain that unit seating is clean and that rack							
R	connectors are in correct condition (no corrosion).							
R	(2) Visually check comparator for correct external condi-							
R	tion (no dents) and check that rear connectors are un-							
R	damaged and free from traces of corrosion.							
R	E. Install							
	(1) Engage unit on its guiding rails, then push it fully							
	home (proceed with care in order not to damage elec-							
	trical connector pins).							
R	(2) Engage latches in lugs, and tighten retaining nuts.							
R	(3) Remove safety clips and tags and set circuit breakers							
R	F. Test							
R	(1) Carry out operational test described in 27-17-00,							
R	Adjustment/Test, paragraph 2.							
R	G. Close-Up							
	(1) Install and lock panel 216AS (or 215AS).							

R EFFECTIVITY: ALL

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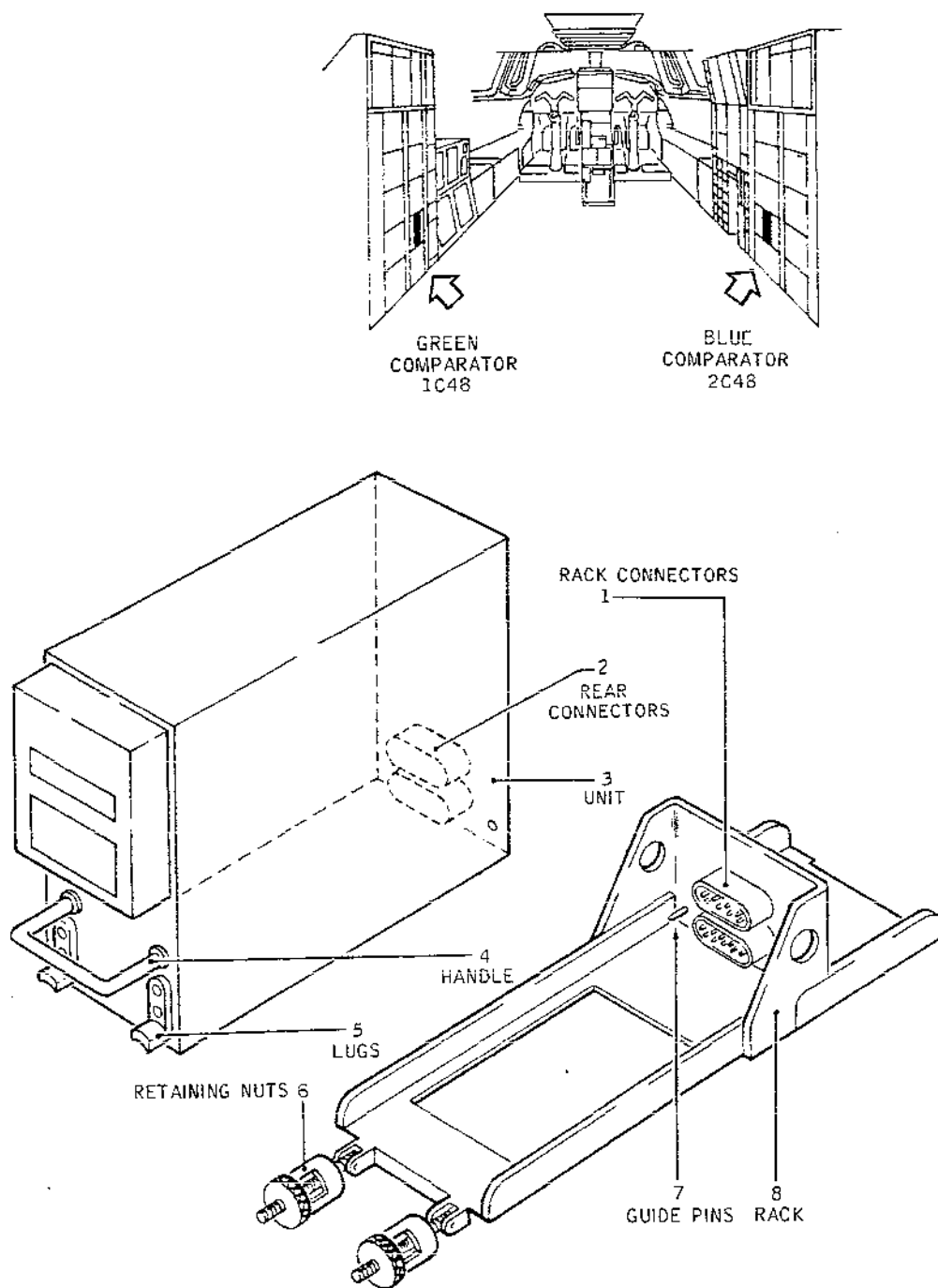
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Comparators - Location and Removal  
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R (2) Remove access platform.

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### STATIC MONITORING CHANGE-OVER UNIT - REMOVAL/INSTALLATION

#### 1. General

R The Static Monitoring Change-Over Unit (electrical identifier  
R C56) is located on shelf 8-216 of electronics rack.  
R Locating pins are provided on connectors to prevent computer  
R replacement with a computer of a different type.

#### 2. Static Monitoring Change-Over Unit

##### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Circuit breaker Safety Clips

R Access Platform 4.47 m (14 ft. 8 in.)

##### B. Prepare

R (1) Observe the electrical safety precautions described  
R in 24-00-00, Servicing.

R (2) Trip, safety and tag the following circuit breakers

---

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
---------	-------	--------------------	-------------

---

R PFCS INV GRN FAIL 1-213 1C 73 M15  
IND

R PFCS INV GRN SUP 1C 66 P11  
R FLT CONT POSN IND CONT C 83 R11

R PFCS INV BLUE SUP 5-213 2C 66 B14  
R PFCS INV BLUE FAIL IND 2C 73 E11

R (3) Remove access panel 216AS.

##### C. Remove

R (1) On unit C56, unscrew retaining nuts (6) and disengage  
R latches downwards.

(2) Remove unit, pulling it by its handle.

EFFECTIVITY: ALL

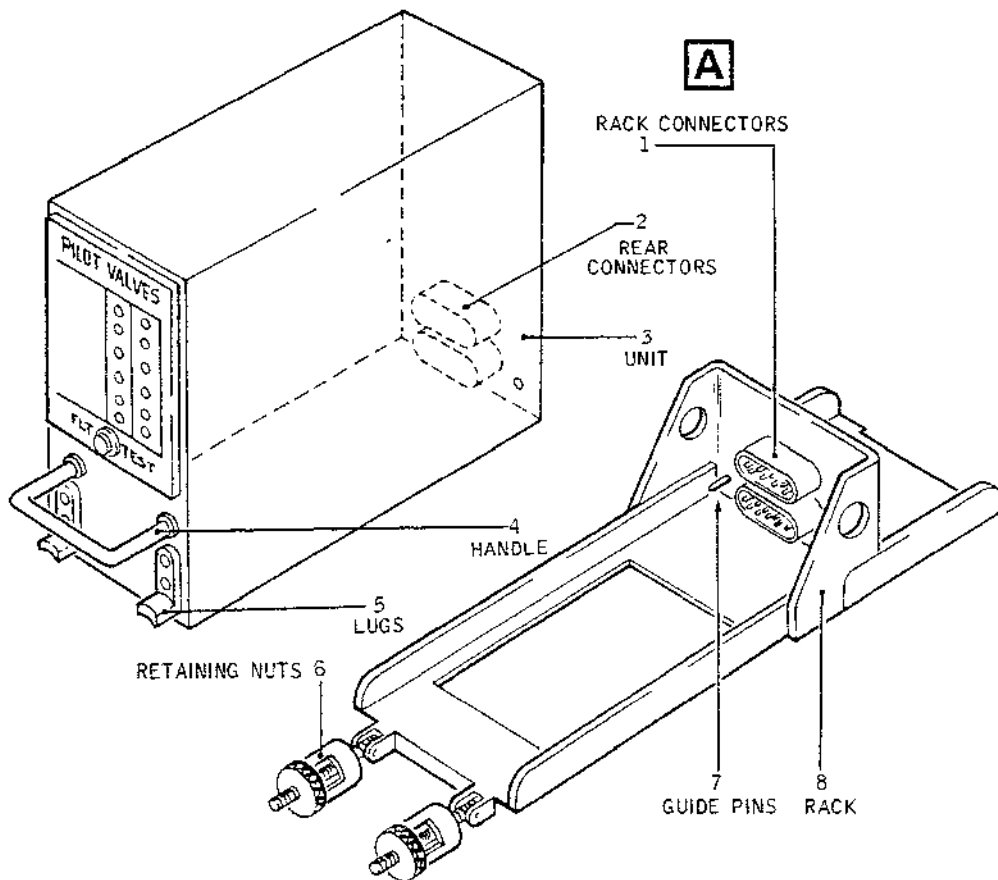
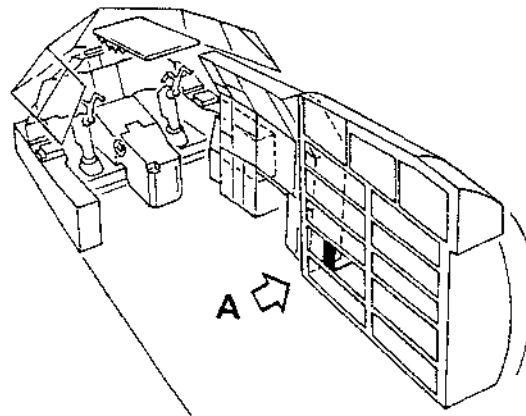
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Static Monitoring Change-Over Unit - Location  
and Removal  
Figure 401

EFFECTIVITY: ALL

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### R D. Preparation of Replacement Component

R (1) Make certain that unit seating is clean and that rack  
R connectors are in correct condition (no corrosion).

R (2) Visually check unit for correct external condition  
R (no dents) and check that rear connectors are unda-  
R maged and have no traces of corrosion.

### R E. Install

(1) Engage unit on guiding rails and push it fully home.  
(Proceed with care in order not to damage electrical  
connector pins).

R (2) Engage latches in lugs and tighten retaining nuts.

R (3) Remove safety clips and tags and set circuit brea-  
kers.

### R F. Test

(1) Carry out test described in 27-37-12 - Adjustment/  
Test.

### R G. Close-Up

R (1) Close access panel 216AS.

R (2) Remove access platform.

EFFECTIVITY: ALL

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### STATIC MONITORING CHANGE-OVER UNIT - ADJUSTMENT/TEST

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

#### 1. General

This test must not be carried out when Flight Controls Electrical Circuits Test Set (Part Number 31-56-100) is available : use of this test set is dealt with in topic 27-17-00, Adjustment/Test, paragraph 3.

In the event this test set is not available, the following test enables the various functions ensured by the static monitoring change-over unit to be checked.

After this test, it is necessary to carry out procedure with the test set as soon as it is available, and at the latest, during the first scheduled inspection after replacement of the static monitoring change-over unit.

#### 2. Test

##### A. Equipment and materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	

##### B. Prepare

EFFECTIVITY: ALL

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- (1) Carry out Prepare paragraph of Procedure to set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).

NOTE : During the following test, do not take aural or visual warnings which are not mentioned into account.

### C. Test

- (1) Pressurize Blue and Green hydraulic systems (Ref. 29-12-00, Servicing, 29-11-00, Servicing).

- Elevons must deflect up to neutral position.

- (2) On overhead panel :

- (a) On Flight Control Unit, place BLUE INVERTER and GREEN INVERTER switches in ON position, and place O & M ELEVONS, IN. ELEVONS and RUDDER switches in BLUE position. Then press each RESET push-button (RH side of switches)
  - For each action on RESET push buttons, the ICOVOL (Flight Control Surface Position Indicator) magnetic indicators, corresponding to the elevons or rudders to which are associated the RESET push buttons, must display B.
- (b) On Flight Control Unit, place BLUE INVERTER switch in OFF INV position.
  - On ICOVOL indicator, the 8 magnetic indicators must display G.
- (c) On Flight Control Unit, place GREEN INVERTER switch in OFF INV position, then in ON position.
  - On ICOVOL indicator, the 8 magnetic indicators must display M.
- (d) On Flight Control Unit, press and release each RESET push button mentioned above in (a).
  - When pressing each RESET push button, check, on ICOVOL indicator, that magnetic indicators of corresponding associated control surface assembly, display G.
- (e) On SERVO CONTROLS unit, place lower selector switch in GREEN L-PRESS position :
  - On ICOVOL indicator, the 8 magnetic indicators must display M.
- (f) On Flight Control Unit, place BLUE INVERTER switch in ON position, then press each push

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button mentioned above in (a)

- On ICOVOL indicator, the 8 magnetic indicators must display B.

(g) On SERVO CONTROLS unit, place lower selector switch in BLUE L-PRESS position :

- On ICOVOL indicator, the 8 magnetic indicators must display G.

(h) On SERVO CONTROLS unit, place lower selector switch in NORMAL position.

(i) On Flight Control Unit, press each RESET push button mentioned above in (a)

- On ICOVOL indicator, the 8 magnetic indicators must display B.

(3) Carry out test described in 27-17-00 Adjustment/Test Paragraph 2 : Operational Test.

### D. Close-Up

(1) Carry out Close-Up operations of Procedure to set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).

EFFECTIVITY: ALL

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### STALL WARNING - DESCRIPTION AND OPERATION

#### 1. General

The stall warning system generates :

- vibrations in Captain's and First Officer's control columns caused by the stick shaker.
- an aural warning (stall warning horn).

The signal causing activation of the system is recorded in the Aircraft Integrated Data System (AIDS). The stall warning system operates when one of the four following conditions occurs.

- A. The aircraft speed CAS at least equal to 95 Kts, its angle-of-attack reaches a value greater than or equal to  $16^{\circ}.5$  for at least 500 milliseconds.
- B. Function of altitude, CAS decreases until it reaches a value 20 Kts less than the VLA (Velocity Lowest Authorized) i.e. : CAS equal to or less than VLA-20 Kts.
- C. The aircraft centre of gravity has shifted out of aft CG limit by more than 0.35%.
- D. Wobbler is activated.

#### 2. Description (Ref. Fig. 001 )

The vibrations in the Captain's and First Officer's control column are generated by a motor which is mounted on the Captain's control columns, on the barrel of which is fixed an eccentric bob-weight driven by means of a gear train. When the motor is in operation, the resulting unbalanced rotation causes the Captain's control column to vibrate. The rigid linkage between the Captain's and First Officer's control columns transmits the vibrations from one to the other. The frequency of vibrations in control column is 20 Hertz approx. An aural warning is also generated when the stick shaker operates. A metallic sounding warning device, consisting of a coil-driven metal disc, is attached to control column above the stick shaker : it is controlled by a modulator which contains an electronic circuit ensuring conversion of a DC voltage into amplitude modulated signals at a frequency of 120 Hertz approx.

EFFECTIVITY: ALL

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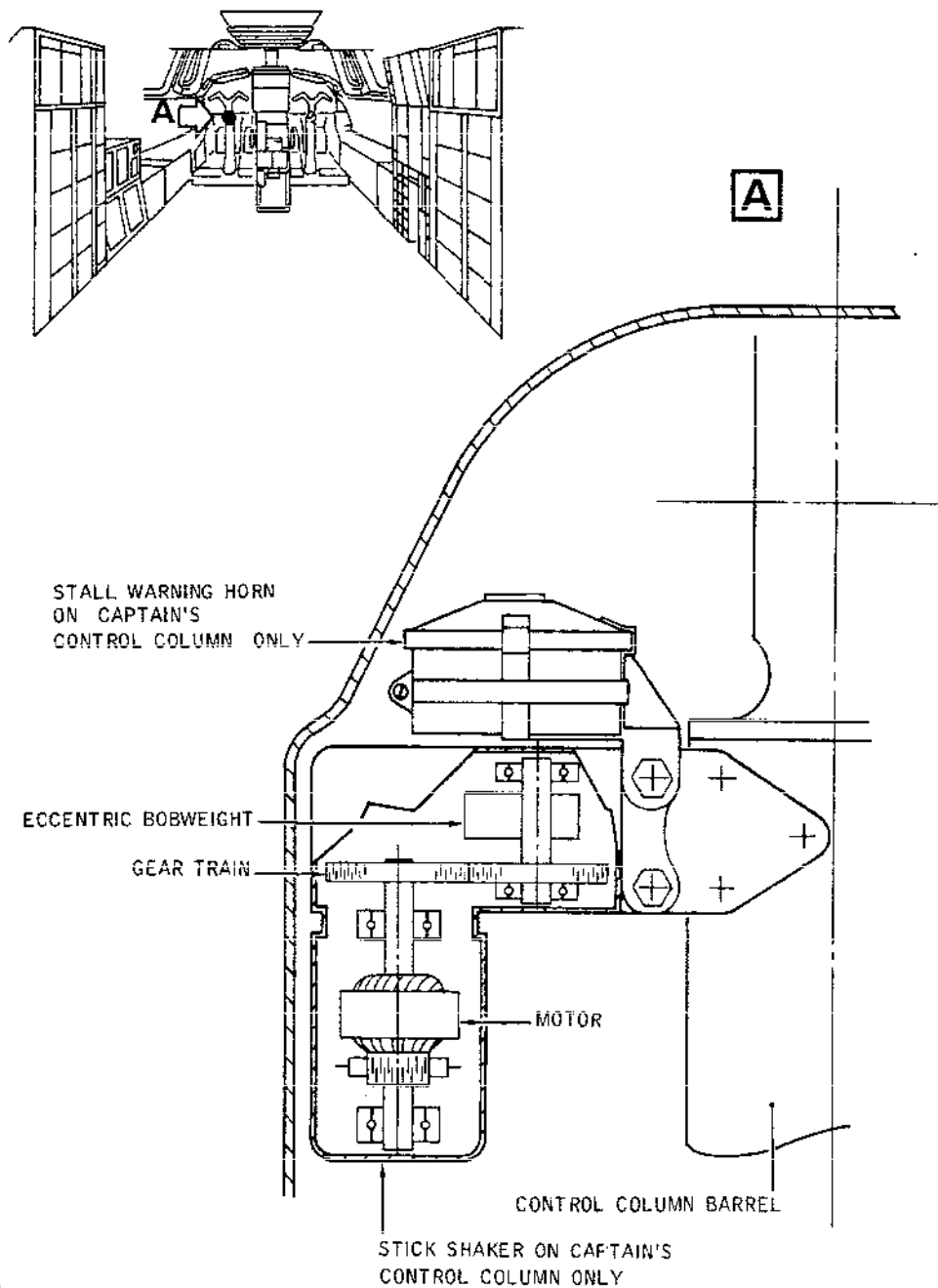
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CMA 27 38 00 0 AAMO

- Stick Shaker and Aural Warning - Location  
Figure 001

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### 3. Operation (Ref. Fig. 002 )

The operation of the stick shaker motor and the aural stall warning modulator is activated when one, or both, of the relays W522 or W512 close(s).

These two relays are permanently supplied with +28 VDC by busbar 3P through circuit breaker W513.

They are energized when one of the following conditions occurs.

- A. Each ADC receives local angle-of-attack information from sensors and computes true angle-of-attack. When the latter reaches  $16^{\circ}.5$  the ADC sends a ground level to relay (W512 for ADC1 or W522 for ADC2) through a 500 millisecond delay timer (1W641 and 2W641).
- B. From data supplied by a potentiometer servoed to the altitude channel, the ADC develops a signal proportional to VLA (Velocity Lowest Authorized).  
An amplifier enables a signal proportional to aircraft speed (CAS) to be subtracted from the VLA signal. When VLA - CAS difference is equal to or greater than 20 Kts (i.e CAS equal to or less than VLA-20 Kts) a comparator establishes a ground.

This ground is sent to relay (W512 for ADC1 and W522 for ADC2) through a diode.

- C. From Mach data supplied by the ADC, the CG pack develops a signal proportional to the aft CG limit. When the computed CG has shifted out of aft CG limit by more than 0.35%, a comparator establishes a ground which is sent to relay (W512 for CG PACK Q1345 and W522 for CG PACK Q1344) through a diode.

NOTE : The CG PACK which receives Mach and (CAS-VM0) information from ADC establishes this ground only if CAS is smaller than VM0 less 7.5 Kts and Mach is between 0.45 and 1.6.

However this ground remains present if the latter condition disappears.

- D. The Safety Flight Control computer generates a signal, function of angle-of-attack and aircraft pitch rate conditions, which activates the wobbler.  
This activation signal sends a ground to relays W512 for SFC1 and W522 for SFC2 through a diode.

At the same time as the stick shaker and aural warning activation signal is sent, the relays W512 and W522 inhibit :

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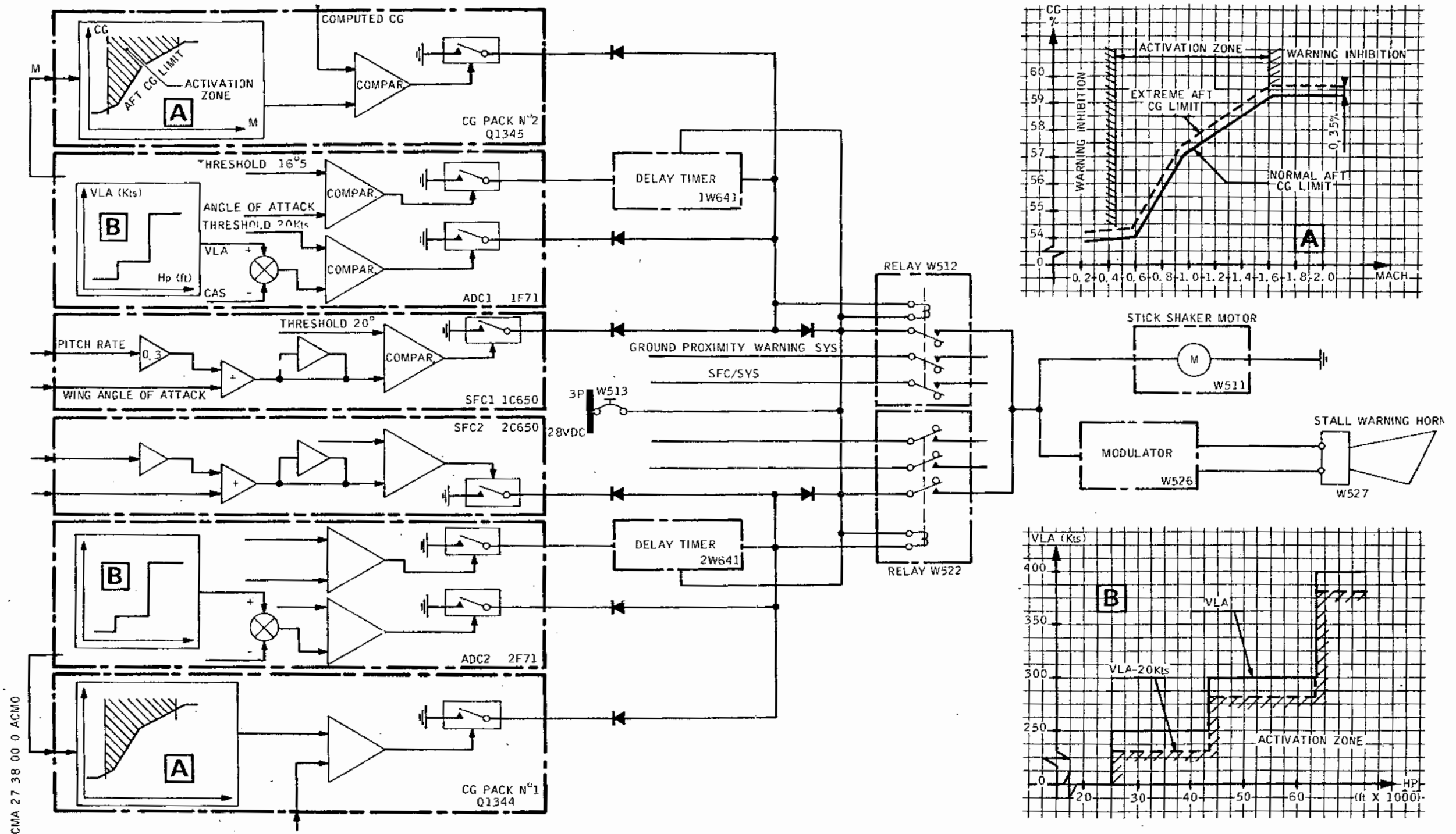
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Stall Warning Indicating - Schematic  
Figure 002

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- R - PULL UP warning activation signal delivered by the Ground Proximity Warning System (GPWS)
- R - OVERSPEED warning activation signal delivered by the Safety Flight Control System.

### 4. Electrical Power Supplies

SERVICE	BUSBAR	C/B PANEL
Stall Warning Indicating	"A" essential 28 Vdc 3P	1-213

The stall warning indicating system is active when the aircraft electrical network is energized.

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## MAINTENANCE MANUAL

### STALL WARNING - TROUBLE SHOOTING

R WARNING : OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN  
24-00-00, SERVICING.

#### 1. General

The following information is intended to enable faults found in flight or on the ground to be quickly rectified. This information is given in the form of fault analysis synoptic charts.

R The defect can be isolated with the aid of the trouble shooting  
R procedures and traced through OK and NOT OK paths to the appro-  
R priate charts or other specified rectification action as may be  
R necessary. If a defect occurs perform the appropriate rectifica-  
R tion action, then repeat the operation at which the defect was  
R encountered to ensure the operation is OK.

R Bracketed numbers in the procedures and charts indicate items on  
R the component identification table (at the end of topic).

R The table provides information component location.

R The electrical wiring is assumed to be serviceable. However,  
R if the component fault is not found, check the wiring in accor-  
R dance with the Wiring Diagram Manual (27-38-01).

The system consists of two channels. Trouble Shooting procedure described is for channel 1, Trouble Shooting procedure for channel 2 is indicated between brackets.

#### 2. Prepare

R A. Refer to paragraphs on Equipment and Materials and Prepare  
R described in 27-38-00, Adjustment/Test (paras. 2, 3, 4 or 5)  
R for appropriate tests.

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### R 3. Trouble Shooting

\*\*\*\*\*  
R \* Activate stick shaker and aural stall warning by \*  
\* selection of one of modes in channel 1 (channel 2)\*  
\* (high angle of attack mode for example, \*  
R \* Ref. 27-38-00, Adjustment/Test, para.2) \*  
R \* -Circuit breaker STICK SHAKER SUP (W513) does \*  
R \* not trip (on circuit breaker panel 1-213, \*  
R \* position P15) \*  
R \* -Stick shaker and aural stall warning operate. IF\*  
\*\*\*\*\*

R	OK	NOT OK--	Circuit breaker STICK SHAKER SUP W513 trips When stick shaker is activated by selection of one of the channel 1 (channel 2) modes Ref. Chart 101
		NOT OK--	Stick shaker operates and aural stall warning is inoperative Ref. Chart 102
		NOT OK--	Stick shaker is inoperative and aural stall warning operates Change stick shaker W511 [02]

\*\*\*\*\*  
R \* Carry out tests described in 27-38-00 Adjustment/ \*  
R \* Test para. 2 \*  
\* Stick shaker and aural stall warning are operative\*  
\* in the high angle of attack mode with ADC1 (ADC2) \*  
\* IF\*  
\*\*\*\*\*

OK	NOT OK--	Stick shaker and aural stall warning are inoperative in the high angle of attack mode with ADC1 (ADC2) Ref. Chart 103

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||  
OK  
||

\*\*\*\*\*  
R \* Carry out tests described in 27-38-00 Adjustment/ \*  
R \* Test paragraph 3 \*  
\* Stick shaker and aural stall warning are operative\*  
\* in VLA mode with ADC1 (ADC2) computer IF\*  
\*\*\*\*\*

 OK 	 NOT OK-- 	Stick shaker and aural stall warning are inoperative in VLA mode with ADC1 (ADC2) Ref. Chart 104
------------	------------------	--

\*\*\*\*\*  
R \* Carry out tests described in 27-38-00 Adjustment/ \*  
R \* Test paragraph 3 \*  
\* Stick shaker and aural stall warning are operative\*  
R \* in CG positioning mode with standby pack CG2 (CG1)\*  
\* IF\*  
\*\*\*\*\*

R	 OK 	 NOT OK-- 	Stick shaker and aural stall warning are inoperative in CG positioning mode with standby pack CG2 (CG1) Ref. Chart 105
---	------------	------------------	---

\*\*\*\*\*  
R \* Carry out tests described in 27-38-00 Adjustment/ \*  
R \* Test paragraph 5 \*  
\* Stick shaker and aural stall warning are operative\*  
\* in wobbler mode with SFC1 (SFC2) computer IF\*  
\*\*\*\*\*

 OK 	 NOT OK-- 	Stick shaker and aural stall warning are inoperative in wobbler mode with SFC1 (SFC2) Ref. Chart 106
------------	------------------	--

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*

R \* As none of the conditions for stick shaker and \*  
R \* aural stall warning operation have been fulfilled \*  
R \* (Refer to tests described in 27-38-00 \*  
R \* Adjustment/Test) stick shaker and aural stall \*  
R \* warning are inoperative IF\*

\*\*\*\*\*

R			-----
R			Untimely operation of stick shaker and aural
R	OK	NOT OK--	stall warning
R			Ref. Chart 107
R			-----

\*\*\*\*\*

R \* End of stall warning system trouble shooting \*  
R \*\*\*\*\*

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## MAINTENANCE MANUAL

```
*****-----
R * CIRCUIT BREAKER STICK SHAKER SUP * | GROUND EQUIPMENT REQUIRED |
R * (W513) TRIPS DURING OPERATION OF * |-----|
R * STICK SHAKER IN ONE OF CHANNEL 1 * | DESCRIPTION          PART NO. |
R * (CHANNEL 2) MODES * |-----|
R ***** | MULTIMETER |
*****-----
```

```
*****
R * On circuit breaker panel 1-213, position P15. *
R * trip circuit breaker STICK SHAKER SUP (W513) *
R * Operate stick shaker and aural stall warning *
R * by one of the modes of channels 2 (Channel 1) *
R * (High angle of attack mode, for *
R * example, Ref. 27-38-00 Adjustment/Test, para. 2) *
R * Circuit breaker STICK SHAKER SUP W513 remains *
R * set *
*****
```

```
*****
R      ||      |-----| Investigate cause of current overload on
R      ||      | parts common to channel 1 and channel 2 :
R      YES NO-----| stick shaker (W511) [02] ; motor short
R      ||      | circuit ; line insulation ; circuit breaker
R      ||      | STICK SHAKER SUP W513 [01]
R      ||      |-----|
*****
```

```
*****
R * On shelf 6-215, remove diode assembly W515 [09] *
R * and check correct condition of diodes W528 *
R * [15] (W529 [16]) by means of multimeter connected *
R * between terminals J (+) and K (-), (L (+) and M *
R * M (-)). Diode W528 (W529) is in correct condition *
*****
```

```
*****
R      ||      |-----|
R      YES NO-----| Replace diode W528 [15] (W529 [16])
R      ||      |-----|
*****
```

```
*****
R * On shelf 6-215, remove relay W512 [05] (W522 [06]) *
R * and check condition of coil (no short circuit *
R * between terminals X1 and X2) *
R * Relay W512 (W522) is in correct condition *
*****
```

```
*****
R      ||      |-----|
R      YES NO-----| Replace relay W512 [05] (W522 [06])
R      ||      |-----|
R      ||      |-----|
R      ||      |-----|
R      ||      |-----| Replace delay timer 1W641 [07] (2W641 [08])
R      ||      |-----|
*****
```

R Chart 101 (Sheet 1 of 1)

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*****		-----	
* THE STICK SHAKER IS OPERATIVE AND *	*	GROUND EQUIPMENT REQUIRED	
* AURAL STALL WARNING IS INOPERATIVE *	*	-----	
*****		DESCRIPTION	PART NO.
		-----	-----
		ACCESS PLATFORM	
		3.972 M (13 FT.)	
		-----	-----

*****			
R	* On panel 8-211, on Captain's stick shaker, replace*		
R	* aural stall warning W527 [03]		*
R	* Resume tests which have led to the failure. Aural *		*
R	* stall warning is operative		*
R	*****		
R			-----
R			
R	YES	NO-----	Replace modulator W526 [04]
R			-----
R			
R		-----	The replaced aural stall warning was
R			defective
R			-----

Chart 102 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

```
*****
* STICK SHAKER AND AURAL STALL * | GROUND EQUIPMENT REQUIRED |
* WARNING ARE INOPERATIVE IN HIGH * |-----|
* ANGLE OF ATTACK MODE WITH ADC 1 * | DESCRIPTION          PART NO. |
* (ADC 2) * |-----|
***** |-----|
```

```
*****
R * Carry out a wobbler mode test with SFC 1 (SFC2) *
R * (Ref. 27-38-00 Adjustment/Test Paragraph 5 *
* Stick shaker and aural stall warning are *
* activated *
*****
```

```
*****
R      | | |-----|
      YES NO-----| Replace relay W512 [05] (W522 [06]) |
      | | |-----|
```

```
*****
R * Replace ADC 1 computer 1F71 [19] (ADC2 2F71 [20]) *
R * Carry out tests described in 27-38-00 Adjustment/ *
R * Test paragraph 2 *
* Stick shaker and aural stall warning are activated*
* in high angle of attack mode with *
* ADC 1 (ADC 2) *
*****
```

```
*****
R      | | |-----|
      YES NO-----| Replace delay timer 1W641 [07] (2W641 [08]) |
      | | |-----|
R      | | |-----|
R      | | |-----|
R      | |-----| The replaced ADC computer was defective |
      | |-----|
```

Chart 103 (Sheet 1 of 1)

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# MAINTENANCE MANUAL

```
*****
* Carry wobbler mode test with SFC1 (SFC2) *
* Ref. 27-38-00, Adjustment/Test paragraph 5 *
* Stick shaker and aural stall warning are activated*
*****
```

```
*****
* Replace computer ADC1, 1F71 [19], (ADC2 2F71 [20])*
* Carry out tests described in 27-38-00,
* Adjustment/Test, paragraph 3
* Stick shaker and aural stall warning are
* activated in VLA mode with ADC1 (ADC2)
*****
```

```
R      |||-----|-----|
R      |||       | Remove diode assembly W515 [09], (W525 [10])
R      YES NO-----| and replace on it diode W520 [13] (W524 [18])
R      |||-----|-----|
R      |||       |
R      |||-----|-----|
R      |||       | The replaced computer ADC1 (ADC2) was
R      |||-----| defective
R      |||-----|
```

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*****		
	* STICK SHAKER AND AURAL STALL	*   GROUND EQUIPMENT REQUIRED
	* WARNING ARE INOPERATIVE IN CG	*
	* POSITIONING MODE WITH STANDBY PACK	*   DESCRIPTION PART NO.
R	* CG2 (CG1)	*
*****		
*****		
	* Carry out light angle of attack mode test with	*
R	* ADC1 (ADC2) Ref. 27-38-00 Adjustment/Test	*
R	* paragraph 2	*
	* Stick shaker and aural stall warning are activated*	
*****		
		-----
R	YES NO-----	Replace relay W512 [05] (W522 [06])
		-----
*****		
R	* Replace standby pack CG2 Q1345 [21] (CG1 Q1344	*
R	* [22])	*
R	* Carry out tests described in 27-38-00, Adjustment/*	
R	* Test, paragraph 4	*
	* Stick shaker and aural stall warning are activated*	
R	* in CG positioning mode with standby pack CG2 (CG1)*	
*****		
		-----
R	YES NO-----	Remove diode assembly W515 [09] and replace
R		on it diode W 516 [11] (W521 [14])
R		-----
R		-----
R		The replaced standby pack CG2 (CG1) was
R	-----	defective
R		-----

Chart 105 (Sheet 1 of 1)

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```
*****
* Carry out high angle-of-attack mode test with ADC1*
* (ADC2) (Ref. 27-38-00 Adjustment/Test paragraph 2)*
* Stick shaker and aural stall warning are activated*
*****
```

```
*****
R * Replace SFC computer No.1 1C650 [23] (No.2 2C650 *
R * [24]). Carry out tests described in 27-38-00, *
R * Adjustment/Test, paragraph 5 *
* Stick shaker and aural stall warning are activated*
* in wobbler mode with computer SFC1 (SFC2) *
*****
```

```
R      | |   | -----|-----|
R      YES    NO-----| Remove diode assembly W515 [09] (W525 [10]) and
R      | |       | replace on it diode W517 [12], (W523 [17])
R      | |       |-----|
R      | |       |-----|
R      | |       |-----|
R      | |-----| The replaced SFC1 (SFC2) computer was defective|
R      | |       |-----|
```

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\*\*\*\*\*  
\* UNTIMELY OPERATION OF STICK SHAKER \*  
\* AND AURAL STALL WARNING \*  
\*\*\*\*\*

GROUND EQUIPMENT REQUIRED

DESCRIPTION

PART NO.

-

-

\*\*\*\*\*  
R \* On shelf 6-215 remove relay W522 [06] \*  
R \* Install ADC 1 computer 1F71 [19] then remove \*  
R \* safety clip and set circuit breaker STICK SHAKER \*  
R \* SUP W513 \*  
\* Untimely operation continues \*

\*\*\*\*\*

			Continue trouble shooting according to
YES	NO-----		procedure for channel 2 (in brackets)

\*\*\*\*\*

R \* On shelf 6-215 (6-216) remove ADC1 computer 1F71 \*  
R \* [19] (ADC2 2F71 [20]) and install relay W522 [06] \*  
R \* Remove circuit breaker safety clips and set \*  
R \* circuit breaker STICK SHAKER SUP W513 \*  
R \* Untimely operation continues \*

\*\*\*\*\*

R			Replace computer ADC1 1F71 [19]
R	YES	NO-----	(ADC2 2F71 [20])

R \*\*\*\*\*  
R \* On shelf 6-215 (6-215 and 6-216), remove diode \*  
R \* assembly W515 [09] (W515 [09] and W525 [10]) \*  
\* Untimely operation stops \*

\*\*\*\*\*

R	YES	NO-----	Replace relay W512 [05] (W522 [06])
---	-----	---------	-------------------------------------

Chart 107 (Sheet 1 of 2)

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## MAINTENANCE MANUAL

||  
\*\*\*\*\*  
R \* Install diode assembly W515 [09] (W515 [09]) and \*  
R \* W525 [10] and on shelf 6-215 (6-216) remove \*  
R \* SFC computer No.1 1C650 [23] (No.2 2C650 [24]) \*  
\* Untimely operation continues \*  
\*\*\*\*\*

R	YES	NO-----	Replace computer SFX No.1 1C650 [23] (No.2
R			2C650 [24])
R			Replace computer MCG No.2 Q1345 [21] (No.1
R			Q1344 [22])

Chart 107 (Sheet 2 of 2)

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# MAINTENANCE MANUAL

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[1] Circuit breaker 28 VDC		1-213	W513	Map. Ref P 15	24-50-00 R/I	27-38-01
[2] Stick shaker	211ES	8-211	W511	Captain's control column	27-38-11 R/I	27-38-01
[3] Aural stall warning	211ES	8-211	W527	Captain's control column	27-38-00 R/I	27-38-01
[4] Modulator	121CL	121	W526	Under cabin floor	27-38-00 R/I	27-38-01
[5] Relay	215BS	6-215	W512	Electronics rack LH	27-38-00 R/I	27-38-01
[6] Relay	215BS	6-215	W522	Electronics rack LH	27-38-00 R/I	27-38-01
[7] Delay timer	215BS	6-215	1W641	Electronics rack LH	27-38-00 R/I	27-38-01
[8] Delay timer	216BS	6-216	2W641	Electronics rack RH	27-38-00 R/I	27-38-01
[9] Diode assembly	215BS	6-215	W515	Electronics rack LH	27-38-00 R/I	27-38-01
[10] Diode assembly	216BS	6-216	W525	Electronics rack RH	27-38-00 R/I	27-38-01
[11] Diode	215BS	6-215	W516	Diode assembly W515	27-38-00 R/I	27-38-01

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## MAINTENANCE MANUAL

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[12] Diode	215BS	6-215	W517	Diode assembly W515	27-38-00 R/I	27-38-01
[13] Diode	215BS	6-215	W520	Diode assembly W515	27-38-00 R/I	27-38-01
[14] Diode	215BS	6-215	W521	Diode assembly W515	27-38-00 R/I	27-38-01
[15] Diode	215BS	6-215	W528	Diode assembly W515	27-38-00 R/I	27-38-01
[16] Diode	215BS	6-215	W529	Diode assembly W515	27-38-00 R/I	27-38-01
[17] Diode	216BS	6-216	W523	Diode assembly W525	27-38-00 R/I	27-38-01
[18] Diode	216BS	6-216	W524	Diode assembly W525	27-38-00 R/I	27-38-01
[19] Air data computer No.1	215BS	6-215	1F71	Electronics rack LH	34-00-00 R/I	27-38-01
[20] Air data computer No.2	216BS	6-216	2F71	Electronics rack RH	34-00-00 R/I	27-38-01
[21] Standby pack CG2	216DS	9-216	Q1345	Electronics rack RH	28-44-81 R/I	27-38-01
[22] Standby pack CG1	216AS	10-216	Q1344	Electronics rack RH	28-44-81 R/I	27-38-01

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ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[23] Safety flight control computer	215BS	6-215	1C650	Electronics rack LH	27-39-11 R/I	27-38-01
[24] Safety flight control computer	216BS	6-216	2C650	Electronics rack RH	27-39-11 R/I	27-38-01

Component Identification  
Table 101

#### 4. Close-Up

- A. De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

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## MAINTENANCE MANUAL

### STALL WARNING - REMOVAL/INSTALLATION

#### 1. General

This sub-section deals with Removal/Installation of all minor components of the stall warning system.

- Stall warning horn (W527).
- Modulation box (W526).
- Relays (W512 and W522).
- Delay timers (1W641 and 2W641).
- Diode sets (W515 and W525).

#### 2. Stall Warning Horn

##### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Circuit Breaker Safety Clips	
------------------------------	--

##### B. Prepare

- (1) Observe the electrical safety precautions described in 24-00-00, Servicing.
- (2) Trip, safety and tag the following circuit breaker :

---

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
---------	-------	--------------------	-------------

---

STICK SHAKER SUP	1-213	W 513	P15
------------------	-------	-------	-----

##### C. Remove (Ref. Fig. 401 )

- (1) Unscrew screws and loosen gaiter attachment clamp maintaining protective casing 211ES.
- (2) Disengage and remove protective casing.
- (3) Loosen stall warning horn attachment clamps.
- (4) Slowly disengage stall warning horn from its support then disconnect electrical wires and note their location.

EFFECTIVITY: ALL

BA

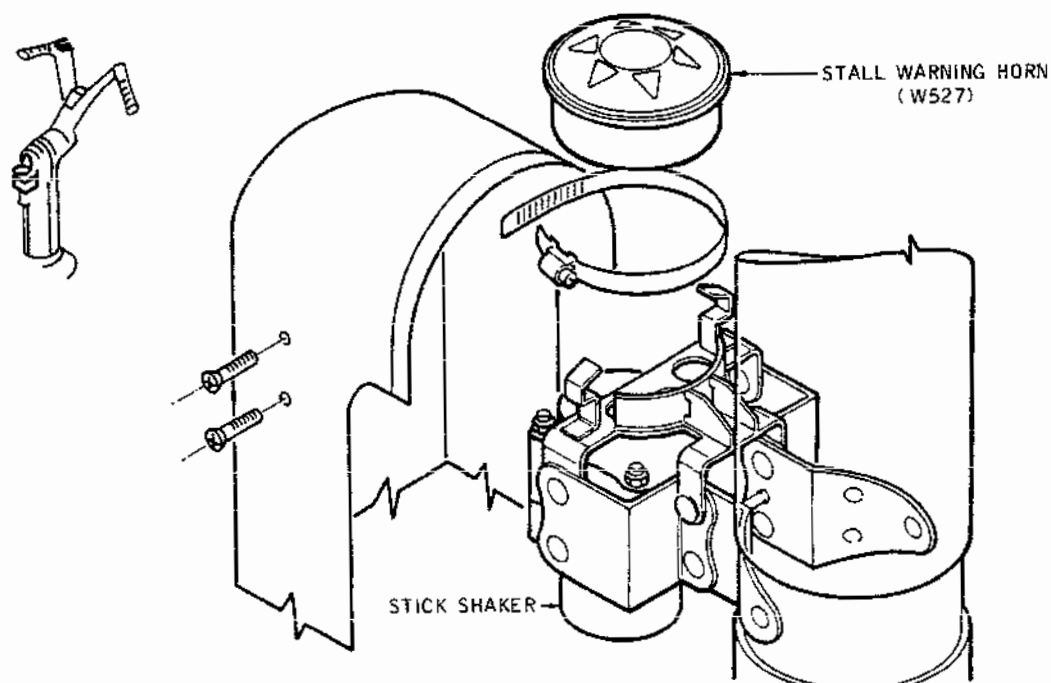
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Stall warning horn removal  
Figure 401

- (5) Remove stall warning horn (W527)

### D. Preparation of Replacement Component

- (1) Make certain that stall warning horn is free of dents and corrosion and check that electrical connectors are in good condition.

### E. Install

- (1) Position stall warning horn facing its support.
- (2) Connect electrical wires. Make certain that they are connected according to their identification and as per corresponding wiring diagram.
- (3) Engage stall warning horn in its support and tighten its attachment clamp.
- (4) Install and attach upper protective casing 211ES (screws and gaiter attachment clamp). Make certain that it is correctly inserted in upper stops.

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NOTE : Clearance between casing and handwheel is equal to 0.05 in. (1.2 mm). No friction should occur when the handwheel is moved.

### F. Tests

- (1) Remove safety clip and tag and set circuit breaker.
- (2) Carry out tests dewcribed in 27-38-00, Adjustment/Tests (paragraph 2, "High angle of attack" mode - Test") in order to trigger the stall warning horn.

### G. Close-Up

## 3. Modulator

### A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Access Platform 2.960 m (9 ft. 8 in.)	

### B. Prepare

- (1) Observe the electrical safety precautions described in 24-00-00, Servicing.
- (2) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
STICK SHAKER SUP	1-213	W 513	P15

### C. Remove (Ref. Fig. 402 )

- (1) At zone 121, open access door 121CL
- (2) Disconnect electrical connector of modulator.
- (3) Inscrew attachment screws, recover washers.
- (4) Remove modulator (W526)

### D. Preparation of Replacement Component.

EFFECTIVITY: ALL

BA

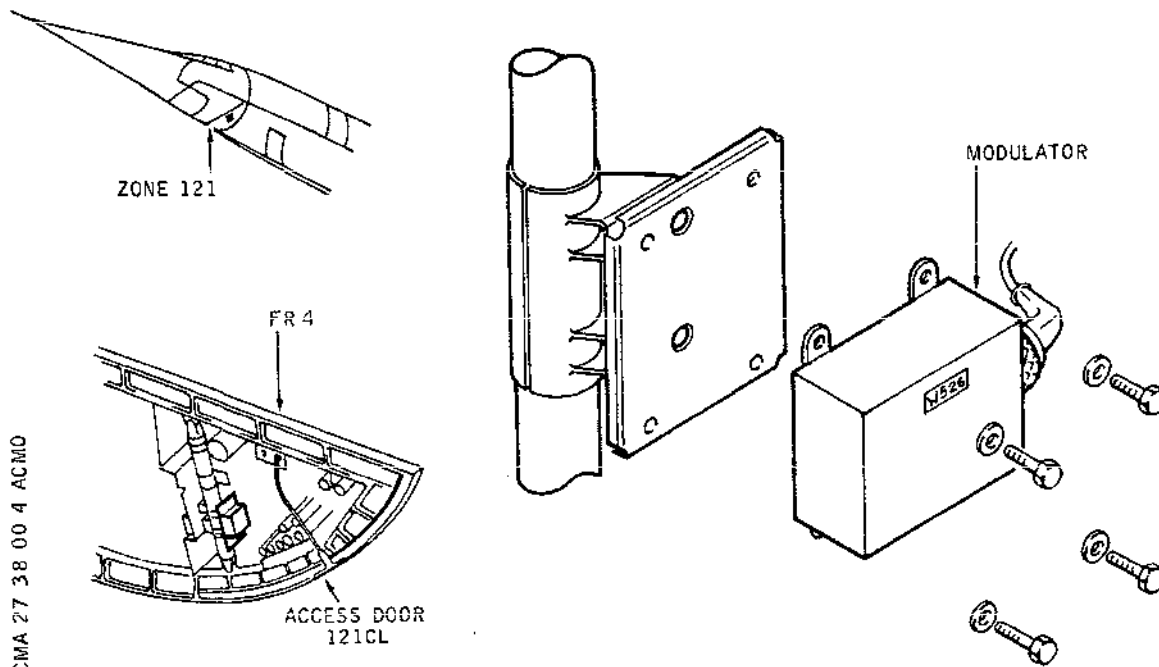
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Modulator Removal  
Figure 402

- (1) Make certain that modulator is free of dents and corrosion, and check that electrical connector is in good condition.

### E. Install

- (1) Position modulator facing its support.
- (2) Install washers and attachment screws, tighten screws.
- (3) Connect electrical connector to modulator.

### F. Tests

- (1) Remove safety clip and tag and set the circuit breaker.
- (2) Carry out test described in 27-38-00, Adjustment/Test (paragraph 2, "High angle of attack" mode - Test) in order to trigger modulator and stall warning horn.

### G. Close-Up

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- (1) Close access door 121CL
- (2) Remove access platform

### 4. Relay

#### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Circuit Breaker Safety Clips

#### B. Prepare

- (1) Observe the electrical safety precautions described in 24-00-00, Servicing.
- (2) Trip, safety and tag the following circuit breaker.

---

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
---------	-------	--------------------	-------------

---

STICK SHAKER SUP

1-213

W 513

P15

- (3) Proceed with "Prepare" procedure relating to Air Data Computer No.1 removal (Ref. 34-00-00, Removal/Installation).

#### C. Remove (Ref. Fig. 403 )

- (1) Remove access panel 215-BS
- (2) Remove ADC No.1 1F71 (Ref. 34-00-00, Removal/Installation).
- (3) Unscrew attachment nuts and recover washers of relay W512 or W522 to be removed.
- (4) Disengage relay from its mounting base by pulling it perpendicularly to the latter

#### D. Preparation of Replacement Component

- (1) Make certain that relay is free of dents and corrosion and check that electrical pins are in good condition.

#### E. Install

EFFECTIVITY: ALL

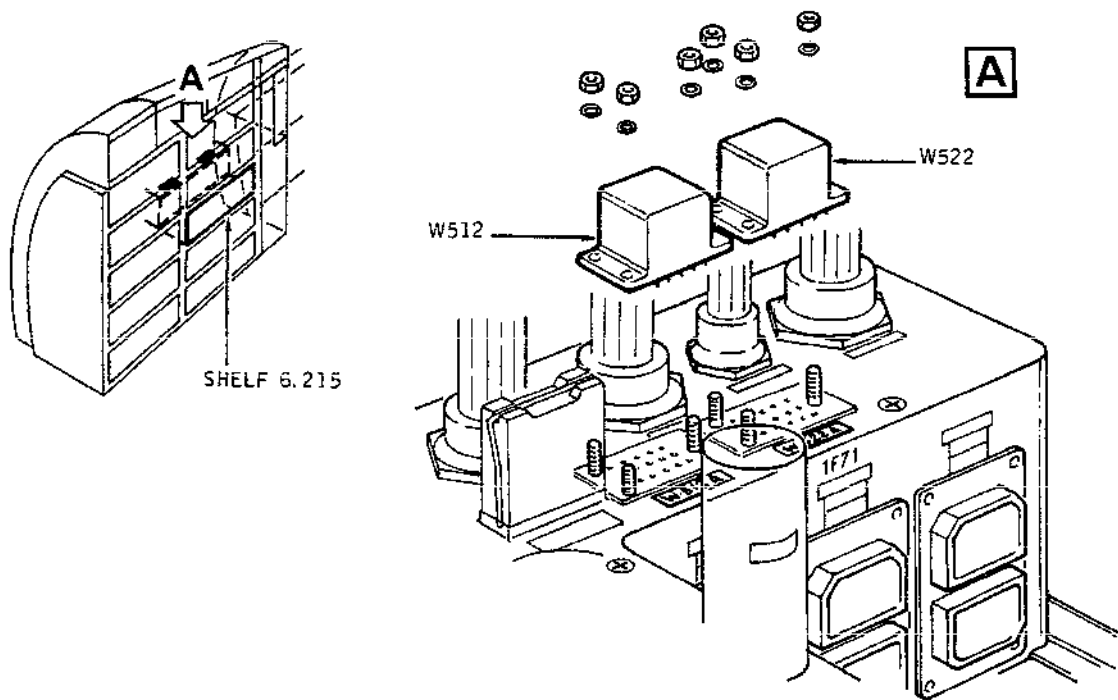
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Relay Removal  
Figure 403

- (1) Fully engage relay on its mounting base.
- (2) Install washers and tighten relay attachment nuts.
- (3) Install ADC No.1 1F71 (Ref. 34-00-00, Removal/Installation).
- (4) Close access panels 215-BS.

### F. Tests

- (1) Remove safety clip and tag and set circuit breaker.
- (2) Carry out tests described in 27-38-00, Adjustment/Test (paragraph 2 : "High angle of attack" mode - Test.) in order to check correct operation of relay W512 or W522.
- (3) Proceed with tests to be carried out after Removal/Installation of ADC No.1 (Ref. 34-00-00, Removal/Installation)

EFFECTIVITY: ALL

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G. Close-Up

### 5. Delay Timers

A. Equipment and Materials

DESCRIPTION	PART NO.
-------------	----------

Circuit Breaker Safety Clips

B. Prepare

(1) Observe the electrical safety precautions described in 24-00-00, Servicing.

(2) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
---------	-------	--------------------	-------------

STICK SHAKER SUP	1-213	W 513	P15
------------------	-------	-------	-----

(3) Proceed with "Prepare" procedure relating to Removal/Installation of :

- ADC No.1 1F71, For delay timer 1W641 (Ref. 34-00-00, Removal/Installation)
- ADC No.2 2F71, For delay timer 2W641 (Ref. 34-00-00, Removal/Installation).

C. Remove (Ref. Fig. 404 )

(1) Remove delay timer 1W641

- (a) Remove access panel 215-BS.
- (b) Remove ADC No.1 1F71 (Ref. 34-00-00, Removal/Installation).
- (c) Disengage attachment clip of delay timer.
- (d) Disengage delay timer from its mounting base by pulling it perpendicularly to the latter.

(2) Remove delay timer 2W641

- (a) Remove access panel 216-BS

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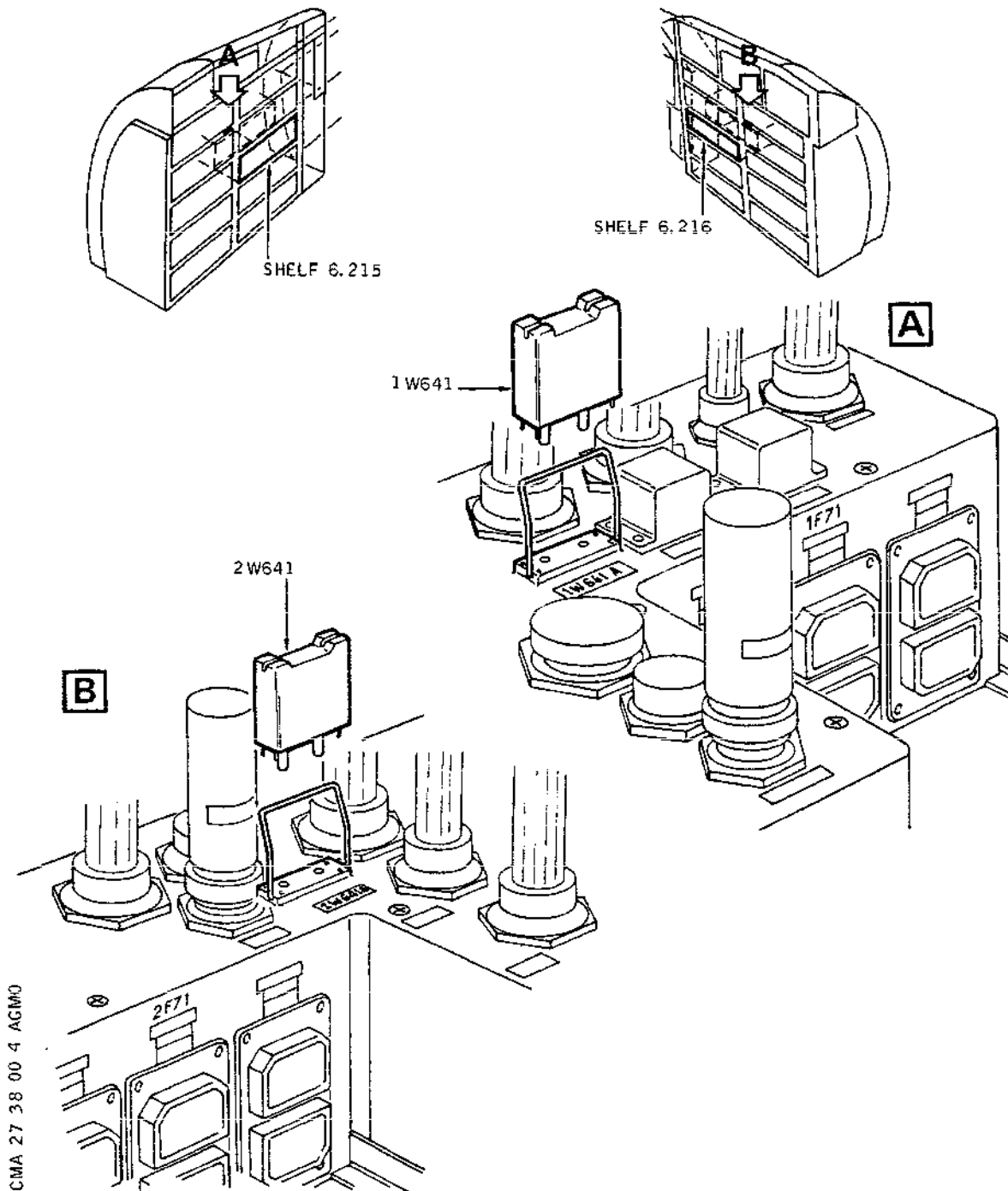
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Delay timer removal  
Figure 404

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- (b) Remove ADC No.2 2F71 (Ref. 34-00-00, Removal/Installation).
- (c) Disengage attachment clip of delay timer.
- (d) Disengage delay timer from its mounting base by pulling it perpendicularly to the latter

### D. Preparation of Replacement Component.

- (1) Make certain that delay timer is free of dents and corrosion and check that electrical pins are in good condition.

### E. Install

- (1) Install delay timer 1W641
  - (a) Fully engage delay timer on its mounting base.
  - (b) Install attachment clip on delay timer.
  - (c) Install ADC No.1 1F71 (Ref. 34-00-00, Removal/Installation).
  - (d) Close access panel 215 BS
- (2) Install delay timer 2W641
  - (a) Fully engage delay timer on its mounting base.
  - (b) Install attachment clip on delay timer.
  - (c) Install ADC No.2 2F71 (Ref. 34-00-00, Removal/Installation).
  - (d) Close access panel 216-BS

### F. Tests

- (1) Remove safety clip and tag and set circuit breaker
- (2) Carry out tests described in 27-38-00, Adjustment/Test (paragraph 2 : "High angle of attack mode - Test) in order to check the correct operation of delay timer 1W641 or 2W641.
- (3) Proceed with Tests to be carried out after Removal/Installation of ADC (Ref. 34-00-00, Removal/Installation).

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G. Close-Up

### 6. Diode Assemblies

A. Equipment and Materials

DESCRIPTION	PART NO.
-------------	----------

Circuit Breaker Safety Clips

B. Prepare

- (1) Observe the electrical safety precautions described in 24-00-00, Servicing.
- (2) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
STICK SHAKER SUP	1-213	W 513	P15

C. Remove (Ref. Fig. 405 )

- (1) Remove diode assembly W515.
  - (a) Remove access panel 215-BS
  - (b) Remove GROUND PROXIMITY WARNING COMPUTER W633 (Ref. 34-00-00, Removal/Installation)
  - (c) Unlock electrical connector and remove diode assembly W515.
- (2) Remove diode assembly W525
  - (a) Remove access panel 216-BS
  - (b) Remove ADC No.2 2F71 (Ref. 34-00-00, Removal/Installation).
  - (c) Unlock electrical connector and remove diode assembly W525
- (3) Remove a diode From assembly (Ref. Fig. 406 )
  - (a) Loosen and remove attachment clamp of protective

EFFECTIVITY: ALL

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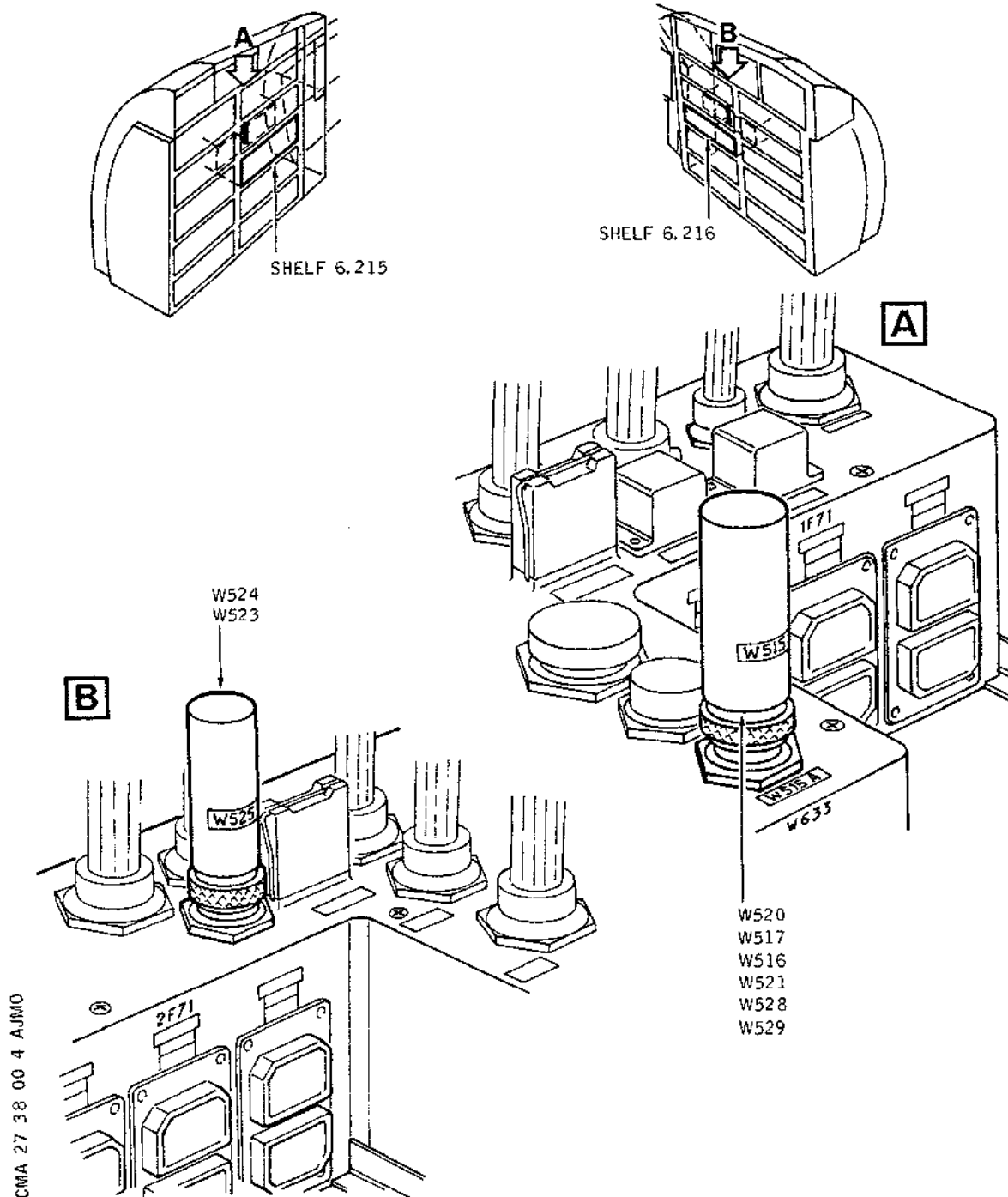
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Diode assembly removal  
Figure 405

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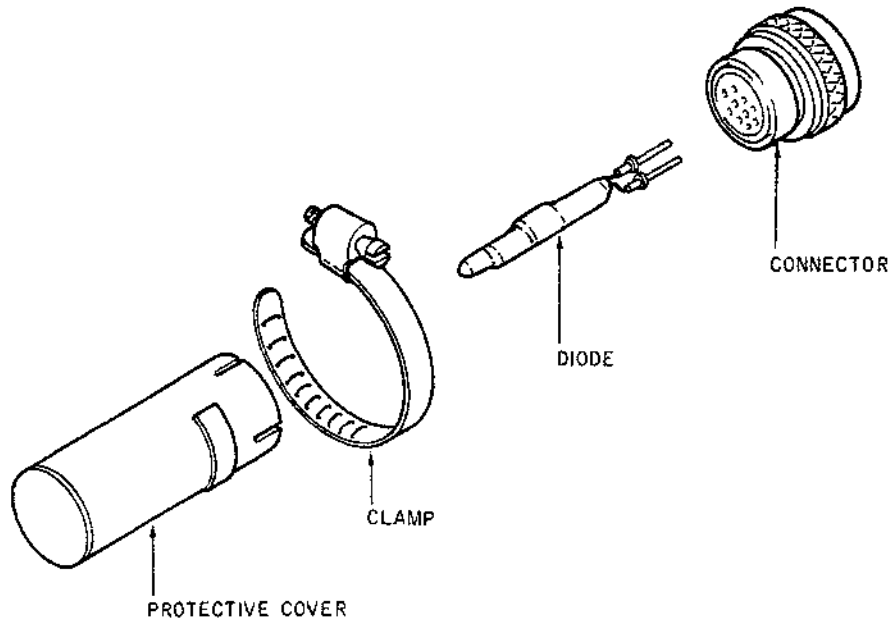
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Diode removal  
Figure 406

cover.

- (b) Disengage protective cover from electrical connector.
- (c) By means of an appropriate tool (extractor) remove the two pins corresponding to the diode to be removed.

### D. Preparation of Replacement Component

- (1) Diode preparation : Make certain that diode is correctly insulated by sleeve and check that the two pins are in good condition.
- (2) Assembly preparation : Make certain that assembly is free of dents and corrosion and check that electrical pins are in good condition.

### E. Install

- (1) Diode installation in assembly

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- (a) By means of an appropriate tool, lock the two pins of diode in the electrical connector.
  - (b) Check that diode connection is in accordance with corresponding wiring diagram.
  - (c) Install protective cover then tighten attachment clamp.
- (2) Diode assembly W515 installation.
- (a) Lock electrical connector of diode assembly on its mounting base.
  - (b) Install GROUND PROXIMITY WARNING COMPUTER W633 (Ref. 34-00-00, Removal/Installation).
  - (c) Close access panel 215-BS
- (3) Diode assembly W525 installation
- (a) Lock electrical connector of diode assembly on its mounting base.
  - (b) Install ADC No.2 2F71 (Ref. 34-00-00, Removal/Installation).
  - (c) Close access panel 216-BS

### F. Tests.

- (1) Remove safety clip and tag and set circuit breaker.
- (2) After Removal/Installation of diode assembly W515.
  - (a) Carry out tests described in 27-38-00, Adjustment/Tests.
  - (b) Proceed with test to be carried out after Removal/Installation of the GROUND PROXIMITY WARNING COMPUTER (Ref. 34-00-00, Removal/Installation).
- (3) After Removal/Installation of diode assembly W525.
  - (a) Carry out tests described in 27-38-00, Adjustment/Test (paragraph 3 : VLA mode - Test, and paragraph 5 : Wobbler mode - Test)
  - (b) Proceed with tests to be carried out after Removal/Installation of ADC No.2 (Ref. 34-00-00, Removal/Installation).

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G. Close-Up

Not applicable

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### STALL WARNING - ADJUSTMENT/TEST

#### 1. General

The purpose of the following tests is to check the stall warning indicating control in the four following modes :

- High angle-of-attack mode (angle-of-attack greater than  $16^{\circ}30$ ).
- VLA mode.
- C.G. positioning mode.
- Wobbler mode.

#### 2. Test - High Angle of Attack Mode

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	

##### B. Prepare

- (1) The aircraft must be in "Ground" configuration, shock absorbers compressed.

- R (2) On ADC control panel (centre console) make certain that :

- R
  - ADC 1 and ADC 2 switches are in OFF position.
  - ADC 1 TEST and ADC 2 TEST selector switches are in NORM position.

- (3) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW "A" SYS SUP	1-213	G 292	M17
ADC 1 28 V SUP		1F 74	P12
STICK SHAKER SUP		W 513	P15
ADC 1 26 V SUP	2-213	1F 78	A 2
1ST PLT ADC INST SUP		1F 75	B 3
ADC 1 115 V SUP		1F 73	F 3

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SERVICE		PANEL	CIRCUIT BREAKER	MAP REF.
RH UC WEIGHT SW "B" SYS SUP		3-213	G 294	B 9
ADC 2 28 V SUP		5-213	2F 74	F12
R	2 ND PLT ADC INST SUP	13-216	2F 75	A14
R	ADC 2 26 V SUP		2F 78	F14
R	ADC2 115V SUP		2F 73	F15
R	(4) Remove safety clip and tag and set the following circuit breaker :			

SERVICE		PANEL	CIRCUIT BREAKER	MAP REF.
R	NAV INST BUS 13 x s	13-216	X 345	G 4
R	(5) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).			
R	(6) At Flight Engineer's station, on EQUIPMENT BAY COOLING unit, make certain that electronics rack ventilation operates. (Ref. 21-21-00)			

### C. Test

- R On ADC control panel (centre console)
- (1) Place ADC 1 switch in ON position.
- R (2) Place ADC 1 TEST selector switch in position 1.
- R After approximately 30 seconds, ADC 1 blue TEST indi-  
cator light must illuminate.
- Captain's and First Officer's control columns must  
vibrate.
- On Captain's control column, the stall warning horn  
must sound.
- NOTE : Do not take visual and aural warnings which  
are a result of ADC 1 self test function into  
account.

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- R (3) Place ADC 1 TEST selector switch in NORM position.
- Captain's and First Officer's control columns must stop vibrating.  
On Captain's control column stall warning horn must stop sounding.
- (4) Place ADC 1 switch in OFF position.
- (5) Place ADC 2 switch in ON position.
- R (6) Place ADC 2 TEST selector switch in position 1.
- After approximately 30 seconds, ADC 2 blue TEST indicator light must illuminate.
- Captain's and First Officer's control columns must vibrate.  
On Captain's control column, stall warning horn must sound.
- NOTE : Do not take visual and aural warnings which are a result of ADC 2 self test function into account.
- R (7) Place ADC 2 TEST selector switch in NORM position.
- Captain's and First Officer's control columns must stop vibrating.  
On Captain's control column, stall warning horn must stop sounding.
- (8) Place ADC 2 switch in OFF position.
- D. Close-Up
- (1) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

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### 3. Test - VLA mode

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Simulator - Pressure Sensors	87-209-455
or	
Pressure Generator - Air Data System	
2 Adapters - Pitot Tube	853 BFT 025
2 Blanking Plugs-Pitot Tube Drain Port	853 BFT 026
2 Adapters - Static Ports	T 8751E22783002

#### B. Prepare

- (1) On ADC control panel (centre console) make certain that :
  - ADC 1 and ADC 2 switches are in OFF position
  - ADC 1 and ADC 2 TEST selector switches are in NORM position
- (2) Depending on equipment used :
  - (a) Connect Pressure Sensor Simulator to front panel of ADC 1 (1F71) (on shelf 6-215).  
On Simulator, make certain that :
    - SIMUL-SENSOR switch is in SENSOR position.
    - ALTITUDE COARSE potentiometer is set to 1013
    - AIRSPEED COARSE potentiometer is set to 4.or
  - (b) Connect pressure generator to Pitot heads and static ports, ADC 1 and ADC 2 systems, and make certain that pressure generator is shut off with hoses to ambient air.
- (3) On Captain's and First Officer's instrument panel altimeters, display a pressure of 1013. 25 mb. by means of the barometric correction adjustment button and make certain that mode selection buttons are in N (normal) position.
- (4) On Captain's and First Officer's instrument panel airspeed indicators, make certain that mode selection buttons are in N (Normal) position.
- (5) Make certain that the following circuit breakers are set :

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	SERVICE	PANEL	CIRCUIT BREAKER		MAP REF.
	ADC1 28V SUP	1-213	1F	74	P12
	IST PLT ADC INST SUP	2-213	1F	75	B 3
	ADC1 26V SUP	2-213	1F	78	A 2
	ADC1 115V SUP		1F	73	F 3
	ADC2 28V SUP	5-213	2F	74	F12
	2ND PLT ADC INST SUP	13-216	2F	75	A14
R	ADC2 26V SUP		2F	78	F14
R	ADC2 115V SUP		2F	73	F15
R	(6)	Remove safety clip and tag and set the following circuit breaker			
R					

	SERVICE	PANEL	CIRCUIT BREAKER		MAP REF.
	NAV INST BUS 13 XS	13-216	X	345	G 4
	(7)	Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).			
	(8)	At Flight Engineer's panel, on EQUIPMENT BAY COOLING unit, make certain that electronics rack ventilation operates (Ref. 21-21-00).			

### C. Test

- (1) Trip safety and tag the following circuit breaker

	SERVICE	PANEL	CIRCUIT BREAKER		MAP REF.
	STICK SHAKER SUP	1-213	W	513	P15
R	(2)	On ADC control panel (centre console), place ADC 1 switch in ON position.			
	(3)	Depending on equipment used :			

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- (a) On Pressure Sensor Simulator, place SIMUL-SENSOR switch in SIMUL position, then adjust ALTITUDE and AIRSPEED potentiometers so as to read 227 on ALTITUDE and 106 on AIRSPEED.  
or
- R (b) Operate pressure generator and apply an absolute pressure of 227 mb (3.292 psi.) to static pressure system and a pressure difference (delta P) of 106 mb (1.537 psi.) to total pressure system.
- R (4) On ADC control panel (centre console) press amber ADC 1 warning light then release it ; it must go off.  
R Flags must disappear on altimeter, airspeed indicator and angle-of-attack indicator (Captain's instrument panel).
- (5) On Captain's instrument panel, check that the angle-of-attack indicator does not display an angle-of-attack value greater than 16°30.
- NOTE : - If angle-of-attack value displayed on indicator is greater than 16°30, lower LH angle-of-attack sensor vane (zone 113) until the angle-of-attack value displayed is less than 16°30.  
- If pressure sensor simulator is used place I local - I = 1° switch in I = 1° position.
- R  
R
- (6) Depending on equipment used :
- (a) On Pressure Sensor Simulator, adjust ALTITUDE fine and AIRSPEED fine potentiometers so as to read.  
- 35000 feet on Captain's altimeter  
- 250 kts or more on Captain's airspeed indicator.  
or
- R  
R
- (b) On Pressure Generator, slightly modify values of static and total pressure so as to obtain :  
- 35000 feet on Captain's altimeter,  
- 250 kts or more on Captain's airspeed indicator.
- R  
R
- (7) Remove safety clip and tag and set the following circuit breaker :
- R  
R

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
STICK SHAKER SUP	1-213	W 513	P15

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(8) Depending on equipment used :

- (a) On Pressure Sensor Simulator, slowly adjust AIRSPEED potentiometer so as to reduce speed read on Captain's airspeed indicator.  
or
- (b) On pressure generator reduce value of total pressure so as to reduce speed read on Captain's airspeed indicator.

When displayed speed reaches 230 kts, plus or minus 9 kts :

- Captain's and First Officer's control columns must vibrate.
- On Captain's control column, stall warning horn must sound.

(9) Depending on equipment used.

- (a) On Pressure Sensor Simulator ; slightly adjust AIRSPEED potentiometer so as to read on Captain's airspeed indicator a speed equal to or greater than 250 kts.  
or
- (b) On pressure generator, slowly increase value of total pressure so as to read on Captain's airspeed indicator a speed equal to or greater than 250kts.

- R
  - Captain's and First Officer's control columns must stop vibrating.
  - On Captain's control column, stall warning horn must stop sounding.

- R
  - (10) On ADC control panel (centre console) place ADC 1 switch in OFF position.

- R
  - (11) If Pressure Sensor Simulator is used ; disconnect Simulator from ADC 1 and, on shelf 6-216 connect it to front panel of ADC 2 (Take care not to change value of ALTITUDE and AIRSPEED potentiometers).

- R
  - (12) On ADC control panel (centre console)

- (a) Place ADC 2 switch in ON position.

- R
  - amber ADC 2 warning light must illuminate.

- R
  - (b) Wait 1 minute approximately, then press and release amber ADC 2 warning light : it must go off.
- R
  - On First Officer's instrument panel, flags must

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disappear on altimeter, airspeed indicator and angle-of-attack indicator.

- (13) On First Officer's instrument panel, check that angle-of-attack indicator does not display an angle-of-attack value greater than  $16^{\circ}30$ .

NOTE : - If angle-of-attack value displayed on indicator is greater than  $16^{\circ}30$ , lower RH angle-of-attack sensor vane (zone 114) until the displayed angle-of-attack value is less than  $16^{\circ}30$ .

- If Pressure Sensor Simulator is used ; place I local - I =  $1^{\circ}$  switch in I =  $1^{\circ}$  position.

- (14) Depending on equipment used :

- (a) On Pressure Sensor Simulator, slowly adjust AIRSPEED potentiometer so as to reduce speed read on First Officer's airspeed indicator.  
or  
(b) On pressure generator, slowly reduce value of total pressure so as to reduce speed read on First Officer's airspeed indicator.

When displayed speed reaches 230 kts, plus or minus 9 kts :

- Captain's and First Officer's control columns must vibrate.
- On Captain's control column, stall warning horn must sound.

- (15) Depending on equipment used :

- (a) On Pressure Sensor Simulator ; slowly adjust AIRSPEED potentiometer so as to read on Captain's airspeed indicator a speed value equal to or greater than 250kts.  
or  
(b) On pressure generator, slowly increase value of total pressure so as to read on Captain's airspeed indicator a speed equal to or greater than 250kts.
- Captain's and First Officer's control columns must stop vibrating.
  - On Captain's control column, stall warning horn must stop sounding.

- (16) Trip safety and tag the following circuit breaker :

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
STICK SHAKER SUP	1-213	W 513	P15

(17) Depending on equipment used :

- (a) On Pressure Sensor Simulator :
  - Set ALTITUDE potentiometer to 1013
  - Set AIRSPEED potentiometer to 4
  - Place SIMUL-SENSOR switch in SENSOR position.
- or
- (b) On pressure generator ; slowly reduce static and total pressure systems to ambient atmospheric pressure.

(18) On ADC control panel (centre console) place ADC 2 switch in OFF position.

### D. Close-Up

(1) Depending on equipment used :

- (a) Disconnect Pressure Sensor Simulator from front panel of ADC 2.
- or
- (b) Disconnect pressure generator from pitot heads and static ports, ADC 1 and ADC 2 systems.

(2) Trip, Safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
NAV INST BUS 13 XS	13-216	X 345	G 4

(3) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

(4) Remove safety clip and tag and set circuit breaker previously tripped.

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## MAINTENANCE MANUAL

### 4. Test - C.G. positioning mode

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Pressure Sensor Simulator	87-209-455
or	
Pressure Generator - Air Data System	
2 Adapters Pitot Tube	853 BFT 025
2 Blanking Plugs - Pitot Tube Drain	853 BFT 026
Port	
2 Adapters Static Ports	T8751E22783002

#### B. Prepare

- (1) On ADC control panel (centre console) make certain that :
  - ADC 1 and ADC 2 switches are in OFF position
  - ADC 1 and ADC 2 TEST selector switches are in NORM position
- (2) Depending on equipment used :
  - (a) Connect Pressure Sensor Simulator to front panel of ADC 1 (1F71) (on shelf 6-215)  
On Simulator, make certain that :
    - SIMUL-SENSOR switch is in SENSOR position.
    - ALTITUDE coarse potentiometer is set to 1013
    - AIRSPEED coarse potentiometer is set to 4.
  - or
  - (b) Connect pressure generator to pitot heads and static ports, ADC 1 and ADC 2 systems, and make certain that generator is shut off with hoses to ambient air.
- (3) Make certain that the following circuit breakers are set.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FQI CONT PNL WARN & FUEL FLOW TEST SUP	1-213	Q1407	J17

R \*\*ON A/C 006-007,  
STBY 1 BOUNDARY WARN SUP 1-213 Q1367 K18

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## MAINTENANCE MANUAL

STBY 1 BOUNDARY WARN SUP	1-213	Q1367	L18
**ON A/C ALL			
ADC1 28V SUP	1-213	1F 74	P12
STICK SHAKER SUP		W 513	P15
1st PLT ADC INST SUP	2-213	1F 75	B 3
ADC1 26V SUP	2-213	1F 78	A 2
TANK 9.10 & 11 FQI CH A		Q1358	A18
& PLTS CG IND SUP			
TANK 5.5A & 6 FQI SUP		Q1359	A22
TANK 1 & 2 FQI SUP		Q1360	A23
STBY 1CG LIMITS & CG COMPN SUP		Q1361	A24
STBY 1 MACH LIMIT L COMPN		Q1362	B23
TOTAL FUEL & MAIN CG SUP		Q1363	B24
ADC1 115V SUP		1F 73	F 3
STBY 2 BOUNDARY WARN SUP	3-213	Q1366	F 7
TANKS 9, 10, 11 FQI CH B	4-213	Q1356	B 1
& 3 CM CG IND & SUP			
STBY 2 CG LIMITS & CG COMPN SUP		Q1357	B 2
TANKS 3 & 4 FQI SUP		Q1354	C 1
TANKS 77A & 8 FQI SUP		Q1355	C 2
ADC2 28V SUP	5-213	2F 74	F12
TANKS 9, 10, 11 REFUEL FQI & FLT COUNT SUP	13-215	Q1365	C17
REFUEL SHUT-OFF & VENT VALVES IND	15-215	Q 511	E19
REFUEL CONT & FAIL IND		Q 513	E20
FQI CONT PNL WARN & FQI TEST SUP		Q1021	G25
2ND PLT ADC INST SUP	13-216	2F 75	A14
ADC2 26V SUP	13-216	2F 78	F14
STBY 2 MACH LIMITS COMPN SUP	13-216	Q1364	D 3
ADC 2 115V SUP		2F 73	F15
GRND POWER REFUEL CONT & IND	25-216	Q 635	B 8

- (4) Remove safety clip and tag and set the following circuit breaker

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## MAINTENANCE MANUAL

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
NAV INST BUS 13 XS	13-216	X 345	G 4
(5) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).			
(6) At Flight Engineer's panel, on EQUIPMENT BAY COOLING unit, make certain that electronics rack ventilation operates (Ref. 21-21-00).			

### C. Test

- (1) On ADC control panel (centre console), place ADC 1 switch in ON position.
- (2) Depending on equipment used :
  - (a) On Pressure Sensor Simulator, place SIMUL-SENSOR switch in SIMUL position then adjust ALTITUDE and AIRSPEED potentiometers so as to read 940 on ALTITUDE and 190 on AIRSPEED.  
or
  - (b) Operate pressure generator and apply an absolute pressure of 940 mb. (13.633 psi.) to static pressure system and a pressure difference (Delta P) of 190 mb. (2.756 psi.) to total pressure system.
- (3) On ADC control panel (centre console) press amber ADC 1 warning light then release it ; it must go off. On Captain's instrument panel, flags must disappear on machmeter and angle-of-attack indicator.
- (4) On Captain's instrument panel, check that angle-of-attack indicator does not display an angle-of-attack value greater than 16°30.

NOTE : - If angle-of-attack value displayed on indicator is greater than 16°30, lower LH angle-of-sensor vane (zone 113) until the angle-of-attack value displayed is less than 16°30.  
- If Pressure Sensor Simulator is used, place I local - I = 1° switch in I = 1° position.

- (5) On Captain's instrument panel, check that machmeter indicates Mach 0.5 or more (If not ; slowly adjust

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## MAINTENANCE MANUAL

AIRSPEED potentiometer on Pressure Sensor Simulator or slightly change value of total pressure on pressure generator).

- (6) At Flight Engineer's station, on FUEL QUANTITY INDICATION test panel :
- (a) Make certain that 1-M-2 switch is in position M.
  - (b) Place rotary switch in GAUGES position.
  - (c) Place CANCEL-TEST switch in TEST position and hold it.
  - (d) The following warnings may operate :
    - CG position warnings (MW : C.G, Gong, Captain's and First Officer's CG warning lights, C.G. positioning warning light).
    - Captain's and First Officer's control columns vibrate.
    - On Captain's control column, stall warning horn associated with stick shaker sounds.
  - (e) If these warnings do not operate, turn control unit ZFCG button to shift the displayed C.G. beyond 54.4% (C.G. positioning value for which warnings are triggered if Mach number is equal to 0.5. For other simulated Mach values, refer to graph given in 27-38-00, Description and Operation). After warnings have been triggered off, place ZFCG button in initial position.
  - (f) Release CANCEL-TEST switch.  
The above warnings stop operating.
- (7) On ADC control panel (centre console) place ADC 1 switch in OFF position
- (8) If Pressure Sensor Simulator is used ; disconnect simulator from ADC 1, and on shelf 6-216 connect it to front panel of ADC 2 (Take care not to change value of ALTITUDE and AIRSPEED potentiometers.)
- (9) On ADC control panel (centre console).
- (a) Place ADC 2 switch in ON position  
amber ADC 2 warning light must illuminate.
  - (b) Wait 30 seconds approximately then press and re-

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lease amber ADC 2 warning light ; it must go off.  
On First Officer's instrument panel, flags must  
disappear on machmeter and on angle-of-attack  
indicator.

- (10) On First Officer's instrument panel, check that angle-of-attack indicator does not display an angle-of-attack value greater than  $16^{\circ}30$ .

NOTE : - If angle-of-attack value displayed on indicator is greater than  $16^{\circ}30$ , lower RH angle-of-attack sensor vane (zone 114) until the angle-of-attack value displayed is less than  $16^{\circ}30$ .  
- If Pressure Sensor Simulator is used, place I local - I = 1° switch in I = 1° position.

- (11) On First Officer's instrument panel, check that machmeter indicates Mach 0.5 approximately or more (if not, slowly adjust AIRSPEED potentiometer on Pressure sensor Simulator or slightly change value of total pressure on pressure generator.)

- (12) At Flight Engineer's station, on FUEL QUANTITY INDICATION test panel :

- (a) Check that 1-M-2 switch is in position M.
- (b) Check that rotary switch is in GAUGES position.
- (c) Place CANCEL - TEST switch in TEST position and hold it.
- (d) The following warnings may operate :
  - C.G. positioning warnings (MW : C.G, gong, Captain's and First Officer's C.G. warning lights, CG positioning warning light).
  - Captain's and First Officer's control columns vibrate.
  - On Captain's control column, stall warning horn sounds.
- (e) If these warnings do not operate, turn control unit ZFCG button to shift the displayed C.G. beyond 54.4% (C.G. positioning value for which warnings are triggered if Mach number is equal to 0.5. For other simulated Mach values refer to graph given in 27-38-00, Description and Operation). After warnings have been triggered off, place ZFCG button in initial position.

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## MAINTENANCE MANUAL

- (f) Release CANCEL-TEST switch.  
The above warnings stop operating.

(13) Depending on equipment used :

- (a) On Pressure Sensor Simulator  
- Set ALTITUDE potentiometer to 1013  
- Set AIRSPEED potentiometer to 4  
- Place SIMUL-SENSOR switch in SENSOR position.  
or  
(b) On pressure generator, slowly reduce static and total pressure systems to ambient atmospheric pressure.

(14) On ADC control panel (centre console) place ADC 2 switch in OFF position.

### D. Close-up

(1) Depending on equipment used :

- (a) Disconnect Pressure Sensor Simulator from front panel of ADC 2.  
or  
(b) Disconnect pressure generator from pitot heads and static ports, ADC 1 and ADC 2 systems.

(2) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
NAV INST BUS 13 XS	13-216	X 345	G 4

(3) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

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### 5. Test - Wobbler mode

R NOTE : The following test is carried out by means of the Inte-  
R grated Test and Maintenance Equipment (ITEM). Aircraft  
R is on the ground.

#### A. Equipment and Materials

DESCRIPTION	PART NO.
-------------	----------

Electrical Ground Power Unit

#### B. Prepare

- (1) Aircraft must be on the ground, shock absorbers compressed.
- (2) On Flight Control Unit (on overhead panel) make certain that ANTI STALL 1 and 2 switches are in OFF position.
- (3) Make certain that the following circuit breakers are set.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
STICK SHAKER SUP	1-213	W 513	P15
NOSE UC WEIGHT SW "A" SYS		G 291	M16
SUP			
AP/FD SYST 1 CONT		1C 17	Q13
AFCS TEST 1 28V SUP		1C 383	R12
SAFETY FLT CONT No.1 SUP		1C 651	S20
NOSE UC WEIGHT SW "B"	3-213	G 296	D 8
SYS SUP			
AP/FD SYST 2 CONT	5-213	2C 17	A11
SAFETY FLT CONT No.2		2C 651	D17
SUP			
AFCS TEST 2 28V SUP		2C 383	F11
AP/FD COMP 1 SUP	13-215	1C 18	A 5
AFCS TEST 1 115V SUP		1C 384	D 6
SAFETY FLT CONT COMP		1C 652	E 6
No.1 115V SUP			
SAFETY FLT CONT COMP		1C 653	F 6
No.1 26V SUP			

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## MAINTENANCE MANUAL

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SAFETY FLT CONT COMP No.2	13-216	2C 653	C16
26V SUP			
SAFETY FLT CONT COMP No.2		2C 652	C17
115V SUP			
AFCS TEST 2 115V SUP		2C 384	F17
AP/FD COMP 2 SUP		2C 18	F18

- (4) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).  
On overhead panel, on Flight Control Unit SYST 1 FAIL and SYST 2 FAIL warning lights must be off.
- (5) At Flight Engineer's panel, on EQUIPMENT BAY COOLING-unit, make certain that electronics rack ventilation operates (Ref. 21-21-00).

### C. Test

All tests described below are carried out at Flight Engineer's station on ITEM indicating and control panel.

- (1) Place both IFM-OFF-TEST switches in TEST position.

NOTE : These two switches are of the "pull to unlock" type.

- (2) Place FLIGHT-TEST ALL-TEST UNIT switch in TEST UNIT position.

- (3) ITEM indication must appear in display windows 3 and 7 and TEST indication must appear in display windows 4 and 8.

- (4) Wait three minutes approximately, (duration of ITEM self-test), PASS indication must replace TEST indication.

NOTE : - During the first minute a weak flashing in display window is normal.  
- IF FAIL indication appears in lieu of PASS indication on display windows 4 or (and) 8, this indicates that self-test is negative (Faulty operation of associated computer).

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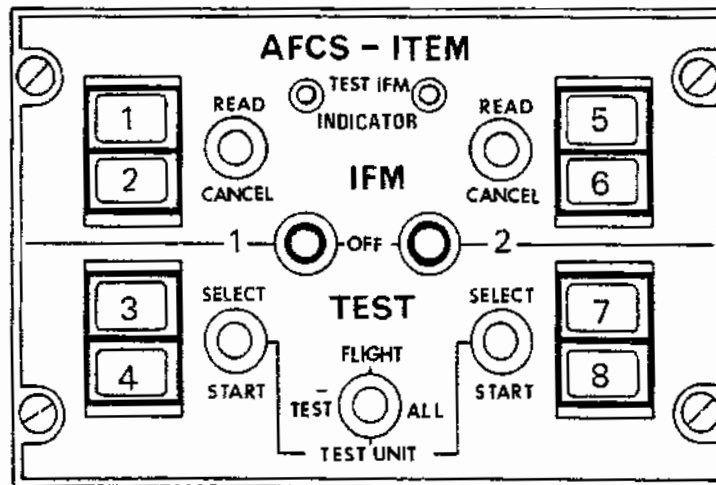
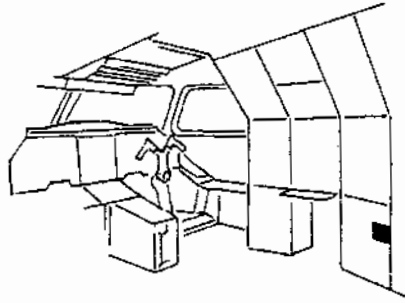
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CMA 27 38 00 5 AAM0

ITEM Indicating and Control Panel  
Figure 501

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## MAINTENANCE MANUAL

- (5) Place and hold SELECT/START switch, side 1, in SELECT position until SFC indication appears in display window 3.

NOTE : Indications relating to AFCS appear in sequence as follows : SFC, AP.P, AP.A, AT, AS.P, AS.R, AS.Y, ET, WLD. They appear on display window 3 or 7 depending on the selected side.

- (6) Place SELECT/START switch in START position when SFC indication is present in display window 3.
- (7) Release SELECT/START switch, it returns to central position (mechanical return).
- (8) Check that SFC indication remains displayed in window 3.
- (9) Check that TEST indication remains displayed in window 4.
- (10) Note that, intermittently :
- Captain's and First Officer's control columns vibrate.
  - On Captain's control column, stall warning horn sounds.

- (11) Check that PASS indication replaces TEST indication in display window 4 at the end of test.

NOTE : PASS indication indicates that channel 1 computer is correct. If COMP indication appears instead of PASS indication, this indicates that SFC computer is faulty.

- (12) Place IFM-OFF-TEST switch on side 1 in OFF position.
- (13) Check that SFC and PASS indications have disappeared from display windows 3 and 4.
- (14) Carry out the same test with side 2, as described from paragraph 5-C (5) to paragraph 5-C (13) inclusive. SFC and TEST indications followed by PASS, for the channel 2 computer, will appear respectively in display windows 7 and 8. Intermittently Captain's and First Officer's control columns must vibrate and on Captain's control column, stall warning horn must sound.
- (15) Place IFM-OFF-TEST switch of side 2 in OFF position.

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## MAINTENANCE MANUAL

(16) Place FLIGHT-TEST ALL-TEST UNIT switch in FLIGHT position.

### D. Close-Up

(1) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

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**END OF THIS  
SECTION**

**NEXT**

# Concorde

## MAINTENANCE MANUAL

### STICK SHAKER - REMOVAL/INSTALLATION

#### 1. General

The stick shaker is located on the Captain's control column.

#### 2. Stick shaker

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clip	

##### B. Prepare

- (1) Observe the electrical safety precautions described in 24-00-00, Servicing.
- (2) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
STICK SHAKER SUP	1-213	W 513	P15

##### C. Remove

- (1) Unscrew screws and loosen gaiter attachment clamp securing upper protective casing 211ES.
- (2) Disengage and remove protective casing.
- (3) Unscrew screws (6), recover washers (7), remove plate (8). Disconnect electrical supply wires (5) and note their location.
- (4) Remove cotter pins (1), unscrew nuts (2), recover washers (3), remove bolts (4) and disengage stick shaker.
- (5) Insert one bolt (4) to support stall warning horn

##### D. Preparation of Replacement Component

- (1) Make certain that stick shaker is free of dents and

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**27-38-11**

R

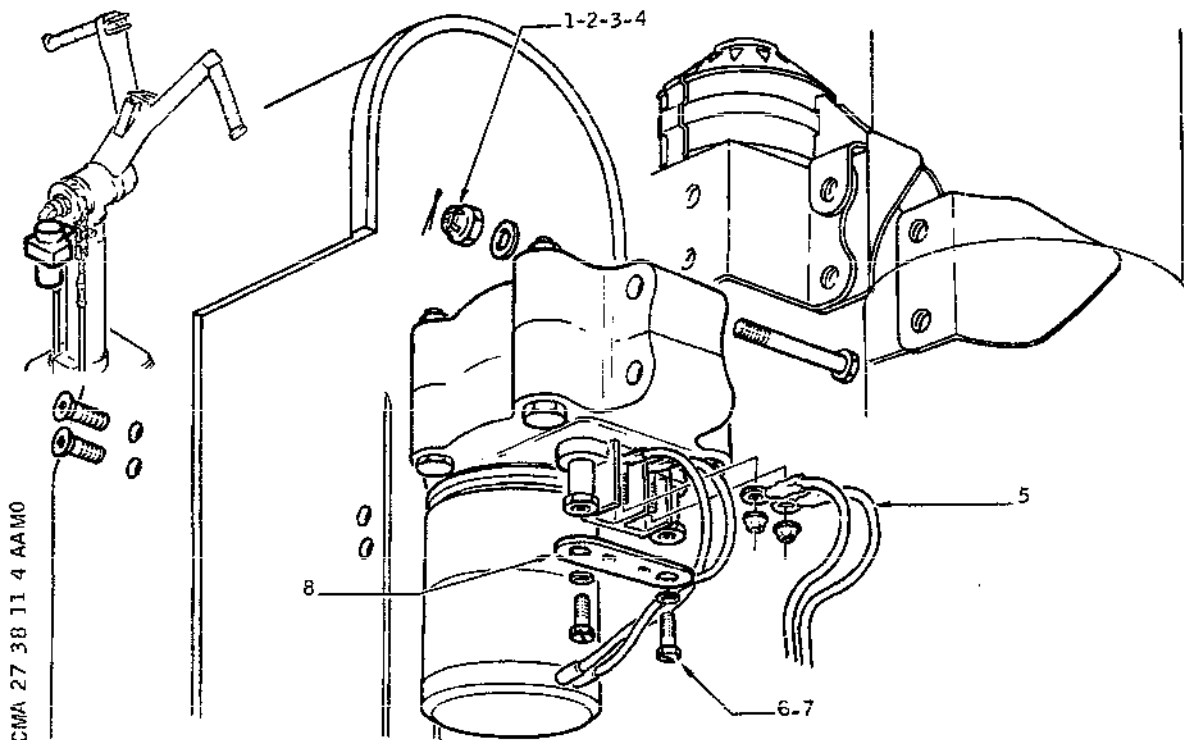
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## MAINTENANCE MANUAL



Stick shaker  
Figure 401

traces of corrosion and check that electrical pins are in correct condition.

### E. Install

- (1) Remove bolt (4).
- (2) Position stick shaker facing its support.
- (3) Insert bolts (4), washers (3), tighten nuts (2) engage cotter pins (1).
- (4) Connect electrical wires (5) according to their initial location.
- (5) Install plate (8), washer (7), tighten screws (6).
- (6) Install and secure upper protective casing 211ES (screws and gaiter attachment clamp). Make certain that casing is correctly inserted in upper stops.

NOTE :Circular clearance between protective casing and

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**27-38-11**

R

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handwheel must be 0.05 in. (1.2 mm).  
No friction should occur when the handwheel is moved.

### F. Tests

- (1) Remove safety clip and tag and set circuit breaker.
- (2) Proceed with tests described in 27-38-00, Adjustment/Test (paragraph 2. Test - "High angle of attack mode") in order to activate stick shaker.

### G. Close Up

Not applicable

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### STICK SHAKER - ADJUSTMENT/TEST

R

#### 1. General

R The purpose of the following tests is to check the stick shaker  
R for correct operation after maintenance work has been carried  
R out on this component.

#### R 2. Test

This test is identical with test described in 27-38-00, Adjust-  
R ment/Test, paragraph 2 : Test - "High angle-of-attack mode".  
R Refer to this topic.

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## MAINTENANCE MANUAL

### SAFETY FLIGHT CONTROL SYSTEM - DESCRIPTION AND OPERATION

#### 1. General

The Safety Flight Control system (SFC) groups in a single computer several functions designed to improve the aircraft safety.

##### A. Anti-Stall Functions

These functions are complementary to the conventional angle-of-attack warning (stick shaker and stall horn) and improve flight safety in high angle-of-attack configuration.

These functions ensure the following :

- (1) Wobbler warning.
- (2) Superstabilization.
- (3) AP disconnection.
- (4) Auto trim inhibit function.

##### B. Emergency Flight Control Mode

This mode enables the aircraft to be controlled in the event of seizure of the flight controls between the control column or the control wheel and the relay jacks.

This control mode is effected through conventional flight controls, but only for roll and pitch axis.

The load applied on the jammed component is detected by force detectors. The signals, delivered by these detectors are processed, and a resulting signal is applied to the elevon PFCU servo valves.

When the Emergency Flight Control mode is in operation, the flight controls operate only in electrical mode (Blue or Green).

##### C. Overspeed Warning Activation Function

This warning is normally activated by the ADC in the whole flight envelope.

In supersonic flight, the SFC also generates this warning when the pitch attitude exceeds 6° nose-down.

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## MAINTENANCE MANUAL

### R D. Computer Test Function

The computer incorporates test circuits designed to test the computer on the ground by means of an on-board system (ITEM integrated test and maintenance). In flight, ITEM ensures continuous monitoring of computer safety devices and stores any faults which occur.

### 2. Description (Ref. Fig. 001 )

Two identical SFC systems are installed on the aircraft.

R The SFC No.1 has priority over SFC No.2 which overrides No.1 in case of failure of the latter (For AP Disconnection, Auto-Trim Inhibit and Overspeed Warning Activation functions, the two systems are simultaneously active).

The two systems comprise :

- R - Two SFC computers. The SFC computer No.1 (1C650) is located in the LH electronics rack, on shelf 6-215. The SFC computer No.2 (2C650) is located in the RH electronics rack, on shelf 6-216.
- R - An assembly of two engagement switches and two warning lights for Anti-Stall functions (Wobbler Warning and Superstabilization). This assembly forms part of the Flight Control Unit (C57) located on the overhead panel.
- Two force detectors (1C655 and 2C655) which detect the effort applied to the Captain's and First Officer's control columns for Emergency Flight Control mode.
- Emergency Flight Control engagement components comprising EMERG CONT engage switch (C654) and test button (C656) located on the Captain's control column.

In addition, each SFC computer is connected to the following components :

- Autostabilization computer for pitch rate data, roll and pitch autostabilization fail data, and for + 15 VDC and - 15 VDC supply (used when there is a failure of the SFC computer supply circuits).
- R In addition, Superstabilization function and Emergency Flight Control mode are directly linked with the autostabilization computer (Ref. 22-22-00, Description and Operation).
- R - Inertial Navigation Unit (INU) for pitch attitude and INU valid signal (Ref. 34-45-00, Description and Operation).

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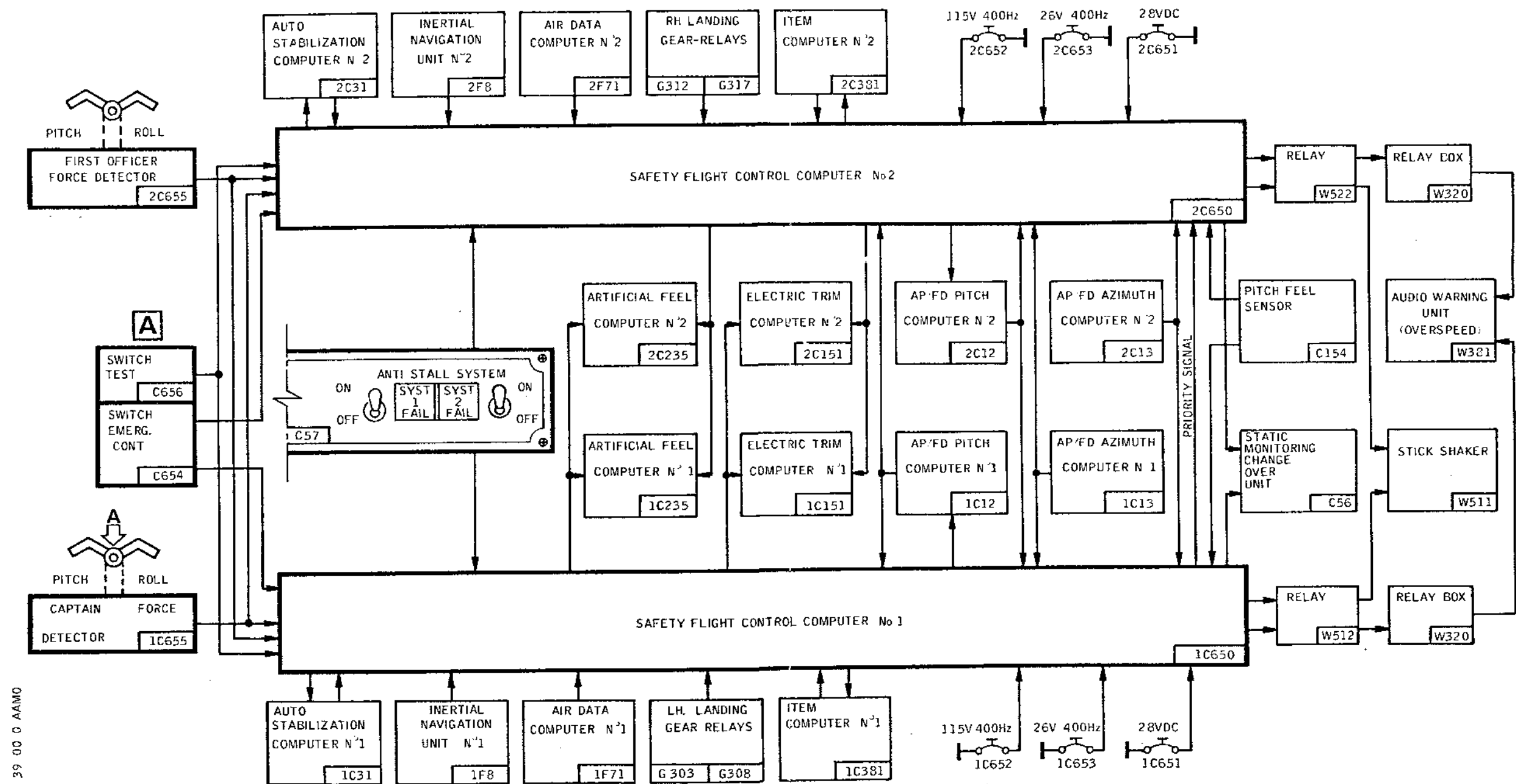
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## MAINTENANCE MANUAL



SFC System - Configuration  
Figure 001

**27-39-00**

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- ADC for angle-of-attack data, CAS data, Mach number, ADC fail and ADC angle-of-attack comparison warning (Ref. 34-11-00, Description and Operation).
- Main landing gear relays for aircraft in flight or on the ground configuration data.
- ITEM computer (Ref. 22-42-00, Description and Operation).
- Artificial Feel computer which receives the wobbler warning activation signal (Ref. 27-32-00, Description and Operation).
- Electric trim computer which receives the Auto-Trim Inhibit signal (Ref. 22-23-00, Description and Operation).
- AP/FD pitch computer which receives the disconnect signal and transmits the engage signal (Ref. 22-12-00, Description and Operation).
- AF/FD azimuth computer for LOC Track and GLIDE capture phase data (Ref. 22-13-00, Description and Operation).
- Pitch feel sensor for trim deflection data (Ref. 22-23-00, Description and Operation).
- Static monitoring changeover unit which receives the Flight Control comparators inhibit signal.
- Stall warning system relay which transmits stick shaker and Overspeed warning activation signals (Ref. 27-37-00, Description and Operation).
- The other SFC computer which transmits the priority signal.

R

### 3. Computers (Ref. Fig. 002 )

Each computer is in the form of a box.  
The front face is equipped with two connectors, ZA and ZB, for test and servicing, an hour counter, a NULL RESET push button protected by a guard, and two handles.

The rear face is equipped with a double connector (DPX2) for connection to the aircraft electrical circuit.

Each computer contains the electronic circuits which process data received and transmit signals to carry out all functions and, where necessary, to monitor them. The computer comprises :

- 1 power supply unit
- 16 electronic cards which are :

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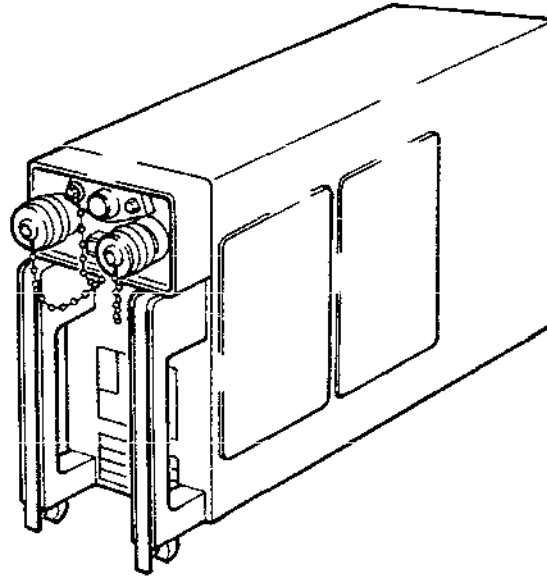
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## MAINTENANCE MANUAL



CMA 27 39 00 0 ACMO

SFC Computer  
Figure 002

R

- . 2 power supply cards (control and monitoring)
- . 2 pairs of logic circuit cards (control and monitoring) for detection of activation or inhibit conditions of the functions.
- . 9 analog circuit cards for processing and monitoring of signals.
- . 1 digital logic circuit card for computer integral test.

The power supply unit is powered by 115 VAC and 28 VDC. From a 115 VAC input, the stabilized power supply provides stabilized voltages for the various logic and analog circuits.

Both the 28 VDC supply and certain stabilized voltages are monitored by two level detectors. Triggering of one of these detectors causes cut-off of the 115 VAC supply and loss of the power supply valid signal.

The computer also has a 26 VAC 400 Hz input (monitored by the logic cards).

R

Description and operation of computation channels and the various functions of the computer will be given under paragraph 7 (Operation).

EFFECTIVITY: ALL

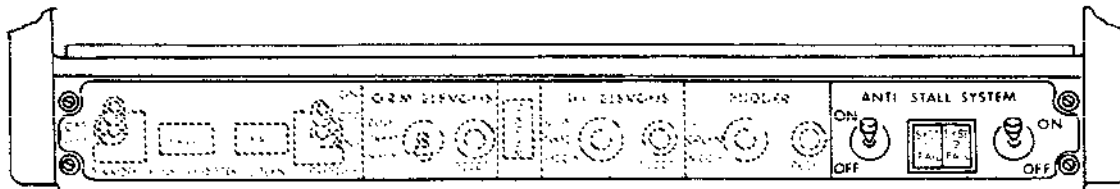
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The control and warning components associated with the two SFC computers are grouped in the Flight Control Unit (C57) on the overhead panel.

The switches are two-position, two-pole (control and monitoring) toggle switches. They serve for selection of wobbler warning and Superstabilization functions.

The switches supply the associated SFC computer with + 15 VDC in OFF position and - 15 VDC in ON position.

All faults detected by monitoring of the SFC functions cause the warning light associated with the faulty computer to be supplied with 28 VDC.

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### 5. Emergency Flight Control Components (Ref. Fig. 004 )

- R The system is equipped with a single EMERG CONT engage switch located on the Captain's Control column.  
This switch is a combined engage switch/green caption light equipped with 4 contacts (2 per computer) located at the junction of the control column yoke.  
Action on the switch causes activation of the Emergency Flight Control circuits of the two SFC computers. Selection of the mode is indicated by illumination of EMERG CONT caption light.  
Disengagement is possible by pressing on the switch a second time.
- R A thin guard cover (which must be ruptured to engage the mode)
- R avoids untimely engagement.
- A button located behind the engage switch allows for testing of the Emergency Flight Control mode. When the button is pressed and held, it simulates engagement of the mode (on the ground only).

### 6. Force Detectors (Ref. Fig. 005 )

A force detector is installed on each control column to measure effort applied in roll and pitch.

The detectors are housed in the articulation point of each control handwheel and transmit signals to the SFC computers proportional to force applied.

For pitch, force is measured at four vertical, sensitive cruciform blades (1) on which are mounted strain gauges.

Effort is transmitted from the handwheel to the control column via tubes (2) and (3) which are free to move in relation to tube (4) which is integral with the control column.

For roll, force is measured at torque tube (3) which is equipped with strain gauges. This tube is bent by the couple exerted on tube (2) which is integral with the control handwheel, in relation to tube (4) which is integral with the control linkage.

Each strain gauge is connected in a wheatstone bridge.

Each force detector is equipped with two strain gauge bridges, for roll and for pitch.

Each SFC computer supplies the roll strain gauge bridge and the pitch strain gauge bridge of each detector with a constant current (21mA). A zero-resetting device (by resistances) allows correction of any drift with time of the strain gauges (by pressing the NULL RESET push button, located on the front face of

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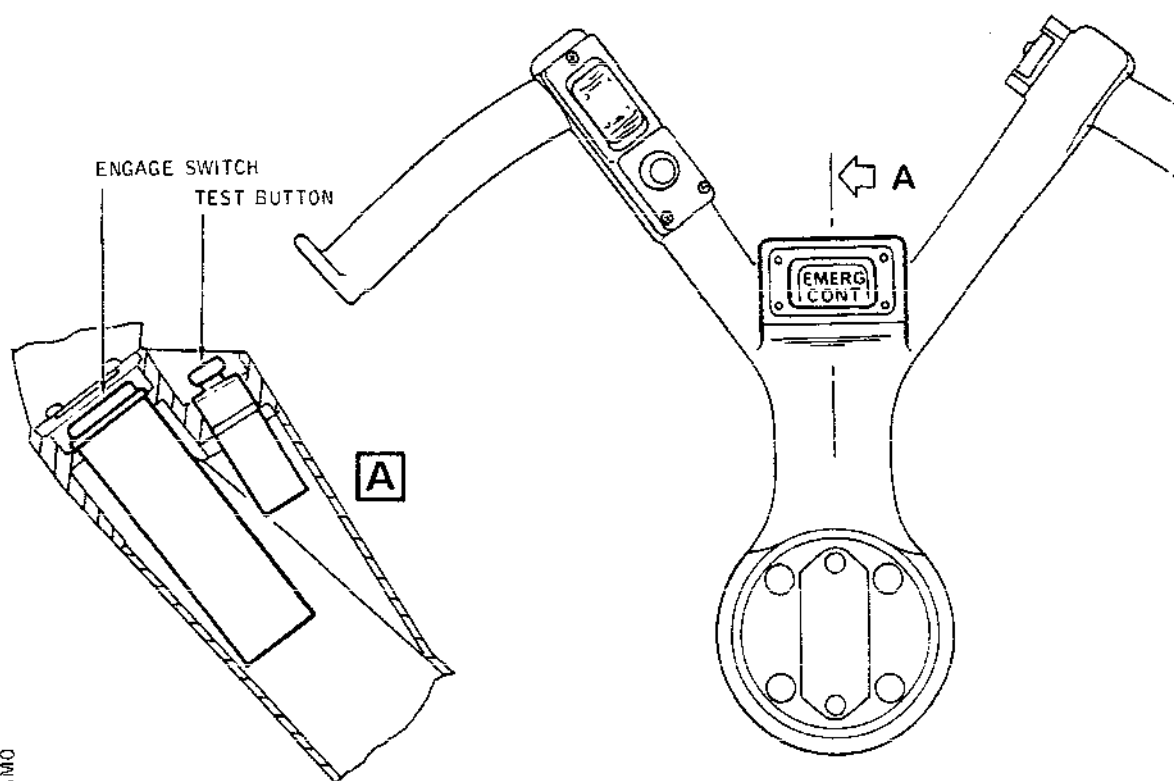
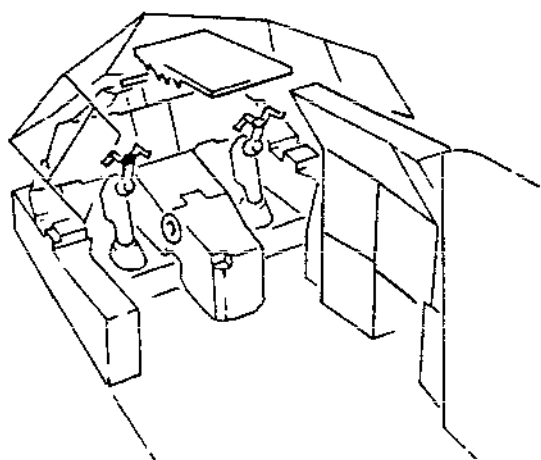
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Emergency Flight Control Components  
Figure 004

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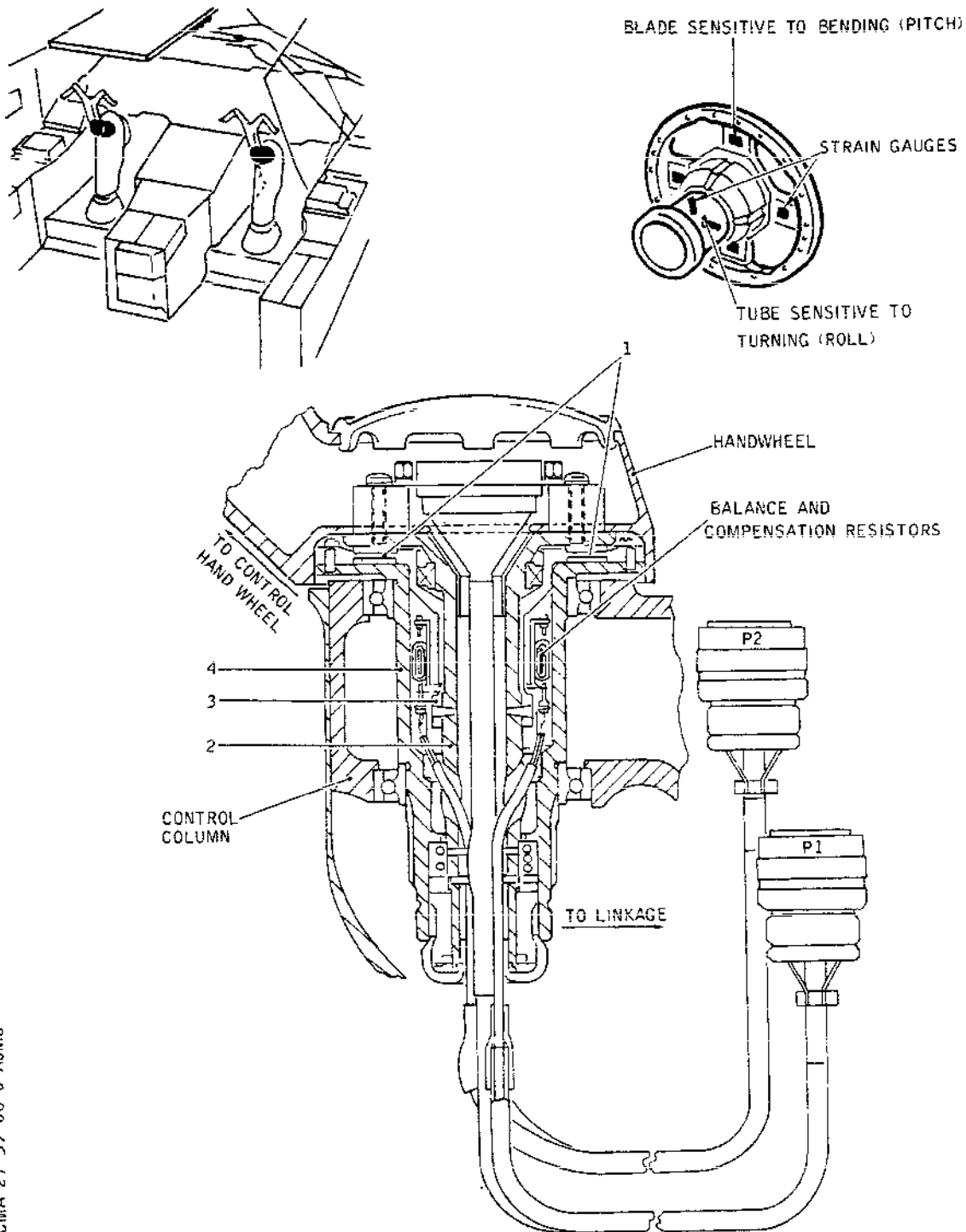
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Force Detectors  
Figure 005

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the computer, voltage is fed in to cancel out drift voltage).

### 7. Operation

#### A. Anti-Stall Functions

- (1) Wobbler warning  
(Ref. Fig. 006 )

##### (a) Function description

The wobbler warning consists of a pulsation of the control column. This is obtained by a varying pressure in the artificial feel jacks.

The wobbler warning is activated when the aircraft corrected angle-of-attack, plus the rate of change of corrected angle-of-attack with respect to time (which is limited to 3 degrees) is greater than 19.5 degrees.

The corrected angle-of-attack is the sum of the wing angle-of-attack (aircraft angle-of-attack plus 0.5 degrees) and 0.3 times the rate of change of pitch with respect to time.

Operation of this function is limited to :

- Vc less than 270 Kts
- An out of trim nose-up deflection.

NOTE : Activation of the wobbler warning also activates the stick shaker.

##### (b) Computation channel.

When the warning is activated, the priority computer transmits a pulsed signal (frequency 3 Hz) simultaneously to the two pitch Artificial Feel computers.

A monitored square wave generator, permanently processes the pulsed signal.

A comparison is carried out at the four outputs. This consists of two comparators with a short time delay 0.15 ms, such that a SFC fail does not cause loss of Artificial Feel.

Priority of SFC1 is ensured by an inhibit signal transmitted to SFC2. This is a logic signal which indicates that the function is in operational condition, that is, when the following conditions are simultaneously fulfilled :

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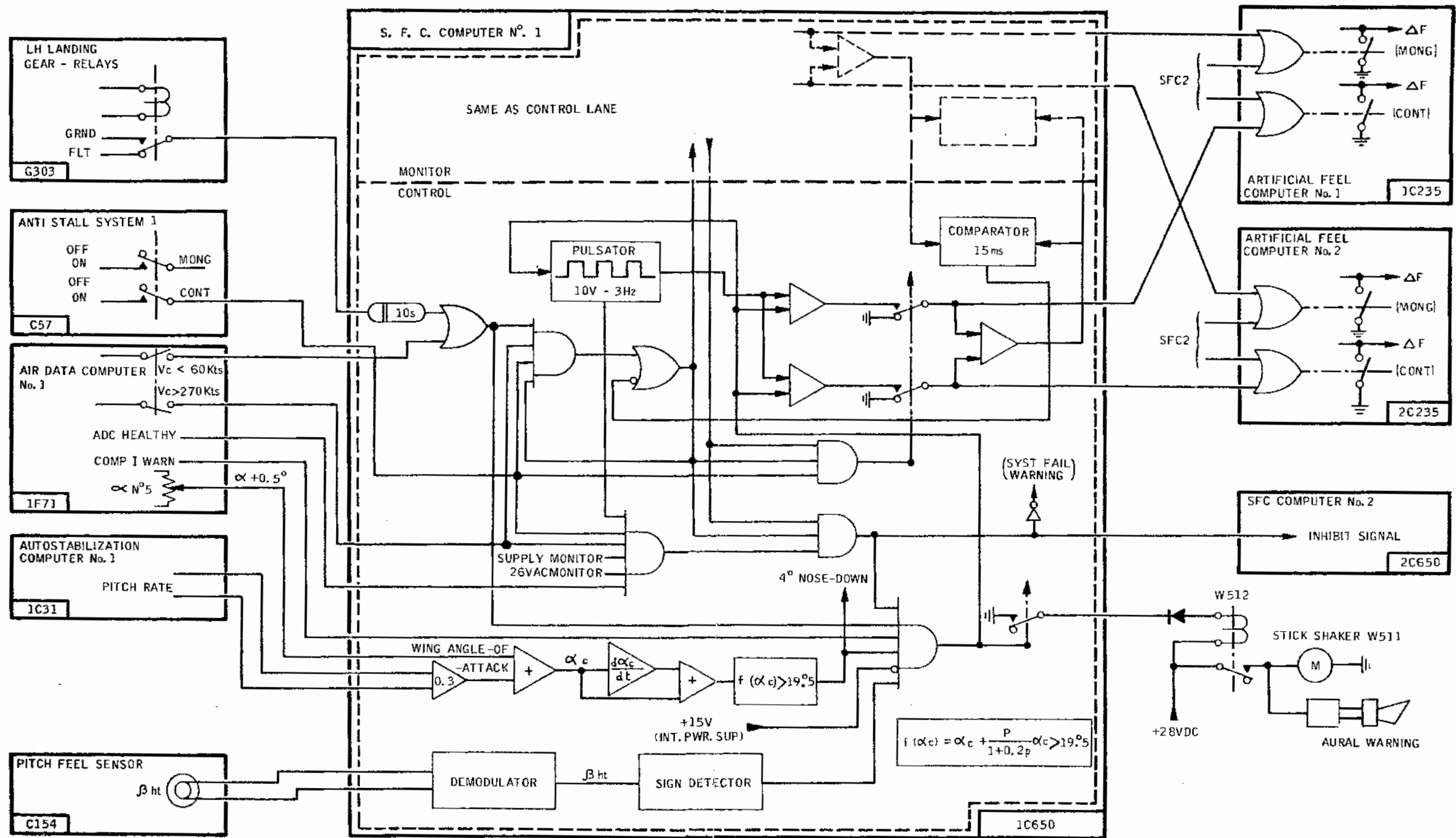
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Wobbler Warning Logic Diagram (System 1)  
Figure 006

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- Square wave generator operational.
- SFC power supply operational.
- 26 VAC available.
- Comparison of the four outputs operational.
- Vc less than 270 Kts.
- ADC operational.
- Associated ANTI STALL switch in ON position.
- Main landing gear shock absorbers have been extended for at least 10 seconds or main landing gear shock absorbers are compressed and Vc is less than 60 Kts.

The wobbler warning is activated when the following conditions occur :

- The corrected angle-of-attack plus its rate of change with respect to time is greater than 19.5 degrees.
- There is an out of trim nose-up deflection.
- There is no ADC angle-of-attack comparison warning.
- The other SFC computer is not operational.

NOTE 1 : The latter condition is inhibited with respect to system 1 by the aircraft wiring.

NOTE 2 : The logic signal corresponding to angle-of-attack condition is transmitted to the superstabilization computer for processing of the 4 degrees nose-down signal

Detection of these conditions is carried out by two identical, independent computation channels. In the same way the necessary data is received from different sources.

Any difference between the two channels is detected at the output comparison.

The activation signal is also transmitted to the stick shaker and stall warning horn control relay.

NOTE : At any time, the wobbler warning can be cancelled by disengaging the pitch Artificial Feel.

(2) Superstabilization  
(Ref. Fig. 007 )

(a) Function description

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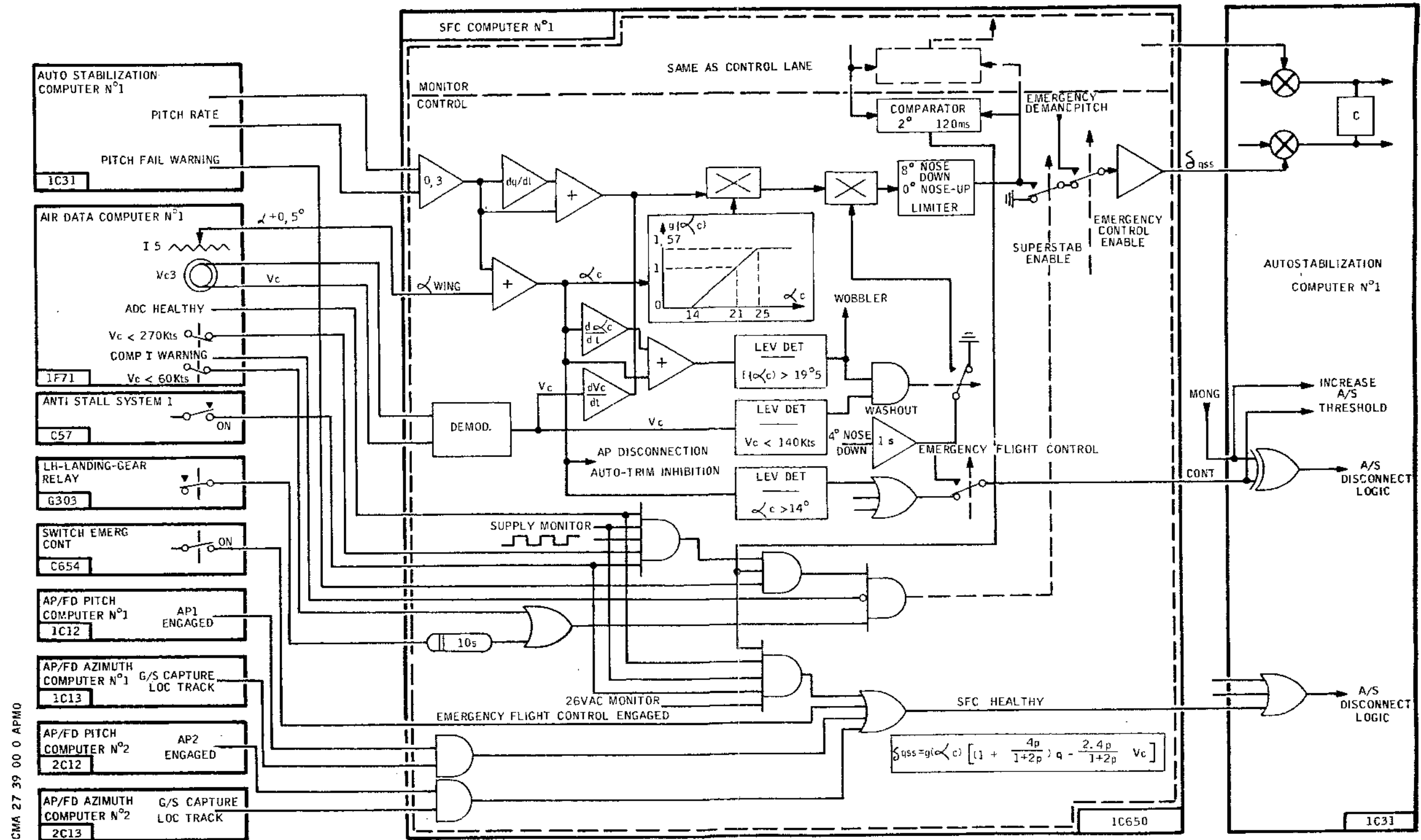
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Superstabilization Logic Diagram (System 1)  
Figure 007

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The superstabilization function artificially increases the aircraft pitch damping to allow for very severe manoeuvres at high angle-of-attack attitudes.

This function transmits a symmetrical elevon deflection signal to the six elevon PFCU's via the pitch autostabilization channels. This signal is a function of :

- Rate of change of pitch and variation of this rate.
- Rate of change of  $V_c$
- A gain function of corrected angle-of-attack.

Deflection by the superstabilization function is limited to 8 degrees nose-down and 0 degrees nose-up. Operation of this function is limited to a  $V_c$  of less than 270 Kts.

In addition, given the following conditions :

- $V_c$  less than 140 Kts.
- Corrected angle-of-attack plus its rate of change with respect to time greater than 19.5 degrees, (activation condition of wobbler warning),

the superstabilization function transmits a signal equivalent to 4 degrees nose-down via a 1 second time constant filter (washout).

### (b) Computation channel

Both computer channels transmit a deflection signal to the associated pitch autostabilization computer. Monitoring is ensured by a double comparison between the two channel outputs. The processed signals are summed with the pitch autostabilization signals in the autostabilization computer.

The superstabilization function is active when the following conditions are simultaneously fulfilled :

- Associated ANTI STALL switch in ON position.
- SFC power supply operational.
- 26 VAC is supplied.
- Output comparators are operational.
- ADC operational.
- Pitch autostabilization computer operational.
- $V_c$  less than 270 Kts.
- Main landing gear shock absorbers have been ex-

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tended for at least 10 seconds or Main landing gear shock absorbers are compressed and Vc is less than 60 Kts.

- There is no ADC angle-of-attack comparison warning.

If, in addition to the above conditions, there is:

- Vc less than 140 Kts,
- Corrected angle-of-attack, plus its rate of change with respect to time, greater than 19.5 degrees (condition detected in wobbler warning activation circuits),

a signal equivalent to 4 degrees nose down is summed with the superstabilization signal via a 1 second time constant filter.

All logic conditions are detected by two logic channels.

Priority of system 1 is due to the existing priority of autostabilization computer 1 over autostabilization computer 2.

A valid signal is processed by two channels and is transmitted to the pitch autostabilization computer if one of the following conditions is no longer present :

- Associated ANTI STALL switch in ON position.
- SFC power supply operational.
- Output comparators operational.
- ADC operational.
- 26 VAC is supplied.

This signal is inhibited when the computer receives one of the following data :

- AP1 engaged with aircraft in G/S Capture or LOC track modes.
- AP2 engaged with aircraft in G/S Capture or LOC track modes.
- Emergency Flight Control mode engaged.

NOTE : A device on the autostabilization computers provides for re-engagement of one autostabilization computer in case of fail of both SFC computers.

In addition, as the maximum signal level of the

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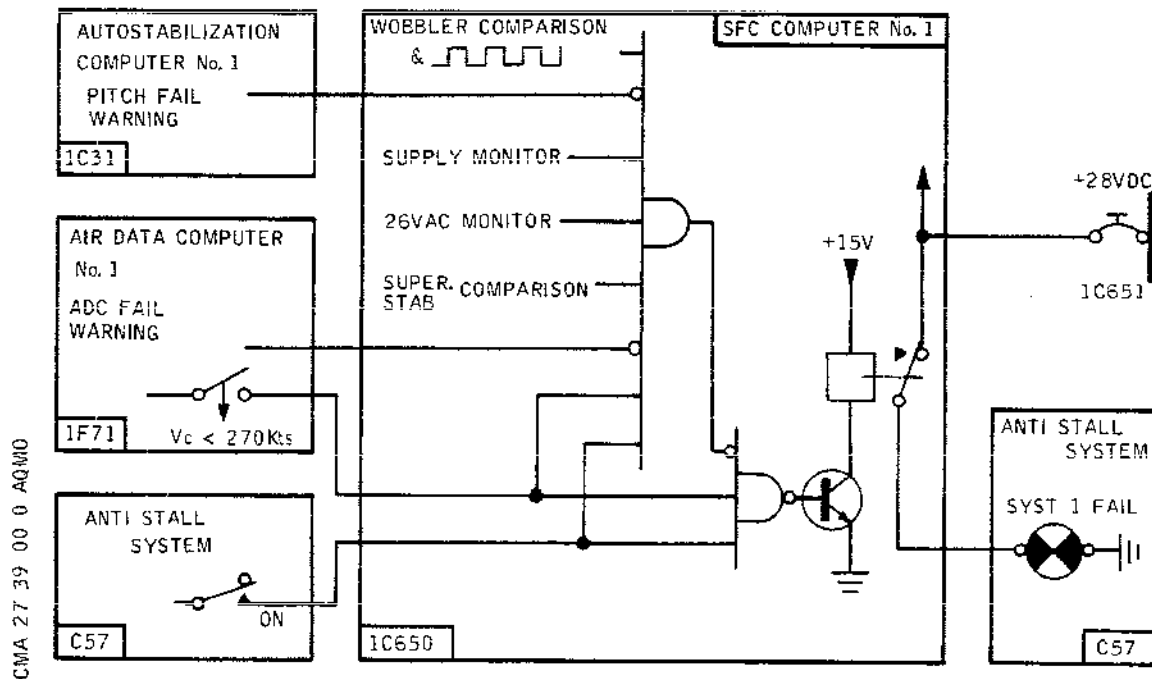
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superstabilization function can be significantly greater than those of the autostabilization computer, two level detectors cause an increase in the autostabilization thresholds when corrected angle-of-attack reaches and exceeds 14 degrees. A difference in the output of these two detectors causes disconnection of the autostabilization computer.

### (3) SYST FAIL warning light associated circuits (Ref. Fig. 008 )



SYST FAIL Warning Light Associated Circuits  
(system 1)  
Figure 008

Superstabilization and wobbler warning functions are selected via ANTI STALL switch. Fail of these functions is indicated by SYST FAIL warning light.

This warning light illuminates with functions selected (ANTI STALL switch in ON position) in the following cases :

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- Comparator fail (Superstabilization or wobbler warning).
- Square wave generator fail
- SFC power supply fail
- Associated ADC fail
- Associated pitch autostabilization computer fail
- 26 VAC not supplied.

It is extinguished (except in case of power supply fail) by placing corresponding ANTI STALL switch in OFF position.

As the functions are only activated at Vc less than 270 Kts, illumination of the warning light is inhibited when Vc is greater than 279 Kts (except in case of power supply fail).

- (4) Autotrim inhibit function and pitch AP disconnection  
(Ref. Fig. 009 )

(a) Function description

In AP flight, the aircraft can reach high angles-of-attack in the following cases :

- non detected failure of the AP in operation which causes a nose-up order
  - insufficient thrust when the AP holds the aircraft in level flight
- In both cases, a disconnection order is sent to the pitch AP when :
- the corrected angle-of-attack is equal to or greater than 18 degrees
  - the pitch attitude is equal to or greater than 20 degrees

An inhibit signal of the automatic operation of the trim is produced when the corrected angle-of-attack is equal to or greater than 15 degrees.

Thus, if a non detected failure of the AP is such that the angle-of-attack increases, the AP disengages when the angle-of-attack reaches 18 degrees. The result is an automatic nose-down order, until the angle-of-attack is reduced to 15 degrees.

For approach, to ensure the independence of AFCS systems with respect to the ADC and faults within the SFC, AP disconnect and autotrim inhibit si-

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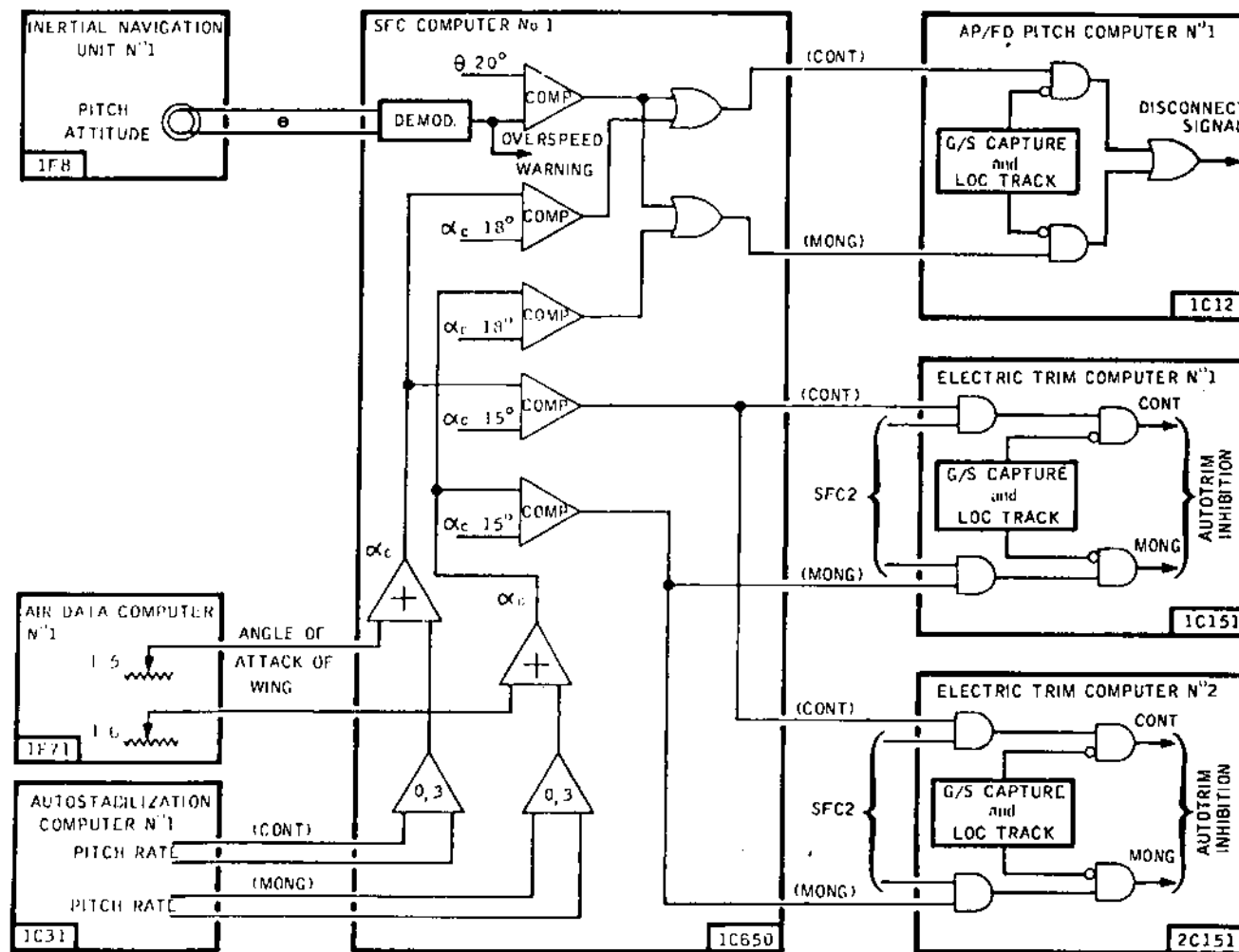
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Autotrim Inhibit Function and Pitch AP  
Disconnection (System 1)  
Figure 009

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gnals are overridden when the aircraft is in LOC Track and G/S Capture modes.

### (b) Computation channel

The SFC computer includes.

- Two level detectors for a corrected angle-of-attack of 15 degrees.
- Two level detectors for a corrected angle-of-attack of 18 degrees.
- One level detector for a pitch attitude of 20 degrees.

Each SFC computer transmits disconnect or inhibit logic signals on the control and monitoring channels of the associated pitch AP and the two electric trim computers.

Inhibit function of autotrim occurs if logic signals are received from both SFC computers. Disconnection of AP occurs if one logic signal at least (control or monitoring channel) is received from the SFC with which it is associated. These signals are overridden when the aircraft is in LOC Track and G/S Capture modes. This overriding is carried out in the AP and Trim computers.

These functions are activated by energization of the SFC system ; they are inhibited by an SFC power supply fail.

### B. Emergency Flight Control Mode (Ref. Fig. 010 )

#### (1) Mode description

##### (a) Pitch axis

The elevon Emergency Control signal is produced as a function of the effort measured at the control columns and the rotation of the integral trim with respect to its initial position (out-of-trim deflection).

The computation channel is so designed that the effort applied to the control column to obtain a certain deflection of the elevons is identical to that which would have to be applied to the non-seized control with artificial feel jacks depressurized.

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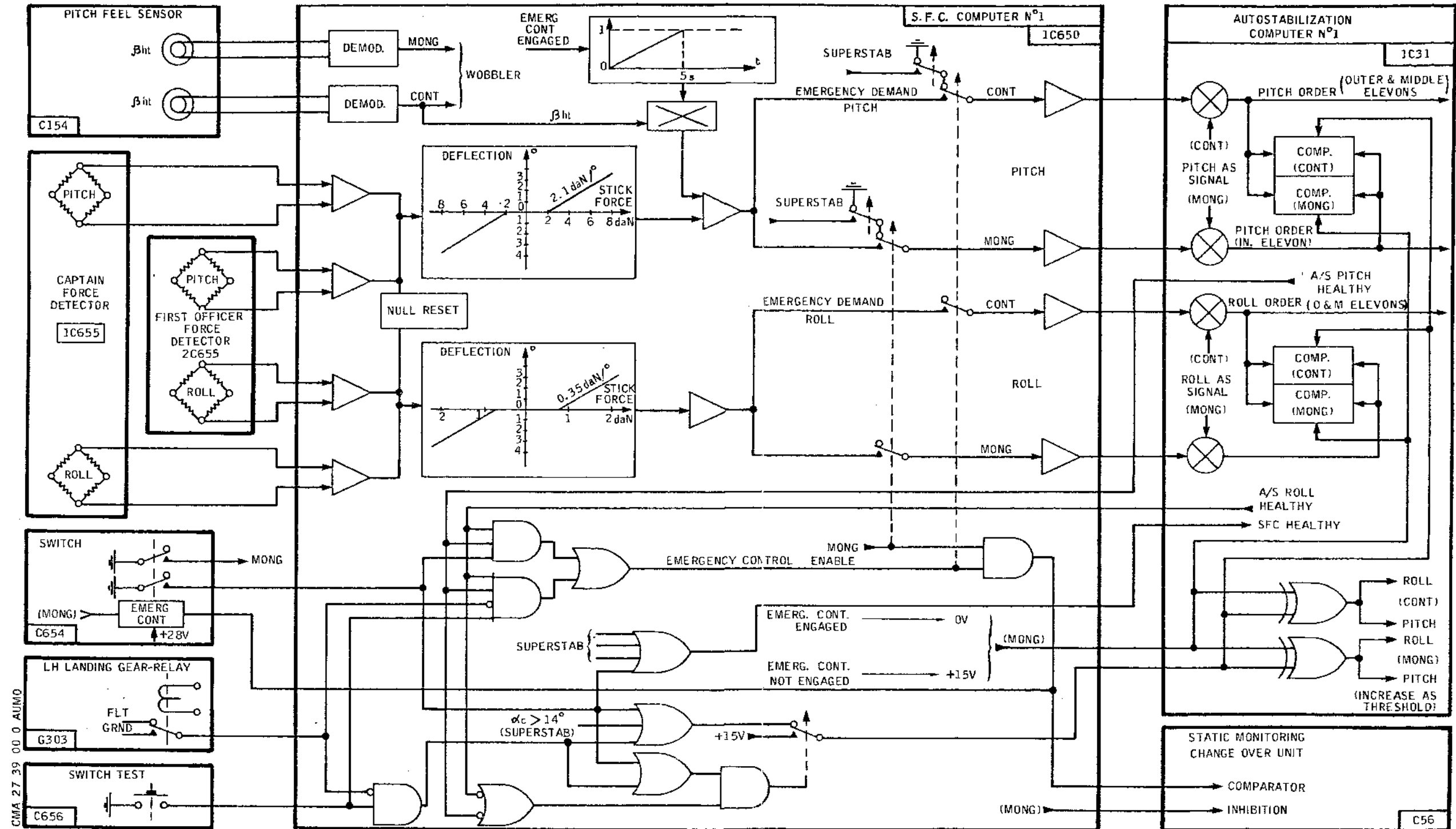
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Emergency Flight Control Mode Logic Diagram  
(System 1)  
Figure D10

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The pitch trim is always operational in Emergency Flight Control mode which causes the cancelling out of effort on the control column for any elevon deflection.

The deflection signal from the Emergency Flight Control is summed with the deflection signal from the autostabilization computer.

### (b) Roll axis

The principle is similar to that of the pitch axis, but with the two following differences :

- The Emergency signal does not take into account the rotation of the integral trim assembly with respect to its initial position;
- The deflection signal from the Emergency Flight Control only drives the outer and middle elevons as this signal is summed with the roll autostabilization signal which does not control the inner elevons.

### (2) Computation channels.

Each SFC computer is associated with a gauge bridge detecting pitch and roll effort for the Captain's control column and a gauge bridge for the First Officer's control column.

The Captain's and First Officer's signals are summed then processed. They are then transmitted to the elevons via the autostabilization computer.

SFC1 is linked with autostabilization computer 1 and SFC 2 with autostabilization computer 2. The Emergency Flight Control mode operates with flight controls in Blue or Green electrical mode.

The Emergency Flight Control signals are summed with the autostabilization signals ; for pitch, the SFC/ autostabilization computer connection normally used to transmit the superstabilization signals is used. Thus, in Emergency Flight Control mode, the Superstabilization function is inhibited.

For pitch, a circuit with a progressive variable gain of 0 to 1 in 5 seconds is superimposed on the out-of-trim deflection signal so as to absorb the transient pulse produced if the mode is engaged when there is a large out-of-trim deflection.

The logic circuits controlling the increase in thresh-

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hold of the pitch autostabilization comparators are activated when the Emergency Flight Control is engaged. These circuits also control the increase in threshold of the roll autostabilization comparators.

The Emergency Flight Control computation channel is not monitored but the engage logic channel is duplicated.

The Emergency Flight Control is engaged when :

- The mode is selected
- Pitch autostabilization is operational
- Roll autostabilization is operational

These conditions must be detected by the two engage channels and if they are present :

- EMERG CONT caption light illuminates
- Threshold of autostabilization comparators is increased.
- Superstabilization function is inhibited
- Superstabilization function valid signal remains present
- Elevon monitoring is inhibited (to prevent untimely changeover to mechanical mode which would cause loss of Emergency Flight Control)

NOTE : Engagement of Emergency Flight Control is simultaneously effective for pitch and roll axes. The efficiency of the control is increased for the axis of which the control component is not seized.

When Emergency Flight Control mode is selected, any fault detected in an SFC computer causes an imbalance condition in the threshold increase logic of the associated pitch and roll autostabilization comparators, thus causing their disconnection. In the same way, loss of one pitch autostabilizer causes disconnection of the associated roll autostabilizer and vice versa when Emergency Flight Control is engaged.

### C. Overspeed Warning Activation Function (Ref. Fig. 011 )

#### (1) Function description

This aural warning sounds when :

- Pitch attitude is greater than 6 degrees nose-down
- Mach number is greater than 1.

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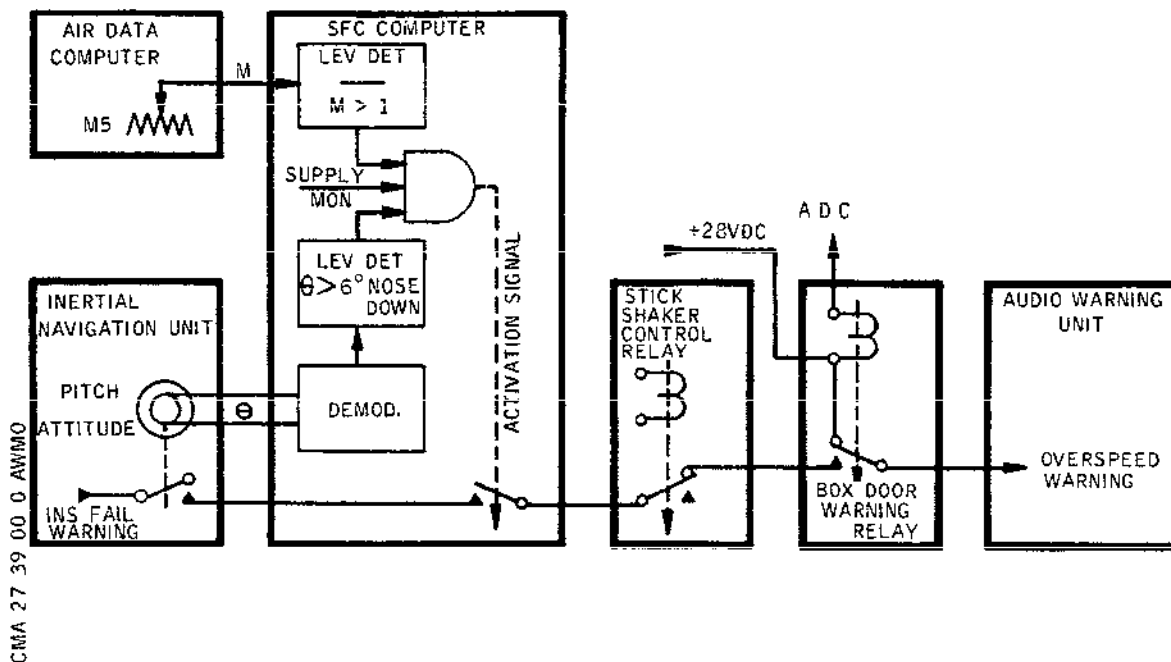
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Overspeed Warning Logic Diagram  
Figure 011

This function is inhibited when the stick shaker is activated.

### (2) Computation channel

Each computer receives a valid signal from the associated INU.

When certain conditions are fulfilled, the computer transmits this signal to the audio warning unit, which activates the Overspeed warning (warbler)

The activation signal is controlled by a single computation channel which detects the following simultaneous conditions :

- Mach number greater than 1
- Pitch attitude greater than 6 degrees nose-down

This activation signal can be cut off by a contact associated with the stick shaker control relay.

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To prevent untimely operation of this warning, it is inhibited in the event of :

- SFC power supply fail
- INU fail

### D. Computer Test Function

By means of sequential binary signals controlled by test equipment (ITEM), coder and decoder circuits enable the SFC computer inputs to be cut out, electrical signals to be fed to the computation channels and the monitoring components, and the circuit response to the electrical signal to be read.

Control binary signals are normally grounded in flight.

### 8. Electrical Power Supply

SERVICE	BUSBAR		C/B PANEL
SFC No.1	A ESSENTIAL	28 VDC - 3P	1-213
SFC No.2	B ESSENTIAL	28 VDC - 4P	5-213
SFC No.1	A AVIONICS	115 VAC - 10X	13-215
SFC No.1	A MAIN	26 VAC - 12X	13-215
SFC No.2	B AVIONICS	115 VAC - 11X	13-216
SFC No.2	B MAIN	26 VAC - 13X	13-216

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### SAFETY FLIGHT CONTROL SYSTEM - TROUBLE SHOOTING

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN 24-00-00, SERVICING.

#### 1. General

A. In order to obtain rapid trouble shooting of the safety Flight Control System procedure is divided in 4 parts:

1st Part : Faults detected when energizing system and during ITEM test sequence.

2nd Part : Faults of Anti-Stall functions.

3rd Part : Faults of Emergency Flight Control mode.

4th Part : Faults of OVERSPEED warning activation function.

NOTE : Each of the 4 parts mentioned above is independent. However Trouble Shooting of any one of these can only be carried out after completing trouble shooting of the first part : Faults detected when energizing system and during ITEM TEST sequence.

B. The following information is intended to enable faults found on the ground or in flight to be quickly rectified. This in-

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formation is given in the form of fault analysis synoptic charts, The defect can be isolated with the aid of the trouble shooting procedures and traced through OK and NOT OK paths to the appropriate charts or other specified rectification action as may be necessary. If a defect occurs perform the appropriate rectification action then repeat the operation at which the defect was encountered to ensure the operation is OK. Bracketed numbers in the procedures and charts indicate items on the component identification table (at the end of topic). The table provides information, including component location, required for rectification. Aircraft wiring is assumed serviceable, If the component fault is not detected, check wiring in accordance with the Wiring Diagram Manual (27-39-01, 02, 03, 04, 05). The system consists of two identical channels, trouble shooting procedure described is for channel 1, trouble shooting procedure for channel 2 is indicated in parentheses.

### 2. Prepare

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Access Platform 4.240 m (13 ft. 11 in.)	
Multimeter	
Pressure Sensor Simulator or Pressure Generator Air Data System	87209455
2 Adapters - Pitot Tube	853BFT025
2 Blanking Plugs. Pitot Tube Drain Port	853BFT026
2 Adapters - Static Ports	T8751E22783002
DEUTSCH 95106 RC 2255P03 Type connector P4 (Terminals A and U connected)	

B. Take the precautions described in the previous WARNING paragraph.

C. Make certain that the following circuit breakers are set :

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW "A" SYS SUP	1-213	G 292	M17
RH UC WEIGHT SW & DOWNLOCK		G 295	M18
"A" SYS SUP			
PITCH ART FEEL COMP 1 SUP	2-213	1C 244	E 4
LH UC WEIGHT SW & DOWNLOCK	3-213	G 293	B 8
"B" SYS SUP			
RH UC WEIGHT SW "B" SYS SUP		G 294	B 9
PITCH ART FEEL COMP2 SUP	13-216	2C 244	G18

D. Carry out Prepare paragraph of autopilot engagement (Ref. 22-10-00, Servicing).

E. Trip, safety and tag the following circuit breaker

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
STICK SHAKER SUP	1-213	W 513	P15

F. Connect Electrical Ground Power Unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

G. On Flight Engineer's panel, on EQUIPMENT BAY COOLING unit, make certain that electronics rack ventilation operates (Ref. 21-21-00).

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### 3. Trouble shooting - Faults detected when energizing system and during ITEM (integrated Test and Maintenance system) Test sequence

\*\*\*\*\*  
\* On circuit breaker panel 13-215 (13-216) trip \*  
\* safety and tag circuit breaker SAFETY FLT CONT \*  
\* COMP No.1 115V SUP 1C 652 (No.2 115V SUP 2C 652 \*  
\* Map Ref. E6 (C17). On overhead panel, on Flight \*  
\* Control Unit, SYST 1 FAIL warning light (SYST 2 \*  
\* must illuminate. \*

\*\*\*\*\*

OK	NOT OK--	Fault of Safety Flight Control System 28 VDC supply. (SYST 1 FAIL (SYST 2 FAIL) warning light does not illuminate). Ref. Chart 101
----	----------	---

\*\*\*\*\*  
\* On circuit breaker panel 13-215 (13-216) set \*  
\* circuit breaker SAFETY FLT CONT COMP No.1 SUP \*  
\* 1C 652 (No.2 115V SUP 2C 652) Map Ref. E 6 (C17). \*  
\* On overhead panel, on Flight Control Unit, SYST 1 \*  
\* FAIL (SYST 2 FAIL) warning light must go off. \*

\*\*\*\*\*

OK	NOT OK--	Fault of Safety Flight Control system 115 VAC supply. (Syst 1 FAIL (SYST 2 FAIL) warning light remains illuminated). Ref. Chart 102
----	----------	--

\*\*\*\*\*  
\* Carry out an ITEM test sequence of SFC computer \*  
\* No.1 (No.2) as per chapter 27-39-00 Adjustment/ \*  
\* Test (paragraph 2 C). \*  
\* At Flight Engineer's station, on ITEM control and \*  
\* display panel PASS indication replaces TEST \*  
\* indication at the end of test. \*

\*\*\*\*\*

OK	NOT OK--	COMP indication is displayed on ITEM control and display panel. Replace SFC computer No.1 1C 650 [1] (No.2 2C 650 [2])
----	----------	---

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||  
OK  
||

\*\*\*\*\*  
\* Using ITEM system test PITCH channel of autostabi-  
\* lization system No.1 (No.2) as per chapter \*  
\* 22-22-00, Adjustment/Test (paragraph 2.C). \*  
\* At Flight Engineer's station, on ITEM control and \*  
\* display panel, PASS indication replaces TEST \*  
\* indication at the end of TEST. \*  
\*\*\*\*\*

OK	NOT OK--	GYR M indication appears on ITEM control and display panel. Replace monitoring pitch rate Gyro 1C38 [14] (2C38 [15]).
OK	NOT OK--	GYR indication appears on ITEM control and display panel. Replace control pitch rate Gyro 1C33 [16] (2C33 [17]).
OK	NOT OK--	COMP indication appears on ITEM control and display panel. Replace autostabilization computer No.1 1C 31 [3] (No.2 2C 31 [4]).

\*\*\*\*\*  
\* IF fault is not yet isolated, refer to one of the \*  
\* following trouble shootings depending on the \*  
\* symptoms of the fault detected on the ground or in \*  
\* Flight. \*  
\*\*\*\*\*

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*****	
* SAFETY FLIGHT CONTROL SYSTEM 28 VDC*	GROUND EQUIPMENT REQUIRED
* SUPPLY FAULT. (SYST 1 FAIL (SYST 2 *	-----
* FAIL) WARNING LIGHT DOES NOT	* DESCRIPTION PART NO.
* ILLUMINATE).	* -----
*****	MULTIMETER.
-----	

\*\*\*\*\*

\* On shelf 6-215 (6-216), remove SFC computer No.1 \*

\* [1] (No.2 [2]) \*

\* On circuit breaker panel 1-213 (5-213) remove \*

\* safety clip and tag and set circuit breaker SAFETY\*

\* FLT CONT No.1 SUP 1C 651 (No.2 SUP 2C 651 Map \*

\* Ref. S20 (D17). \*

\* On rack connector 1C650 (2C650), measure voltage \*

\* between pins AA-4 (+) and AA-5 (ground) \*

\*\*\*\*\*

		-----
28VDC	OVDC--	Replace circuit breaker SAFETY FLT CONT No.1
		SUP 1C 651 [38] (No.2 SUP 2C 651 [39]).
		-----

\*\*\*\*\*

\* Trip, circuit-breaker SAFETY FLT CONT No.1 SUP \*

\* 1C651 (No.2 SUP 2C651). \*

\* On shelf 6.216 (6.215) remove SFC computer No.2 \*

\* (No.1) and replace by SFC computer No.1 (No.2) on \*

\* shelf 6-215 (6.216). \*

\* Set circuit breaker tripped above. \*

\* SYST 1 FAIL (SYST 2 FAIL) warning light illumina- \*

\* tes. \*

\*\*\*\*\*

		-----
OK	NOT OK--	Replace Flight Control Unit C 57 [18]
		-----
		-----
-----		Replace SFC computer No.1 1C650 [1] (No.2
		2C 650 [2])
		-----

Chart 101 (Sheet 1 of 1)

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*****		-----
* SAFETY FLIGHT CONTROL SYSTEM 115VAC*		GROUND EQUIPMENT REQUIRED
* SUPPLY FAULT (SYST 1 FAIL (SYST 2	*	-----
* FAIL) WARNING LIGHT REMAINS	*	DESCRIPTION PART NO.
* ILLUMINATED).	*	-----
*****		MULTIMETER
		-----

\*\*\*\*\*

\* On shelf 6-215 (6-216), remove SFC computer No.1 \*

\* 1C 650 [1] (No.2 2C 650 [2]). \*

\* On circuit breaker panel 13-215 (13-216) remove \*

\* safety clip and tag and set circuit breaker SAFETY\*

\* FLT CONT COMP No.1 115V SUP 1C652 (No.2 115V SUP \*

\* 2C 652 Map Ref. E 6 (C17). \*

\* On rack connector 1C650 (2C650), measure voltage \*

\* between pins AB.1 and AB.2. \*

\*\*\*\*\*

115VAC	OVAC---	-----
		Replace circuit breaker SAFETY FLT CONT COMP
		No.1 115V SUP 1C652 [36] (No.2 115V SUP 2C652
		[37])
		-----
		Replace SFC computer No.1 1C 650 [1] (No.2
		2C 650 [2]).
		-----

NOTE : Presence of 115 VAC on SFC computer can be verified by checking on front panel of the latter the correct operation of the hour meter.

Chart 102 (Sheet 1 of 1)

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### 4. Trouble Shooting - Faults of Anti-Stall Functions

\*\*\*\*\*  
 \* On ADC control panel (centre console), place ADC 1 \*  
 \* and ADC 2 switches in ON position. If necessary, \*  
 \* press then release amber ADC 1 and ADC 2 warning \*  
 \* lights ; these lights must go off. \*  
 \*\*\*\*\*

OK	NOT OK-	ADC 1 or ADC 2 general warning is triggered when system is energized (Ref. 34-11-00, T/S)
----	---------	---

\*\*\*\*\*  
 \* On overhead panel, on AUTO STAB unit No.1 (No.2) \*  
 \* engage PITCH and ROLL switches ; these switches \*  
 \* remain engaged. \*  
 \*\*\*\*\*

f OK	NOT OK-	Disconnection of PITCH or (and) ROLL axes of autostabilization system No.1 (No.2) (Ref. 22-22-00, T/S).
---------	---------	---

\*\*\*\*\*  
 \* On overhead panel, on Flight Control Unit, place \*  
 \* ANTI STALL SYSTEM 1 and 2 switches in ON position \*  
 \* then on AUTO STAB unit No.2 (No.1) engage PITCH and \*  
 \* ROLL switches. \*  
 \* PITCH and ROLL switches on AUTO STAB unit No.1 \*  
 \* (No.2) remain engaged. \*  
 \*\*\*\*\*

OK	NOT OK-	Loss of PITCH and ROLL axes of autostabilization system No.1 (No.2) when engaging anti-stall functions Ref. Chart 111
----	---------	--

OK	NOT OK-	Loss of PITCH axis of autostabilization system No.1 (No.2) when engaging anti-stall functions Ref. Chart 112
----	---------	---

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||  
OK  
||

\*\*\*\*\*  
\* On overhead panel, on AUTO STAB units No.1 and No.2\*  
\* disengage PITCH and ROLL switches, then on Flight \*  
\* Control Unit, place ANTI STALL SYSTEM 2 (1) switch \*  
\* in OFF position. \*  
\* On circuit breaker panels 1-213 and 3-213, trip, \*  
\* safety and tag circuit breakers LH UC WEIGHT SW \*  
\* A SYS SUP G 292 and LH UC WEIGHT SW & DOWNLOCK B \*  
\* SYS SUP G 293 (RH UC WEIGHT SW & DOWNLOCK A SYS \*  
\* SUP G 295 and RH UC WEIGHT SW B SYS SUP G 294) \*  
\* Map Ref. M17 and B8 (M18 and B9). \*  
\* On ADC control panel (centre console) place ADC1 \*  
\* (ADC2) TEST switch in position 1. Amber ADC1 \*  
\* (ADC2) warning light must illuminate and after \*  
\* approximately 30 seconds the Blue TEST indicator \*  
\* light must illuminate. Press then release amber \*  
\* ADC1 (ADC2) warning light ; this light must go off.\*  
\* On overhead panel, on ARTIFICIAL FEEL unit No.1 \*  
\* (No.2), engage PITCH switch. \*  
\* Slightly pull control column and check that \*  
\* pulsations are felt. \*  
\*\*\*\*\*

||  
OK  
||

NOT OK-

Wobbler warning is not activated.  
Ref. Chart 113

\*\*\*\*\*  
\* Remove safety clips and tags and set circuit \*  
\* breakers mentioned previously \*  
\* Slightly pull control column and check that \*  
\* pulsations are no longer present. \*  
\*\*\*\*\*

||  
OK  
||

NOT OK-

Untimely activation of wobbler warning in  
ground configuration and speed greater than  
60 kts.

Ref. Chart 114

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||  
OK  
||

\*\*\*\*\*  
\* On overhead panel, on ARTIFICIAL FEEL No.1 (No.2) \*  
\* unit, disengage PITCH switch. \*  
\* Carry out Prepare paragraph operations and tests \*  
\* described in 22-31-00, Adjustment/Test (paragraph \*  
\* 3.E. Check of IAS ACQ Mode and of Speed Select \*  
\* indicator (autothrottle engagement in IAS ACQ \*  
\* mode). IAS ACQ push button illuminates and on \*  
\* AFCS control unit, AT1 (AT2) switch remains \*  
\* engaged. \*

\*\*\*\*\*

||  
OK NOT OK-| Incorrect speed data. |  
|| | Replace ADC 1 1F 71 [5] (ADC 2 2F 71 [6]). |  
|| |-----|

\*\*\*\*\*  
\* On AFCS control unit, disengage AT1 (AT2) switch. \*  
\* On shelf 6-215 (6-216), on front face of SFC \*  
\* computer, unscrew protective plugs on test \*  
\* connectors ZA and ZB. \*  
\* Check that voltage measured between pins ZA 39 \*  
\* and ZA 60 then ZB 39 and ZB 60 is equal. \*

\*\*\*\*\*

||  
OK NOT OK-| Angle-of-attack data incorrect. |  
|| | Replace ADC 1 1F 71 [5] (ADC 2 2F 71 [6]). |  
|| |-----|

\*\*\*\*\*  
\* On ADC control panel (centre console), place ADC1 \*  
\* (ADC2) TEST switch in NORM position. After approx. \*  
\* 30 seconds, press then release amber ADC1 (ADC2) \*  
\* warning light : this light must go off. \*  
\* Carry out operations to engage Autopilot No.1 \*  
\* (No.2) as detailed in 22-10-00, Servicing. \*  
\* On AFCS control unit, check that AP1 (AP2) switch \*  
\* can be engaged. \*

\*\*\*\*\*

||  
OK NOT OK-| Replace autostabilization computer No.1 1C 31 |  
|| | [3] (No.2 2C 31 [4]). |  
|| |-----|

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||  
OK  
||

\*\*\*\*\*  
\* On ADC control panel (centre console), place ADC1 \*  
\* (ADC2) TEST switch in position 1. Amber ADC1 \*  
\* (ADC2) warning light must illuminate and after \*  
\* approx. 30 seconds, the Blue TEST indicator light \*  
\* must illuminate. Press then release amber ADC1 \*  
\* (ADC2) warning light ; this light must go off. \*  
\* Carry out procedure to engage Autopilot No.1 \*  
\* (No.2) as detailed in 22-10-00, Servicing. \*  
\* On AFCS control unit, check that AP1 switch \*  
\* cannot be engaged. \*  
\*\*\*\*\*

 OK 	 NOT OK- 	Autopilot does not disconnect for an angle-of- attack greater than 18 degrees. Ref. Chart 115
------------	-----------------	---

\*\*\*\*\*  
\* On circuit breaker panels 1-213 and 3-213, trip, \*  
\* safety and tag circuit breakers LH UC WEIGHT SW A \*  
\* SYS SUP G 292 and LH UC WEIGHT SW & DOWNLOCK B SYS \*  
\* SUP G 293 (RH UC WEIGHT SW & DOWNLOCK A SYS SUP \*  
\* G 295 and RH UC WEIGHT SW B SYS SUP G 294) Map Ref. \*  
\* M 17 and B 8 (M 18 and B 9). \*  
\* On overhead panel, on Flight Control Unit, place \*  
\* O & M ELEVONS, IN ELEVONS and RUDDER switches in \*  
\* MECH position then on AUTO STAB unit No.1 (No.2) \*  
\* engage PITCH switch. \*  
\* NOTE : Check that all the other AFCS systems are \*  
\* disengaged. \*  
\* On ADC control panel (centre console) hold pressed \*  
\* amber ADC1 (ADC2) warning light, then place TEST \*  
\* switch in position 2. \*  
\* On overhead panel, on AUTO STAB unit No.1 (No.2) \*  
\* PITCH switch remains engaged. \*  
\*\*\*\*\*

 OK 	 NOT OK- 	Autostabilization disconnects following an order of superstabilization function Ref. Chart 116
------------	-----------------	--

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||  
OK  
||

\*\*\*\*\*  
\* Remove safety clips and tags and set circuit breaker previously mentioned. \*  
\* On ADC control panel (centre console), hold pressed amber ADC1 (ADC2) warning light, then place TEST switch in position 1. \*  
\* On overhead panel, on AUTOSTAB unit No.1 (No.2) PITCH switch remains engaged. \*  
\*\*\*\*\*

		-----
OK	NOT OK-	Superstabilization function does not disconnect
		Replace SFC computer No.1 1C 650 [1] (No.2 2C 650 [2]).
		-----

\*\*\*\*\*  
\* On ADC control panel (centre console), place ADC1 (ADC2) TEST switch in NORM position. After approx. 30 seconds, press then release amber ADC1 warning light : this light must go off. \*  
\* On overhead panel, on AUTO STAB unit No.1 (No.2) engage PITCH switch. \*  
\* Move LH (RH) angle-of-attack sensor vane so as to obtain an angle-of-attack greater than 20° on Captain's (First Officer's) instrument panel angle-of-attack indicator. \*  
\* On ICOVOL indicator (First Officer's instrument panel) markers associated with elevons deflect 4° nose down. \*  
\*\*\*\*\*

		-----
OK	NOT OK-	4° nose down function inoperative
		Ref. Chart 117
		-----

\*\*\*\*\*  
\* Carry out Prepare paragraph operations and tests described in 27-39-00, Adjustment/Test (paragraph 6 : Auto trim Inhibit function test). \*  
\* On centre console, pitch trim wheel must not rotate. \*  
\*\*\*\*\*

		-----
OK	NOT OK-	Auto trim (channel 1) is not inhibited by the
		Safety Flight Control System
		Ref. Chart 118
		-----

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||  
OK  
||

\*\*\*\*\*  
\* On overhead panel, on ELECTRIC TRIM unit disengage \*  
\* switch 1 and engage switch 2. \*  
\* Repeat Auto Trim inhibit tests. \*  
\* On centre console, pitch trim wheel must not \*  
\* rotate. \*

\*\*\*\*\*

||  
OK  
||

NOT OK-

-----  
| Auto Trim (channel 2) is not inhibited by the |  
| Safety Flight Control System. |  
Replace electric trim computer No.2 2C 151 [8]

\*\*\*\*\*  
\* On ADC control panel (centre console) place ADC1 \*  
\* and ADC2 switches in ON position and TEST switches \*  
\* in NORM position. \*  
\* Move LH and RH angle-of-attack sensor vanes (zones \*  
\* 113 and 114) until an angle-of-attack of 20° is \*  
\* obtained on Captain's and First Officer's \*  
\* instrument panel indicators. \*  
\* On ADC control panel (centre console) press then \*  
\* release amber ADC1 and ADC2 warning lights : these \*  
\* lights must go off. \*  
\* Slightly pull control column and check that \*  
\* pulsations are felt. \*  
\* On overhead panel, on Flight Control Unit, place \*  
\* ANTI STALL SYSTEM 1 switch in OFF position and \*  
\* make certain that ANTI STALL SYSTEM 2 switch is \*  
\* in ON position. \*  
\* Slightly pull control column and check that \*  
\* pulsations are felt. \*

\*\*\*\*\*

||  
OK  
||

NOT OK-

-----  
| Faulty operation of priority device between |  
both SFC computers.

Ref. Chart 119

\*\*\*\*\*  
\* End of anti-stall functions trouble shooting. \*  
\*\*\*\*\*

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## MAINTENANCE MANUAL

*****	
* LOSS OF PITCH AND ROLL AXES OF	* GROUND EQUIPMENT REQUIRED
* AUTOSTABILIZATION SYSTEM No.1	* -----
* (No.2) WHEN ENGAGING ANTI-STALL	* DESCRIPTION PART NO.
* FUNCTIONS	* -----
*****	

\*\*\*\*\*  
\* On shelf 6-215 (6-216), replace SFC computer No.1 \*  
\* 1C 650 [1] (No.2 2C 650 [2]). \*  
\* Repeat tests which led to the fault. \*  
\* On overhead panel, on AUTO STAB unit No.1 (No.2) \*  
\* PITCH and ROLL switches disengage. \*  
\*\*\*\*\*

		-----	
YES	NO---	Replaced SFC computers was faulty	
		-----	

\*\*\*\*\*  
\* On shelf 8-215 (8-216), replace autostabilization \*  
\* computer No.1 1C 31 [3] (No.2 2C 31 [4]). \*  
\* Repeat tests which led to the fault. \*  
\* On overhead panel, on AUTO STAB unit No.1 (No.2) \*  
\* PITCH and ROLL switches disengage. \*  
\*\*\*\*\*

		-----	
YES	NO---	Replaced autostabilization computer was faulty	
		-----	
-----		Replace ADC 1 1F 71 [5] (ADC 2 2F 71 [6]).	
		-----	

Chart 111 (Sheet 1 of 1)

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*****		-----	
* LOSS OF PITCH AXIS OF AUTOSTABILIZATION SYSTEM No.1 (No.2) WHEN	*	GROUND EQUIPMENT REQUIRED	*
* ENGAGING ANTI-STALL FUNCTIONS	*	DESCRIPTION	PART NO.
*****		-----	
		MULTIMETER	
		-----	

\*\*\*\*\*

\* On shelf 6-215 (6-216), remove SFC computer No.1 \*  
 \* 1C 650 [1] (No.2 2C 650 [2]). \*

\* On circuit breaker panel 13-215 (13-216), remove \*  
 \* safety clip and tag and set circuit breaker \*

\* SAFETY FLT CONT COMP No.1 26 V SUP 1C 653 (No.2 \*  
 \* 26 V SUP 2C 653) Map Ref. F 6 (C 16). \*

\* On rack connector 1C 650-AA (2C 650-AA) measure \*  
 \* voltage between pins 1 and 2. \*

\*\*\*\*\*

		-----	
26 VAC	0 VAC-	Replace circuit breaker SAFETY FLT CONT COMP	
		No.1 26 V SUP 1C 653 [40] (No.2 26 V SUP 2C 653	
		[41]).	
		-----	

\*\*\*\*\*

\* On shelf 6-215 (6-216), install a new SFC computer \*  
 \* No.1 1C 650 [1] (No.2 2C 650 [2]). \*

\* Repeat tests which led to the fault. \*

\* On overhead panel, on AUTO STAB unit No.1 (No.2) \*  
 \* PITCH switch disengages. \*

\*\*\*\*\*

		-----	
YES	NO---	Replaced SFC computer was faulty.	
		-----	

\*\*\*\*\*

\* On shelf 8-215 (8-216), replace autostabilization \*  
 \* computer No.1 1C 31 [3] (No.2 2C 31 [4]). \*

\* Repeat tests which led to the fault. \*

\* On overhead panel, on AUTO STAB unit No.1 (No.2) \*  
 \* PITCH switch disengages. \*

\*\*\*\*\*

		-----	
YES	NO---	Replaced autostabilization computer was faulty	
		-----	
-----		Replace Flight Control Unit C 57 [18].	
		-----	

Chart 112 (Sheet 1 of 1)

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*****	
* WOBBLER WARNING IS NOT ACTIVATED *	GROUND EQUIPMENT REQUIRED
*****	
	DESCRIPTION PART NO.
	MULTIMETER
	ACCESS PLATFORM
	3.220 m (10 ft. 7 in.)
*****	

\*\*\*\*\*  
 \* Carry out procedure to engage ELECTRIC TRIM No.1 \*  
 \* (No.2) (Ref. 22-23-00, Adjustment/Test) \*  
 \* On overhead panel, on ELECTRIC TRIM unit, switch \*  
 \* 1 (2) remains engaged. \*

*****	
YES	*****
	* Trip, safety and tag circuit breakers listed *
	* in Removal/Installation of ADC (Ref : 34-00-00)*
	* On shelf 6-215 (6-216), replace relay 1F 93 *
NO---	* [28] (2F 93 [29]). *
	* Repeat tests which led to the fault. *
	* Slightly pull control column and check that *
	* pulsations are felt. *
*****	
YES	Replace ADC 1 1F 71 [5]
	(ADC 2 2F 71 [6]).
*****	
NO---	Replaced relay 1F 93
	(2F 93) was faulty.
*****	

\*\*\*\*\*  
 \* On ADC control panel (centre console), place ADC1 \*  
 \* (ADC2) TEST switch in NORM position. After approx. \*  
 \* 30 seconds, press then release amber ADC1 (ADC2) \*  
 \* warning light ; this light must go off. \*  
 \* Carry out procedure to engage Autopilot No.1 (No.2)\*  
 \* as detailed in 22-10-00, Servicing. \*  
 \* On overhead panel, on ELECTRIC TRIM unit, switch \*  
 \* 1 (2) remains engaged. \*

*****	
YES	NO---
	Replace PITCH FEEL SENSOR C 154 [19].
*****	

Sheet 2

Chart 113 (Sheet 1 of 3)

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||  
YES  
||

\*\*\*\*\*  
\* Disengage Autopilot No.1 (No.2) Ref : 22-10-00, \*  
\* Servicing. \*  
\* Carry out Prepare paragraph operations for \*  
\* electric trim functional test, then proceed with \*  
\* tests described in paragraph : Check of safety \*  
\* feature at take-off. Ref. 22-23-00, Adjustment/ \*  
\* Test (paragraph 3-H). \*  
\* On overhead panel, on ELECTRIC TRIM unit, switch \*  
\* 1 (2) disengages. \*  
\*\*\*\*\*

||  
NO YES--| Replace relay G 303 [24] (G 312 [25]). |  
||

\*\*\*\*\*  
\* On ADC control panel (centre console), place ADC1 \*  
\* (ADC2) TEST switch in position 1. Amber ADC1 \*  
\* (ADC2) warning light must illuminate and after \*  
\* approx. 30 seconds, blue TEST indicator light must \*  
\* illuminate. Press then release amber ADC1 (ADC2) \*  
\* warning light : this light must go off. \*  
\* On overhead panel, on Flight Control Unit, place \*  
\* ANTI STALL SYSTEM switch 1 (2) in OFF position and \*  
\* on AUTO STAB unit No.1 (No.2) engage PITCH, ROLL \*  
\* and YAW switches. \*  
\* Move handwheel from stop to stop ; YAW switch on \*  
\* AUTO STAB unit No.1 (No.2) remains engaged. \*  
\*\*\*\*\*

||  
YES NO---| On circuit breaker panels 1-213 and 2-213  
| (5-213 and 13-216) trip, safety and tag  
| circuit breakers ADC1 28V SUP 1F 74 and  
| AUTO STAB 1 COMP SUP 1C 37 (ADC2 28V SUP 2F 74  
| and AUTO STAB 2 COMP SUP 2C 37) Map Ref. P 12  
| and E 5 (F12 and D17).  
| On shelf 6-215 (6-216), replace relay 1F 106  
| [26] (2F 106 [27], after removal of ADC No.2  
| 2F 71 [6]).  
|

Sheet 3

Chart 113 (Sheet 2 of 3)

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```

||
YES
||
*****
* On shelf 6-215 (6-216), replace SFC computer No.1 *
* 1C 650 [1] (No.2 2C 650 [2]). *
* Repeat tests which led to the fault. *
* Slightly pull control column and check that *
* pulsations are felt. *
*****
||      |-----|
NOT OK  OK---| Replaced SFC computer was faulty |
||
*****
* On circuit breaker panel 1-213 (3-213), remove *
* safety clip and set circuit breaker LH UC WEIGHT *
* SW A SYS SUP G 292 (RH UC WEIGHT SW B SYS SUP G *
* 294) Map Ref. M 17 (B 9). *
* On overhead panel, on AUTO STAB unit No.1 (No.2) *
* engage PITCH and ROLL switches. *
* At junction of Captain's handwheel yoke, press *
* Emergency Flight Control test button ; EMERG CONT *
* caption light illuminates. *
*****
||      |-----|
NO      YES--| Replace relay G 308 [30] (G 317 [31]). |
||
*****
* On shelf 6-215 (6-216), on front face of SFC *
* computer, unscrew protective plugs on test *
* connectors ZA and ZB. *
* Measure voltage between pins 4 (+) and 60 (ground) *
* on these two connectors : voltage must be + 15 VDC *
*****
||      |-----|
YES     NO---| Replace ADC 1 1F 71 [5] (ADC 2 2F 71 [6]). |
||
|-----|
| Replace SFC computer No.2 2C 650 [2] (No.1 |
| 1C 650 [1]). |
|-----|

```

Chart 113 (Sheet 3 of 3)

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## MAINTENANCE MANUAL

*****	
* UNTIMELY ACTIVATION OF WOBBLER	* GROUND EQUIPMENT REQUIRED
* WARNING IN GROUND CONFIGURATION AND*	-----
* SPEED GREATER THAN 60 KTS.	* DESCRIPTION PART NO.
*****	
	MULTIMETER

\*\*\*\*\*  
\* On shelf 6-215 (6-216), replace ADC 1 1F 71 [5] \*  
\* (ADC 2 2F 71 [6]). \*  
\* Repeat tests which led to the fault. \*  
\* Pulsations are felt at control column. \*  
\*\*\*\*\*

		-----
YES	NO---	Replaced ADC was faulty
		-----

\*\*\*\*\*  
\* On shelf 6-215 (6-216), replace SFC computer No.1 \*  
\* 1C 650 [1] (No.2 2C 650 [2]). \*  
\* Repeat tests which led to the fault. \*  
\* Pulsations are felt at control column. \*  
\*\*\*\*\*

		-----
YES	NO---	Replaced SFC computer was faulty
		-----

-----  
On Flight Engineer's rack, open panel 1-214  
then remove protective cover from diode moun-  
ting assembly.  
-----  
Check diodes K 129 [42] and K 113 [43] (K 46  
[44]) ; replace faulty diode.  
-----

Chart 114 (Sheet 1 of 1)

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*****		-----	
* AUTOPILOT DOES NOT DISCONNECT FOR	*	GROUND EQUIPMENT REQUIRED	
* AN ANGLE-OF-ATTACK GREATER THAN 18	*	-----	
* DEGREES.	*	DESCRIPTION	PART NO.
*****		-----	
		_____	_____
		-----	

\*\*\*\*\*  
\* On shelf 6-215 (6-216), replace SFC computer No.1 \*  
\* 1C 650 [1] (No.2 2C 650 [2]). \*  
\* Repeat tests which led to the fault. \*  
\* On AFCS control unit, check that AP1 switch cannot \*  
\* be engaged. \*  
\*\*\*\*\*

		-----	
OK	NOT OK-	Replace Pitch AP/FD computer No.1 1C 12 [9]	
		(No.2 2C 12 [10]).	
		-----	
-----		Replaced SFC computer was faulty.	
		-----	

Chart 115 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****		-----	
* AUTOSTABILIZATION DISCONNECTS	*	GROUND EQUIPMENT REQUIRED	
* FOLLOWING AN ORDER OF SUPERSTABI-	*	-----	
* ZATION FUNCTION.	*	DESCRIPTION	PART NO.
*****		-----	
		_____	_____
		-----	

\*\*\*\*\*  
 \* On shelf 6-215 (6-216), replace SFC computer No.1 \*  
 \* 1C 650 [1] (No.2 2C 650 [2]). \*  
 \* Repeat tests which led to the fault. \*  
 \* On overhead panel, on AUTO STAB unit No.1 (No.2) \*  
 \* PITCH switch remains engaged. \*  
 \*\*\*\*\*

		-----	
NO	YES--	Replaced SFC computer was faulty.	
		-----	

\*\*\*\*\*  
 \* On ADC control panel (centre console), place ADC1 \*  
 \* TEST switch in NORM position. After approx. 1 \*  
 \* minute, press then release amber ADC1 (ADC2) \*  
 \* warning light ; this light must go off. \*  
 \* Carry out procedure to engage Autopilot No.1 \*  
 \* (No.2) as described in 22-10-00, Servicing. \*  
 \* At junction of Captain's handwheel yoke, press \*  
 \* Emergency Flight Control test button and hold it \*  
 \* pressed. \*  
 \* Pull control column (do not apply too much force \*  
 \* to avoid disconnection of AP1). \*  
 \* On overhead panel, PITCH and ROLL switches on \*  
 \* AUTO STAB unit No.1 (No.2) remain engaged. \*  
 \*\*\*\*\*

		-----	
YES	NO--	Replace autostabilization computer No.1 1C 31	
		[3] (No.2 2C 31 [4]).	
		-----	
-----		Replace ADC 1 1F 71 [5] (ADC 2 2F 71 [6]).	
		-----	

Chart 116 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\* 4° NOSE DOWN FUNCTION INOPERATIVE \*  
\*\*\*\*\*

GROUND EQUIPMENT REQUIRED

DESCRIPTION

PART NO.

\*\*\*\*\*  
\* On shelf 6-215 (6-216), replace SFC computer No.1 \*  
\* 1C 650 [1] (No.2 2C 650 [2]). \*  
\* Repeat tests which led to the fault. \*  
\* On ICOVOL indicator (First Officer's instrument \*  
\* panel) markers associated with elevons deflect 4° \*  
\* nose down. \*  
\*\*\*\*\*

		-----	-----
YES	NO---	Replace ADC 1 1F 71 [5] (ADC 2 2F 71 [6]).	
		-----	-----
		-----	-----
-----	-----	Replaced SFC computer was faulty.	
		-----	-----

Chart 117 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****		-----	
* AUTO TRIM (CHANNEL 1) IS NOT	*	GROUND EQUIPMENT REQUIRED	
* INHIBITED BY THE SAFETY FLIGHT	*	-----	
* CONTROL SYSTEM	*	DESCRIPTION	PART NO.
*****		-----	-----
		-----	-----

\*\*\*\*\*  
\* On overhead panel, on ELECTRIC TRIM unit, \*  
\* disengage switch 1 and engage switch 2. \*  
\* Repeat Auto trim inhibit function tests. \*  
\* On centre console, pitch trim wheel must not \*  
\* rotate. \*

\*\*\*\*\*

		-----	
NOT OK	OK---	Replace Electric Trim computer No.1 1C 51 [7]	
		-----	

\*\*\*\*\*  
\* On shelf 6-215, replace SFC computer No.1 1C 650 \*  
\* [1]. \*  
\* Repeat Auto Trim inhibit tests. \*  
\* On centre console, pitch trim wheel must not \*  
\* rotate. \*

\*\*\*\*\*

		-----	
NOT OK	OK---	Replaced SFC computer was faulty	
		-----	
-----	-----	Replace SFC computer No.2 2C 650 [2].	
-----	-----	-----	

Chart 118 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****	
* FAULTY OPERATION OF PRIORITY DEVICE*	GROUND EQUIPMENT REQUIRED
* BETWEEN BOTH SFC COMPUTERS.*	
*****	
	DESCRIPTION
	PART NO.

\*\*\*\*\*  
\* On shelf 6-215, replace SFC computer No.1 1C 650 \*  
\* [1]. \*  
\* Repeat tests which led to the fault. \*  
\* Slightly pull control column and check that \*  
\* pulsations are felt. \*  
\*\*\*\*\*

		-----	
OK	NOT OK-	Replace SFC computer No.2 2C 650 [2].	
		-----	
		-----	
-----		Replaced SFC computer was faulty.	
		-----	

Chart 119 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

### 5. Trouble Shooting - Faults of Emergency Flight Control Mode

\*\*\*\*\*  
\* Carry out Prepare paragraph operations of Emergen- \*  
\* cy Flight Control Mode operational test. (Ref : 27-\*  
\* 39-00, Adjustment/Tests, paragraph 7). \*  
\* At junction of Captain's handwheel yoke press \*  
\* Emergency Flight Control test button and hold it \*  
\* in this position : \*  
\* - EMERG CONT caption light on Captain's control \*  
\* handwheel illuminates. \*  
\* - No force is applied to control column and \*  
\* elevons do not deflect (check on ICOVOL indica- \*  
\* tor, First Officer's instrument panel). \*  
\*\*\*\*\*

OK	NOT OK-	EMERG CONT caption light does not illuminate during Emergency Flight Control mode test Ref. Chart 120
OK	NOT OK-	On overhead panel, on AUTO STAB unit No.1 (No.2), PITCH and ROLL switches disengage following test of Emergency Flight Control mode. Ref. Chart 121
OK	NOT OK-	Elevons deflect with no force applied to control column during Emergency Flight Control mode test. Ref. Chart 122

\*\*\*\*\*  
\* Apply force to Captain's control column (Do not \*  
\* apply too much force to avoid disconnection of AP1)\*  
\* On ICOVOL indicator (First Officer's instrument \*  
\* panel) check that elevons deflect in Pitch \*  
\* configuration. \*  
\*\*\*\*\*

OK	NOT OK-	On overhead panel, on AUTO STAB unit No.1 (No.2) PITCH and ROLL switches disengage following a pitch command in Emergency Flight Control mode. Ref. Chart 123
----	---------	--

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## MAINTENANCE MANUAL

OK

NOT OK--

On ICOVOL indicator (First Officer's instrument panel) elevons do not deflect following a pitch order in Emergency Flight Control mode ; Captain's control column.

Ref. Chart 124

\*\*\*\*\*  
 \* Apply a Force to First Officer's control column \*  
 \* (Do not apply too much Force to avoid disconnection of AP1). \*  
 \* NOTE : During this operation, Emergency Flight \*  
 \* control test button is held pressed. \*  
 \* On ICOVOL indicator (First Officer's instrument \*  
 \* panel) check that elevons deflect in pitch configuration. \*  
 \*\*\*\*\*

OK

NOT OK--

On ICOVOL indicator (First Officer's instrument panel) elevons do not deflect following a pitch order in Emergency Flight Control mode ; First Officer's control column.

Ref. Chart 125

\*\*\*\*\*  
 \* Apply a Force to Captain's handwheel (Do not apply \*  
 \* too much Force to avoid disconnection of AP1) \*  
 \* NOTE : During this operation, Emergency Flight \*  
 \* control test button is held pressed. \*  
 \* On ICOVOL indicator (First Officer's instrument \*  
 \* panel) check that elevons deflect in roll configuration. \*  
 \*\*\*\*\*

OK

NOT OK--

On overhead panel, on AUTO STAB unit No.1 (No.2) PITCH and ROLL switches disengage following Roll order in Emergency Flight control mode.

Ref. Chart 126

OK

NOT OK--

On ICOVOL indicator (First Officer's instrument panel) elevons do not deflect following a roll order in Emergency Flight Control mode ; Captain's handwheel

Ref. Chart 127

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## MAINTENANCE MANUAL

||  
OK  
||

\*\*\*\*\*  
\* Apply a Force to First Officer's handwheel (Do not \*  
\* apply too much force to avoid disconnection of \*  
\* AP1) \*  
\* NOTE : During this operation Emergency Flight \*  
\* Control test button is held pressed. \*  
\* On ICOVOL indicator (First Officer's instrument \*  
\* panel) check that elevons deflect in roll confi- \*  
\* guration. \*  
\*\*\*\*\*

 OK 	 NOT OK-- 	On ICOVOL indicator (First Officer's instrument panel) elevons do not deflect following a roll order in Emergency Flight Control mode ; First Officer's handwheel Ref. Chart 128
------------	------------------	--

\*\*\*\*\*  
\* On overhead panel, on AUTO STAB unit No.1 (No.2) \*  
\* disengage PITCH switch. \*  
\* NOTE : During this operation, Emergency Flight \*  
\* Control test button is held pressed. \*  
\* On overhead panel, on AUTO STAB unit No.1 (No.2) \*  
\* ROLL switch disengages. \*  
\*\*\*\*\*

 OK 	 NOT OK-- 	ROLL axis does not disconnect following loss of autostabilization system PITCH axis when Emergency Flight Control mode is engaged. Ref. Chart 129
------------	------------------	--

\*\*\*\*\*  
\* On overhead panel, on AUTO STAB unit No.1 (No.2) \*  
\* engage PITCH and ROLL switches. \*  
\* On circuit breaker panel 2-213 trip then reset \*  
\* circuit breakers INNER ELEVON MON BLUE SUP 2C 47 \*  
\* and MID & OUTER ELEVON MON BLUE SUP 2C 46 (Map \*  
\* Ref. D1 and D2). \*  
\* NOTE : During this operation Emergency Flight \*  
\* Control test button is held pressed. \*  
\* Check on ICOVOL indicator (First Officer's \*  
\* instrument panel) that magnetic indicators still \*  
\* display B. \*  
\*\*\*\*\*

||  
OK  
||

||  
NOT OK  
||

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## MAINTENANCE MANUAL

OK	NOT OK--	Flight Control Surface Comparators are not inhibited when Emergency Flight Control mode is selected (On IC0VOL indicator, magnetic indicators display G). Ref. Chart 130
----	----------	---

\*\*\*\*\*  
\* Release Emergency Flight Control mode test \*  
\* button. Remove EMERG CONT caption light frangible \*  
\* guard cover (Ref. 27-39-00, Removal/Installation). \*  
\* Press EMERG CONT caption light then release; it \*  
\* illuminates and PITCH and ROLL switches on AUTO \*  
\* STAB unit No.1 (No.2) remain engaged. \*  
\*\*\*\*\*

OK	NOT OK--	No indication confirming engagement of the Emergency Flight Control mode (EMERG CONT caption light does not illuminate) or loss of autostabilization No.1 (No.2) PITCH and ROLL axes. Ref. Chart 131
----	----------	---

\*\*\*\*\*  
\* On overhead panel, on Flight Control Unit, place \*  
\* ANTI STALL SYSTEM 1 (2) switch in ON position, and \*  
\* on AUTO STAB unit No.2 (No.1), engage PITCH \*  
\* switch. On AUTO STAB, unit No.1 (No.2) PITCH and \*  
\* ROLL switches remain engaged. \*  
\*\*\*\*\*

OK	NOT OK--	SFC computer validity signal is not inhibited when Emergency Flight Control mode is engaged (On AUTO STAB unit No.1 (No.2), PITCH and ROLL switches disengage) Replace SFC computer No.1 1C 650 [1] (No.2 2C 650 [2]).
----	----------	---

\*\*\*\*\*  
\* End of Emergency Flight Control mode trouble \*  
\* shooting. \*  
\*\*\*\*\*

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## MAINTENANCE MANUAL

*****	
* EMERG CONT CAPTION LIGHT DOES NOT	* GROUND EQUIPMENT REQUIRED
* ILLUMINATE DURING EMERGENCY FLIGHT	*
* CONTROL MODE TEST	* DESCRIPTION PART NO.
*****	
	MULTIMETER
	ACCESS PLATFORM
	3.220 m (10 ft. 7 in.)
*****	

\*\*\*\*\*

\* Carry out Prepare paragraph operations of ELECTRIC \*

\* TRIM functional test then carry out tests \*

\* described in paragraph : Check of safety feature \*

\* at take-off ; Ref. 22-23-00, Adjustment/Test, \*

\* paragraph 3-H). \*

\* On overhead panel, on ELECTRIC TRIM unit, switch 1 \*

\* (2) disengages. \*

\*\*\*\*\*

*****	
YES	NO
	*****
	* In zone 123, open access door 123AB. *
	* On relay box 2-123 (3-123) measure 28 VDC *
	* voltage between pins 3A and 3B (11 A and 11 D) *
	* on connector UT 1837 (UT 1838). *
	*****
	28 VDC 0 VDC-   Ref. 32-61-00, T/S
	-----
	Replace relay G 303 [24]
	(G 312 [25])
	-----

\*\*\*\*\*

\* Carry out Prepare paragraph operations of wobbler \*

\* warning operational test then carry out wobbler \*

\* warning test with ADC 1 (ADC 2) and Artificial Feel \*

\* system No.1 (No.2) (Ref. 27-39-00, Adjustment/ \*

\* Test, paragraph 3). \*

\* Pulsations are felt at control column \*

\*\*\*\*\*

YES NO

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Chart 120 (Sheet 1 of 2)

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## MAINTENANCE MANUAL

*****	
YES	* In zone 123, open access door 123AB. *
NO--	* On relay box 2-123 (3-123), measure 28 VDC *
	* voltage between pins 2C and 2B (13 A and 13 D) *
	* on connector UT 1837 (UT 1838). *
*****	
	28 VDC      0 VDC-       Ref. 32-61-00, T/S
	-----
	Replace relay G 308 [30]
	-----  (G 317 [31]).
*****	
	* On shelf 6-215 (6-216), replace SFC computer No.1 *
	* 1C 650 [1] (No.2 2C 650 [2]). *
	* Repeat Emergency Flight Control mode tests. *
	* EMERG CONT caption light illuminates on Captain's *
	* control column. *
*****	
NO	YES--  Replaced SFC computer was faulty
	-----
*****	
	* Apply a force to Captain's control column ((Do not *
	* apply too much force to avoid disconnection of AP1)*
	* <u>NOTE</u> : During this operation, Emergency Flight Con-*
	* trol test button is held pressed. On *
	* ICVOL indicator (First Officer's instrument*
	* panel) check that elevons deflect. *
*****	
NO	YES--  At Captain's handwheel yoke, replace lamp
	of EMERG CONT caption light [20].
	-----
	At Captain's handwheel yoke, replace test
	-----  button C 656 [21].
	-----

Chart 120 (Sheet 2 of 2)

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## MAINTENANCE MANUAL

```
*****-----
* ON OVERHEAD PANEL, ON AUTO STAB * | GROUND EQUIPMENT REQUIRED |
* UNIT No.1 (No.2), PITCH AND ROLL * |-----|
* SWITCHES DISENGAGE DURING EMERGEN- * | DESCRIPTION PART NO. |
* CY FLIGHT CONTROL MODE TEST. * |-----|
*****-----
```

```
*****
* On shelf 6-215 (6-216), replace SFC computer No.1 *
* 1C 650 [1] (No.2 2C 650 [2]). *
* Repeat Emergency Flight Control Mode *
* tests. *
* EMERG CONT caption light illuminates on *
* captain's control column *
*****
```

```

| |
YES NO----| Replace autostabilization computer No.1 1C 31 |
| | | (No.2 2C 31 [4]). |
| | |-----|
|-----| Replaced SFC computer was faulty |
|-----|
```

Chart 121 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****		-----
* ELEVONS DEFLECT WITH NO FORCE	*	GROUND EQUIPMENT REQUIRED
* APPLIED TO CONTROL COLUMN DURING	*	-----
* EMERGENCY FLIGHT CONTROL MODE TEST	*	DESCRIPTION PART NO.
*****		-----
		CIRCUIT BREAKERS
		SAFETY CLIPS
		-----

\*\*\*\*\*  
\* On shelf 6-215 (6-216), replace SFC computer No.1 \*  
\* 1C 650 [1] (No.2 2C 650 [2]). \*  
\* Reset force detectors/SFC computer by pressing \*  
\* NULL RESET button on front face of SFC computer \*  
\* for approximately 5 seconds. \*  
\* Repeat tests which led to the fault : \*  
\* Elevons deflect. \*  
\*\*\*\*\*

		-----
YES	NO---	Replaced SFC computer was faulty
		-----

\*\*\*\*\*  
\* Trip safety and tag circuit breakers mentioned in \*  
\* 27-39-71, Removal/Installation. \*  
\* Remove First Officer's control column protective \*  
\* gaiter and disconnect connectors C and D. \*  
\* Remove safety clips and tags and set previously \*  
\* mentioned circuit breakers. \*  
\* Repeat tests which led to the fault. \*  
\* Elevons deflect. \*  
\*\*\*\*\*

		-----
YES	NO---	Replace First Officer's force detector 2C 655
		[23].
		-----
-----		Replace Captain's force detector 1C 655 [22].
-----		-----

Chart 122 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****	
* ON OVERHEAD PANEL ON AUTO STAB UNIT*	GROUND EQUIPMENT REQUIRED
* No.1 (No.2), PITCH AND ROLL SWIT-	*
* CHES DISENGAGE FOLLOWING A PITCH	* DESCRIPTION PART NO.
* ORDER IN EMERGENCY FLIGHT CONTROL	*
* MODE	* MULTIMETER
*****	
	ACCESS PLATFORM
	3.220m (10 ft. 7 in)
*****	

\*\*\*\*\*  
\* On shelf 6-215 (6-216), replace SFC computer No.1 \*  
\* 1C 650 [1] (No.2 2C 650 [2]). \*  
\* Repeat tests which led to the fault. \*  
\* On overhead panel, on AUTO STAB unit No.1 (No.2) \*  
\* PITCH and ROLL switches disengage. \*  
\*\*\*\*\*

		-----
YES	NO----	Replaced SFC computer was faulty
		-----
		-----
-----		Replace autostabilization computer No.1
		1C 31 [3] (No.2 2C 31 [4]).
-----		

Chart 123 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

```
*****-----
* ON ICOVOL INDICATOR (FIRST OFFICER'S * GROUND EQUIPMENT REQUIRED
* S INSTRUMENT PANEL) ELEVONS DO NOT * -----
* DEFLECT FOLLOWING A PITCH ORDER * DESCRIPTION PART NO.
* IN EMERGENCY FLIGHT CONTROL MODE : * -----
* CAPTAIN'S CONTROL COLUMN. * -----
*****-----
```

```
*****
* On shelf 6-215 (6-216), replace SFC computer No.1 *
* 1C 650 [1] (No.2 2C 650 [2]). *
* Repeat tests which led to the fault. *
* On ICOVOL indicator (First Officer's instrument *
* panel) elevons deflect *
*****
```

```

||      | -----
NO      YES---| Replaced SFC computer was faulty. |
||      | -----

```

```
*****
* Apply a Force to First Officer's control column *
* (Do not apply too much force to avoid disconnec- *
* tion of AP1) *
* NOTE : During this operation the Emergency Flight *
* Control test button is held pressed. *
* On ICOVOL indicator (First Officer's instrument *
* panel) elevons deflect. *
*****
```

```

||      | -----
NO      YES---| Replace force detector on control column 1C655 |
||      | [22] |
||      | -----

```

```

-----| Check operation of Flight Controls by
        | disengaging Autopilot and moving control column
        | If OK, Refer to Autostabilization trouble
        | shooting procedure (Ref. 22-22-00, T/S).
        | -----

```

Chart 124 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

```

*****
* ON ICOVOL INDICATOR (FIRST OFFICER'S * GROUND EQUIPMENT REQUIRED
* S INSTRUMENT PANEL) ELECONS DO NOT *
* DEFLECT FOLLOWING A PITCH ORDER * DESCRIPTION PART NO.
* IN EMERGENCY FLIGHT CONTROL MODE : *
* FIRST OFFICER'S CONTROL COLUMN *
*****

```

```

*****
* On shelf 6-215 (6-216), replace SFC computer No.1 *
* 1C 650 [1] (No.2 2C 650 [2]). *
* Repeat tests which led to the fault. *
* On ICOVOL indicator (First Officer's instrument *
* panel) elecons deflect. *
*****

```

YES	NO----	Replace force detector 2 C655 [23] on control column
-----		
-----		Replaced SFC computer was faulty.

Chart 125 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

```
*****-----
* ON OVERHEAD PANEL, ON AUTO STAB * | GROUND EQUIPMENT REQUIRED |
* UNIT No.1 (No.2) PITCH AND ROLL * |-----|
* SWITCHES DISENGAGE FOLLOWING A ROLL* | DESCRIPTION PART NO. |
* ORDER IN EMERGENCY FLIGHT CONTROL * |-----|
* MODE * |-----|
*****-----
```

```
*****
* On shelf 6-215 (6-216), replace SFC computer No.1 *
* 1C 650 [1] (No.2 2C 650 [2]). *
* Repeat tests which led to the fault. *
* On ICOVOL indicator (First Officer's instrument *
* panel) elevons deflect. *
*****
```

```
||
YES NO----| Replace autostabilization computer No.1 1C 31 |
|| | [3] (No.2 2C 31 [4]). |
|| |-----|
|-----| Replaced SFC computer was faulty. |
|-----|
```

Chart 126 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****	
* ON ICOVOL INDICATOR (FIRST OFFICER'S	GROUND EQUIPMENT REQUIRED
* S INSTRUMENT PANEL) ELEVONS DO NOT	-----
* DEFLECT FOLLOWING A ROLL ORDER IN	DESCRIPTION PART NO.
* EMERGENCY FLIGHT CONTROL MODE :	-----
* CAPTAIN'S HANDWHEEL.	-----
*****	

\*\*\*\*\*

\* On shelf 6-215 (6-216), replace SFC computer No.1 \*

\* 1C 650 [1] (No.2 2C 650 [2]). \*

\* Repeat tests which led to the fault. \*

\* On ICOVOL indicator (First Officer's instrument \*

\* panel) elevons deflect. \*

\*\*\*\*\*

		-----
NO	YES---	Replaced SFC computer was faulty.
		-----

\*\*\*\*\*

\* Apply a force to First Officer's handwheel (Do not \*

\* apply too much force to avoid disconnection of \*

\* AP1). \*

\* NOTE : During this operation the Emergency Flight \*

\* control test button is held pressed. \*

\* On ICOVOL indicator (First Officer's instrument \*

\* panel) elevons deflect. \*

\*\*\*\*\*

		-----
NO	YES---	Replace force detector 1C655 [22] on the con-
		trol column
		-----

-----		Check operation of Flight Controls by
		disengaging Autopilot and moving control hand-
		wheel. If OK, refer to Autostabilization trou-
		ble shooting procedure (Ref. 22-00-00, T/S).
		-----

Chart 127 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

```
*****-----
* ON ICOVOL INDICATOR (FIRST OFFICER'S * GROUND EQUIPMENT REQUIRED
* 'S INSTRUMENT PANEL) ELEVONS DO NOT *
* DEFLECT FOLLOWING A ROLL ORDER IN * DESCRIPTION PART NO.
* EMERGENCY FLIGHT CONTROL MODE : *
* FIRST OFFICER'S HANDWHEEL *
*****-----
```

```
*****
* On shelf 6-215 (6-216), replace SFC computer No.1 *
* 1C 650 [1] (No.2 2C 650 [2]) *
* Repeat tests which led to the fault. *
* On ICOVOL indicator (First Officer's instrument *
* panel) elevons deflect. *
*****
```

```

| |
| YES NO----| Replace force detector 2C655 [23] on control
| | | column
| |
|-----| Replaced SFC computer was faulty.
|-----|
```

Chart 128 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****	
* ROLL AXIS DOES NOT DISCONNECT	* GROUND EQUIPMENT REQUIRED
* FOLLOWING LOSS OF AUTOSTABILIZATION*	-----
* SYSTEM PITCH AXIS WHEN EMERGENCY	* DESCRIPTION PART NO.
* FLIGHT CONTROL MODE IS ENGAGED	* -----
*****	

\*\*\*\*\*  
\* On shelf 6-215 (6-216), replace SFC computer No.1 \*  
\* 1C 650 [1] No.2 2C 650 [2]). \*  
\* Repeat tests which led to the fault. \*  
\* On overhead panel, on AUTO STAB unit No.1 (No.2) \*  
\* ROLL switch disengages. \*  
\*\*\*\*\*

		-----	
NO	NO----		Replace autostabilization computer No.1 1C 31
			[3] (No.2 2C 31 [4]).
		-----	
		-----	
-----	-----		Replaced SFC computer was faulty
		-----	

Chart 129 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

*****		-----	
* FLIGHT CONTROL SURFACE COMPARATORS	*	GROUND EQUIPMENT REQUIRED	
* ARE NOT INHIBITED WHEN EMERGENCY	*	-----	-----
* FLIGHT CONTROL MODE IS SELECTED	*	DESCRIPTION	PART NO.
*****		-----	-----

\*\*\*\*\*

\* On overhead panel, on AUTO STAB unit No.1 (No.2) \*

\* disengage PITCH and ROLL switches and on AUTO STAB\* \*

\* unit No.2 (No.1) engage PITCH and ROLL switches. \*

\* On circuit breaker panel 2-213, trip and set \*

\* circuit breakers INNER ELEVON MON BLUE SUP 2C 47 \*

\* and MID & OUTER ELEVON MON BLUE SUP 2C 46 (Map \*

\* Ref. D1 and D2). \*

\* NOTE : During this operation Emergency Flight \*

\* Control test button is held pressed. \*

\* Note that, on ICOVOL indicator (First Officer's \*

\* instrument panel), magnetic indicators still dis- \*

\* play B. \*

\*\*\*\*\*

		-----	
YES	NO----	Replace static monitoring change over unit	
		C 56 [13]	
		-----	-----
-----		Replace SFC computer No.1 1C 650 [1] (No.2	
		2C 650 [2]).	
		-----	-----

Chart 130 (Sheet 1 of 1)

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```

*****
* NO ENGAGEMENT INDICATION OF THE * | GROUND EQUIPMENT REQUIRED
* EMERGENCY FLIGHT CONTROL MODE * |
* (EMERG CONT CAPTION LIGHT DOES NOT * | DESCRIPTION PART NO.
* ILLUMINATE) OR LOSS OF AUTOSTABI- * |
* LIZATION No.1 (No.2) PITCH AND ROLL* |
* AXES * |
*****

```

```

*****
* On shelf 6-215 (6-216), replace SFC computer No.1 *
* 1C 650 [1] (No.2 2C 650 [2]) *
* Repeat tests which led to the fault. *
* EMERG CONT caption light illuminates and PITCH and*
* ROLL switches on AUTO STAB unit No.1 (No.2) remain*
* engaged. *
*****

```

```

|| |
YES NO----| Replace EMERG CONT switch C 654 [20] |
|| |
|| |
-----| Replaced SFC computer was faulty |
-----

```

Chart 131 (Sheet 1 of 1)

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## MAINTENANCE MANUAL

### 6. Trouble Shooting - Faults of OVERSPEED Warning Activation Function

\*\*\*\*\*  
\* Check operation of OVERSPEED warning by carrying \*  
\* out Prepare paragraph and tests described in 27-39\*  
\* -00, Adjustment/Test, paragraph 12. The OVERSPEED \*  
\* warning (warbling) is activated when pitch \*  
\* attitude exceeds 6° nose down. \*  
\*\*\*\*\*

OK	NOT OK--	No activation of OVERSPEED warning by the Safety Flight Control System. Ref. Chart 141
----	----------	--

\*\*\*\*\*  
\* On circuit breaker panel 1-213, remove safety clip\*  
\* and tag and set circuit breaker STICK SHAKER SUP, \*  
\* W 513 Map Ref. P15 \*  
\* Move LH (RH) angle-of-attack sensor vane, zone 113\*  
\* (114) in order to increase angle-of-attack till \*  
\* stick shaker and aural stall warning are activated\*  
\* Check that OVERSPEED warning is inhibited. \*  
\*\*\*\*\*

OK	NOT OK--	OVERSPEED warning is not inhibited when stick shaker is activated. Replace relay W512 [32] (W 522 [33]).
----	----------	--

\*\*\*\*\*  
\* End of OVERSPEED warning activation function \*  
\* Trouble Shooting \*  
\*\*\*\*\*

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\*\*\*\*\*  
\* OVERSPEED WARNING IS NOT ACTIVATED \*  
\* BY THE SAFETY FLIGHT CONTROL SYSTEM \*  
\*\*\*\*\*

### GROUND EQUIPMENT REQUIRED

DESCRIPTION	PART NO.
MULTIMETER	_____
CIRCUIT BREAKERS	_____
SAFETY CLIPS	_____

\*\*\*\*\*  
\* Make certain that circuit breakers listed in \*  
\* 22-31-00 A/T, Operational Test, are set. \*  
\* On overhead panel, make certain that the 4 AUTOTH- \*  
\* ROTTLE isolation switches are in ON position. \*  
\* On centre console, place the 4 Throttle levers in \*  
\* middle position. On AFCS control unit engage AT1 \*  
\* (AT2) switch : this switch must remain engaged. \*  
\*\*\*\*\*

		NO----	Replace INERTIAL NAVIGATION UNIT No.1 1F8 [11]
			(No.2 2F8 [12])

\*\*\*\*\*  
\* On AFCS control unit disengage AT1 (AT2) switch \*  
\* and on centre console, place the 4 throttle levers \*  
\* in low position. On overhead panel, on ELECTRIC \*  
\* TRIM unit, engage switch 1 (2) : this switch must \*  
\* remain engaged. \*  
\*\*\*\*\*

		NO----	Replace ADC 1 1F 71 [5] (ADC 2 2F 71 [6])

\*\*\*\*\*  
\* On overhead panel, on ELECTRIC TRIM unit disengage \*  
\* switch 1 (2). \*  
\* On ADC control panel (centre console), place ADC1 \*  
\* (ADC2) TEST switch in position 2. \*  
\* OVERSPEED warning (warbling) is activated. \*  
\*\*\*\*\*

		NO----	Refer to OVERSPEED warning trouble shooting in
			34-11-00

Sheet 2

Chart 141 (Sheet 1 of 2)

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||  
YES  
||

\*\*\*\*\*  
\* On ADC control panel (centre console) place ADC1 \*  
\* (ADC2) TEST switch in NORM position. \*  
\* On shelf 6-215 (6-216), replace SFC computer No.1 \*  
\* 1C 650 [1] (No.2 2C 650 [2]) \*  
\* Repeat tests which led to the fault. \*  
\* OVERSPEED warning (warbling) is activated \*  
\*\*\*\*\*

||  
NO YES---| Replaced SFC computer was Faulty. |  
||

\*\*\*\*\*  
\* On shelf 6-215, remove relay W 512 [32] (W522 \*  
\* [33]) \*  
\* Check continuity between de-energized contact and \*  
\* common point of relay. \*  
\*\*\*\*\*

||  
OK NOT OK--| Replace relay W 512 [32] (W 522 [33]). |  
||

On circuit breaker-panels 1-213 and 5-213, trip  
safety and tag circuit breakers AUDIO WARN  
O/SPEED SUP1 W 374 and AUDIO WARN O/SPEED SUP 2  
W 373 (Map Ref. S19 and C 18)  
On shelf 7-216, in DOOR WARNING RELAY BOX W 320  
replace relay R 25 [34] (R24 [35])

Chart 141 (Sheet 2 of 2)

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ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[1] SFC computer No.1	215 BS	6-215	1C650	Electronics rack-LH	27-39-11 R/I	27-39-0X
[2] SFC computer No.2	216 BS	6-216	2C650	Electronics rack-RH	27-39-11 R/I	27-39-0X
[3] Autostabilization computer No.1	215 AS	8-215	1C31	Electronics rack-LH	22-22-11 R/I	27-39-0X
[4] Autostabilization computer No.2	216 AS	8-216	2C31	Electronics rack-RH	22-22-11 R/I	27-39-0X
[5] ADC 1	215 BS	6-215	1F71	Electronics rack-LH	34-00-00 R/I	27-39-01 27-39-02 27-39-03
[6] ADC 2	216 BS	6-216	2F71	Electronics rack-RH	34-00-00 R/I	27-39-01 27-39-02 27-39-03
[7] Electric trim computer No.1	215 BS	4-215	1C151	Electronics rack-LH	22-23-11 R/I	27-39-03
[8] Electric trim computer No.2	216 BS	4-216	2C151	Electronics rack-RH	22-23-11 R/I	27-39-03
[9] Pitch AP/FD computer No.1	215 BS	4-215	1C12	Electronics rack-LH	22-12-11 R/I	27-39-03
[10] Pitch AP/FD computer No.2	216 BS	4-216	2C12	Electronics rack-RH	22-12-11 R/I	27-39-03
[11] Inertial navigation unit No.1	123 BB	27-123	1F8	Under floor	34-00-00 R/I	27-39-03

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## MAINTENANCE MANUAL

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[12] Inertial navigation unit No.2	123 BB	27-123	2F8	Under floor	34-00-00 R/I	27-39-03
[13] Static monitoring change over unit	216 AS	8-216	C56	Electronics rack-RH	27-37-12 R/I	27-39-04
[14] Monitoring-Pitch rate-Gyro	131 FS	Frame 28	1C38	Main baggage compt.	22-22-81 R/I	22-22-05
[15] Monitoring-Pitch rate-Gyro	132 FS	Frame 28	2C38	Main baggage compt.	22-22-81 R/I	22-22-09
[16] Control-Pitch rate-Gyro	131 FS	Frame 28	1C33	Main baggage compt.	22-22-81 R/I	22-22-05
[17] Control-Pitch rate-Gyro	132 FS	Frame 28	2C33	Main baggage compt.	22-22-81 R/I	22-22-09
[18] Flight Control Unit		4-211	C57	Overhead panel	27-36-15 R/I	27-39-01
[19] Pitch Feel Sensor	211 HF	122	C154	Under Flight compt. floor	22-23-81 R/I	27-39-02 27-39-04
[20] EMERG CONT switch		8-211	C654	Captain's control column		27-39-04 27-39-05
[21] Test button		8-211	C656	Captain's control column		27-39-04 27-39-05
[22] Force detector		8-211	1C655	Captain's control column	27-39-71 R/I	27-39-04 27-39-05

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## MAINTENANCE MANUAL

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL / ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[23] Force detector		4-212	2C655	First Officer's control column	27-39-71 R/I	27-39-04 27-39-05
[24] Relay	123 AB	2-213	G303	Rack under fwd floor	32-00-00 R/I	27-39-01
[25] Relay	123 AB	3-213	G312	Rack under fwd floor	32-00-00 R/I	27-39-01
[26] Relay	215 BS	6-215	1F106	Electronics rack-LH		27-39-01
[27] Relay	216 BS	6-216	2F106	Electronics rack-RH		27-39-01
[28] Relay	215 BS	6-215	1F93	Electronics rack-LH		27-39-01
[29] Relay	216 BS	6-216	2F93	Electronics rack-RH		27-39-01
[30] Relay	123 AB	2-213	G308	Rack under fwd floor	32-00-00 R/I	27-39-01
[31] Relay	123 AB	3-123	G317	Rack under fwd floor	32-00-00 R/I	27-39-01
[32] Relay	215 BS	6-215	W512	Electronics rack-LH	27-38-00 R/I	27-39-03
[33] Relay	216 BS	6-216	W522	Electronics rack-RH	27-38-00 R/I	27-39-03
[34] Relay	216 DS	7-216	R25	Electronics rack-LH	52-71-00 R/I	27-39-03

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ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[35] Relay	216 DS	7-216	R24	Electronics rack-RH	52-71-00 R/I	27-39-03
[36] Circuit breaker 115 VAC		13-215	1C652	E6	24-50-00 R/I	27-39-01
[37] Circuit breaker 115 VAC		13-216	2C652	C17	24-50-00 R/I	27-39-01
[38] Circuit breaker 28 VDC		1-213	1C651	S20	24-50-00 R/I	27-39-01
[39] Circuit breaker 28 VDC		5-213	2C651	D17	24-50-00 R/I	27-39-01
[40] Circuit breaker 26 VAC		13-215	1C653	F6	24-50-00 R/I	27-39-01
[41] Circuit breaker 26 VAC		13-216	2C653	C16	24-50-00 R/I	27-39-01
[42] Diode	214	1-214	K129	Flight Engineer's rack	76-00-00 R/I	76-11-61
[43] Diode	214	1-214	K113	Flight Engineer's rack	76-00-00 R/I	76-11-61
[44] Diode	214	1-214	K 46	Flight Engineer's rack	76-00-00 R/I	76-11-62

Component Identification  
Table 101

### 7. Close Up

- A. Remove safety clips and tags and reset circuit breakers.
- B. Carry out Close up operations for Autopilot engagement (Ref. 22-10-00, Servicing).

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- C. De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

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## MAINTENANCE MANUAL

### SAFETY FLIGHT CONTROL SYSTEM - REMOVAL/INSTALLATION

#### 1. General

This topic deals with the Removal/Installation procedure of the Emergency Flight Control EMERG CONT engage switch frangible guard cover (Captain's control handwheel).

#### 2. Frangible Guard Cover

##### A. Equipment and Materials

---

DESCRIPTION	PART NO.
Electrical Ground Power Unit	

---

RB

##### B. Prepare

R

R

##### C. Remove (Ref. Fig. 401 )

(1) At Captain's control handwheel yoke :

(a) Remove screws (1).

(b) Remove retaining plate (2).

(c) Remove frangible guard cover (3).

CAUTION : DO NOT TOUCH EMERG CONT SWITCH SO AS  
TO AVOID UNTIMELY ENGAGEMENT OF THE  
EMERGENCY FLIGHT CONTROL MODE.

##### D. Preparation of Replacement Component

##### E. Install

CAUTION : CHECK DESCRIBED IN PARAGRAPH F FOLLOWING MUST  
BE CARRIED OUT BEFORE INSTALLATION OF FRANGIBLE  
GUARD COVER AND RETAINING PLATE.

EFFECTIVITY: ALL

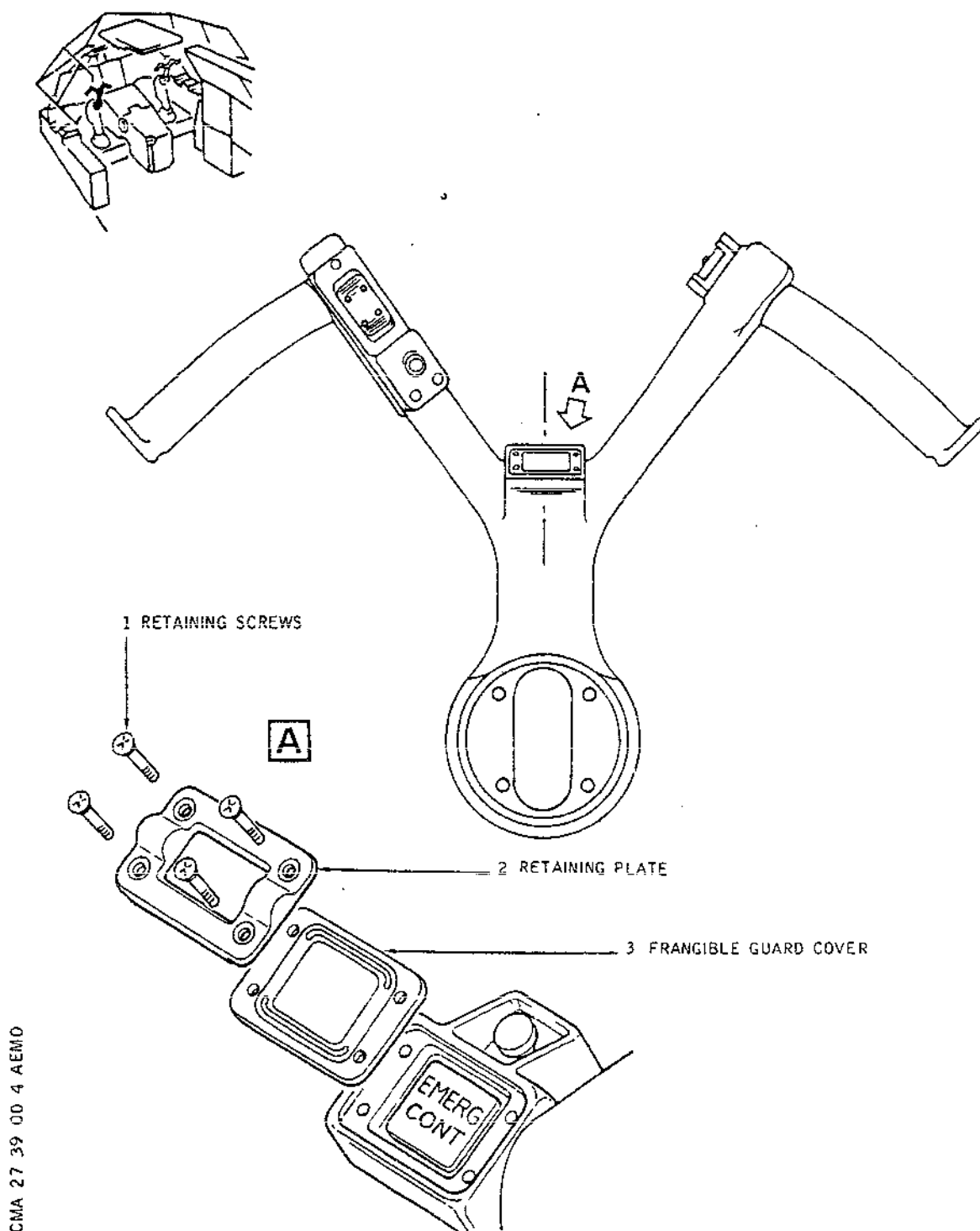
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CMA 27 39 00 4 AEMO

- Removal/Installation of Frangible Guard Cover  
Figure 401

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At Captain's control handwheel yoke :

- (1) Position frangible guard cover (3).

CAUTION : MAKE CERTAIN THAT BREAK LINE UNDERCUTS ARE FACING DOWNWARDS, ADJACENT TO EMERG CONT SWITCH.

- (2) Position retaining plate (2).

CAUTION : RETAINING PLATE MUST BE INSTALLED ABOVE FRANGIBLE GUARD COVER, NOT UNDERNEATH.

RB

- R (3) Secure assembly with screws (1).

- R (4) Carry out post installation check described in paragraph G following.

### F. Pre Installation Check

- (1) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SAFETY FLT CONT No.1 SUP	1-213	1C 651	S20
LAT ACCELMTR 1 26V SUP	2-213	1C 42	A 4
AUTOSTAB 1 COMP SUP		1C 37	E 5
SAFETY FLT CONT no.2 SUP	5-213	2C 651	D17
SAFETY FLT CONT COMP No.1 115V SUP	13-215	1C 652	E 5
SAFETY FLT CONT COMP No.1 26V SUP		1C 653	F 6
LAT ACCELMTR 2 26V SUP	13-216	2C 42	B16
SAFETY FLT CONT COMP No.2 26V SUP		2C 653	C16
SAFETY FLT CONT COMP No.2 115V SUP		2C 652	C17
AUTOSTAB 2 COMP SUP		2C 37	D17

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- (2) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).
- (3) At overhead panel
  - (a) On Flight Control Unit, make certain that both ANTI STALL SYSTEM switches are in OFF position.
  - (b) On AUTO STAB unit No.1, engage PITCH and ROLL switches
    - These two switches must remain engaged.
- (4) At Captain's control handwheel yoke, press and release EMERG CONT switch/caption light
  - Caption light must illuminate in green
- (5) At overhead panel, on AUTO STAB unit No.1, disengage PITCH switch
  - ROLL switch must disengage
  - EMERG CONT caption light must extinguish.
- (6) Press and release EMERG CONT switch/caption light  
  
THIS OPERATION SHALL NOT BE OMITTED.
- (7) At overhead panel, on AUTO STAB unit No.2, engage PITCH and ROLL switches
  - These switches must remain engaged.
- (8) Press and release EMERG CONT switch/caption light
  - Caption light must illuminate in green.
- (9) Press and release EMERG CONT switch/caption light
  - Caption light must extinguish.

### G. Post Installation Check

Circuit breakers listed in paragraph F above are set ; aircraft electrical network is energized and ANTI STALL SYSTEM switches are in OFF position.

- (1) On AUTO STAB unit No.1, successively engage PITCH and ROLL switches.
  - These switches must remain engaged
  - Check that EMERG CONT caption light remains extinguished.
- (2) On AUTO STAB unit No.2, successively engage PITCH and ROLL switches
  - These switches must remain engaged

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- Check that EMERG CONT caption light remains extinguished.

(3) On AUTO STAB units No.1 and No.2, disengage PITCH and ROLL switches.

### H. Close-Up

De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

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- Check that EMERG CONT caption light remains extinguished.

(3) On AUTO STAB units No.1 and No.2, disengage PITCH and ROLL switches.

### H. Close-Up

De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

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## MAINTENANCE MANUAL

### SAFETY FLIGHT CONTROL SYSTEM - ADJUSTMENT/TEST

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN 24-00-00 SERVICING

#### 1. General

In order to fully understand the tests performed on safety flight control system, the test procedure shall be divided as follows :

##### A. Operational Tests

- (1) SFC computer (test using ITEM)
- (2) Wobbler warning
- (3) Superstabilization ("4° nose down' Function)
- (4) Autopilot disconnection
- (5) Auto trim inhibit function
- (6) Emergency flight control mode

##### B. Functional Tests

- (1) Wobbler warning

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- (2) Superstabilization
- (3) Check of logic conditions common to both SFC
- (4) Emergency flight control mode
- (5) OVERSPEED warning activation

NOTE : During the following tests, do not take into account aural and visual warnings which are not mentioned.

### 2. Operational Test of SFC Computer using ITEM

NOTE : The following procedure is carried out with the integrated test and maintenance system (ITEM) ; aircraft is on the ground (shock absorbers compressed).

#### A. Equipment and Materials

DESCRIPTION	PART NO.
-------------	----------

Electrical Ground Power Unit

#### B. Prepare

- (1) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
NOSE UC WEIGHT SW A SYS SUP	1-213	G 291	M16
AP/FD SYST 1 CONT		1C 17	Q13
AFCS TEST 1 28 V SUP		1C 383	R12
SAFETY FLT CONT No.1 SUP		1C 651	S20
NOSE UC WEIGHT SW B SYS SUP	3-213	G 296	D 8
AP/FD SYST 2 CONT	5-213	2C 17	A11
SAFETY FLT CONT No.2 SUP		2C 651	D17
AFCS TEST 2 28 V SUP		2C 383	F11
AP/FD COMP 1 SUP	13-215	1C 18	A 5
AFCS TEST 1 115 V SUP		1C 384	D 6
SAFETY FLT CONT COMP No.1		1C 652	E 6

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
115 V SUP SAFETY FLT CONT COMP No.1 26 V SUP		1C 653	F 6
SAFETY FLT CONT COMP No.2 26 V SUP	13-216	2C 653	C16
SAFETY FLT CONT COMP No.2 115 V SUP		2C 652	C17
AFCS TEST 2 115 V SUP		2C 384	F17
AP/FD COMP 2 SUP		2C 18	F18
(2) Aircraft must be on the ground, shock absorbers compressed.			
(3) On Flight Control Unit (on overhead panel) make certain that ANTI STALL SYSTEM 1 and 2 switches are in OFF position.			
(4) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing). On overhead panel, on Flight Control Unit SYST 1 FAIL and SYST 2 FAIL warning lights must be off.			
(5) On Flight Engineer's panel, on EQUIPMENT BAY COOLING unit, make certain that electronics rack ventilation operates (Ref. 21-21-00).			

### C. Test

All the tests described below are carried out at Flight Engineer's station, on ITEM display and control panel.

- (1) Place both IFM - OFF - TEST switches in TEST position.

NOTE : The 2 switches are of the pull to unlock type.

- (2) Place FLIGHT - TEST ALL - TEST UNIT switch in TEST UNIT position.
- (3) ITEM must appear in display window 3 and 7 and TEST must appear in display window 4 and 8.
- (4) Wait 3 minutes approximately (ITEM self test duration) and, PASS must replace TEST indication.

EFFECTIVITY: ALL

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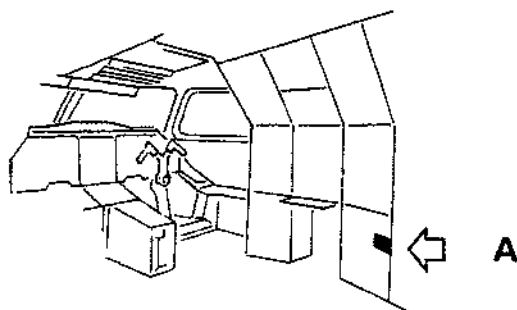
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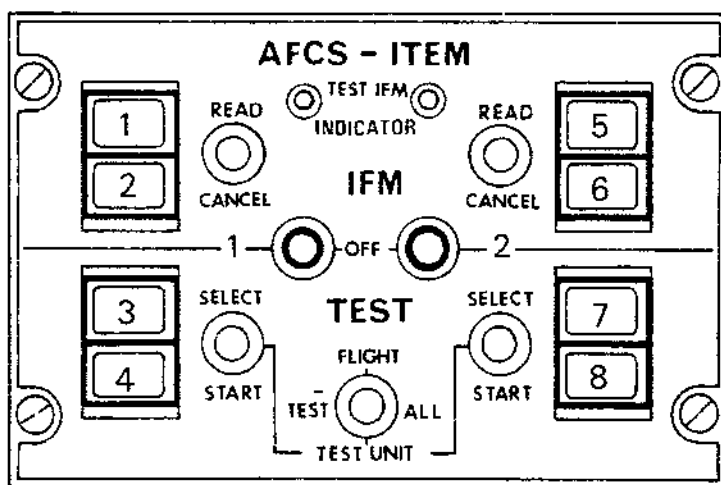
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**A**



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ITEM Display and Control Panel  
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NOTE : - During the first minute a weak flashing display indication is normal.  
- If FAIL indication replaces PASS indication in display windows 4 or (and) 8, self test is negative (Faulty operation of associated computer).

- (5) Place and hold SELECT/START switch, side 1, in SELECT position until SFC indication appears in display window 3.

NOTE : Indications concerning the AFCS appear in a cyclic order as follows : SFC, AP.P, AP.A, AT, AS.P, AS.R, AS.Y. ET. WLD on display windows 3 or 7 according to the selected side.

- (6) Place SELECT/START switch in START position when SFC indication appears in display window 3.
- (7) Release SELECT/START switch, it reverts to centre position (spring return).
- (8) Check that SFC indication remains displayed in display window 3.
- (9) Check that TEST indication remains displayed in display window 4.
- (10) Check that PASS indication replaces TEST indication in display window 4 at the end of test. (Test duration : 20 seconds approximately).

NOTE : PASS indication testifies that channel 1 computer is correct. If COMP indication replaces PASS indication, the SFC computer operation is faulty.

- (11) Place IFM - OFF - TEST switch, side 1, in OFF position.
- (12) Check that SFC and PASS indications have disappeared from display windows 3 and 4.
- (13) Carry out the same test on side 2 as described from paragraph 2. C. (5) to paragraph 2. C. (12) inclusive ; SFC and TEST indications followed by PASS indication for channel 2 computer will appear respectively in display windows 7 and 8.
- (14) Place IFM - OFF - TEST switch, on side 2, in OFF position.

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(15) Place FLIGHT - TEST ALL - TEST UNIT switch in FLIGHT position.

### D. Close-Up

(1) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

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### 3. Wobbler Warning Operational Test

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Circuit Breaker Safety Clips	

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) The aircraft must be on the ground with shock-absorbers compressed.
- (3) On ADC control panel at centre console, make certain that :
  - ADC 1 and ADC 2 switches are in OFF position.
  - TEST selector switches for ADC 1 and ADC 2 systems are in NORM position.
- (4) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RH UC WEIGHT SW & DOWN-LOCK A SYS SUP	1-213	G 295	M18
ADC 1 28 V SUP		1F 74	P12
SAFETY FLT CONT No.1 SUP		1C 651	S20
ADC 1 26 V SUP	2-213	1F 78	A 2
PITCH ART FEEL COMP 1 SUP		1C 244	E 4
AUTO STAB 1 COMP SUP		1C 37	E 5
ADC 1 115 V SUP		1F 73	F 3
RH UC WEIGHT SW B SYS SUP		G 294	B 9
SAFETY FLT CONT No.2 SUP	5-213	2C 651	D17
ADC 2 28 V SUP		2F 74	F12
TRIM SYNCHRO SYS 1 SUP	13-215	1C 163	E 5
SAFETY FLT CONT COMP No.1 115 V SUP		1C 652	E 6

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SAFETY FLT CONT COMP No.1 26 V SUP		1C 653	F 6
TRIM SYNCHRO SYS 2 SUP	13-216	2C 163	A16
SAFETY FLT CONT COMP No.2 26 V SUP		2C 653	C16
SAFETY FLT CONT COMP No.2 115 V SUP		2C 652	C17
AUTO STAB 2 COMP SUP		2C 37	D17
ADC 2 26 V SUP		2F 78	F14
ADC 2 115 V SUP		2F 73	F15
PITCH ART FEEL COMP 2 SUP		2C 244	G18
ROOF PNL LT TEST SUP	15-216	L1002	D13

(5) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW "A" SYS SUP	1-213	G 292	M17
STICK SHAKER SUP		W 513	P15
LH UC WEIGHT SW & DOWN- LOCK "B" SYS SUP	3-213	G 293	B 8

(6) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).

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### C. Test

(1) On ADC control panel (centre console)

(a) Place ADC 1 switch in ON position.

(b) Place ADC 1 TEST selector switch in position 1.

- Amber ADC 1 warning light must illuminate.
- After 30 seconds approx., blue TEST indicator light must illuminate.

(c) Press then release amber ADC 1 warning light :

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it must go off.

- (2) On overhead panel :
  - (a) On ARTIFICIAL FEEL No.1 engage switch unit, engage PITCH switch.
  - (b) On Flight Control Unit, place ANTI STALL SYSTEM 1 switch in ON position.
- (3) Slightly pull control column and check that pulsations are felt. Return control column beyond neutral position (control column slightly in nose down position) and check that pulsations stop.
- (4) Remove safety clips and tags and set the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW A SYS SUP	1-213	G 292	M17
LH UC WEIGHT SW & DOWN- LOCK B SYS SUP	3-213	G 293	B 8

- (5) Slightly pull control column and check that pulsations are no longer felt.
- (6) Trip, safety and tag circuit breakers mentioned in (4) above.
- (7) On ADC control panel (centre console) :
  - (a) Place ADC 2 switch in ON position.
  - (b) If necessary, press then release amber ADC 2 warning light : it must go off.
- (8) Slightly pull control column and check that pulsations are no longer felt.
- (9) On overhead panel :
  - (a) On ARTIFICIAL FEEL No.1 engage switch unit, disengage PITCH switch.
  - (b) On Flight Control Unit, place ANTI STALL SYSTEM 1 switch in OFF position.

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(10) On ADC control panel (centre console) :

- (a) Place ADC 1 TEST selector switch in NORM position.
- (b) Place ADC 1 switch in OFF position.

(11) Remove safety clips and tags and set the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW A SYS SUP	1-213	G 292	M17
LH UC WEIGHT SW & DOWN- LOCK B SYS SUP	3-213	G 293	B 8

(12) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RH UC WEIGHT SW & DOWN- LOCK A SYS SUP	1-213	G 295	M18
RH UC WEIGHT SW B SYS SUP	3-213	G 294	B 9

(13) On ADC control panel (centre console)

- (a) Place ADC 2 TEST selector switch in position 1.  
Amber ADC 2 warning light must illuminate.  
After 30 seconds, Blue TEST indicator light must illuminate.
- (b) Press then release amber ADC 2 warning light ;  
this light must go off.

(14) On overhead panel :

- (a) On ARTIFICIAL FEEL No.2 engage switch unit, engage PITCH switch.
- (b) On Flight Control Unit, place ANTI STALL SYSTEM No.2 switch in ON position.

(15) Slightly pull control column and check that pulsations are felt. Return control column beyond neutral posi-

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tion (control column slightly in nose down position) and check that pulsations stop.

- (16) Remove safety clips and tags and set the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RH UC WEIGHT SW & DOWN- LOCK A SYS SUP	1-213	G 295	M18
RH UC WEIGHT SW B SYS SUP	3-213	G 294	B 9

- (17) Slightly pull control column and check that pulsations are no longer felt.

- (18) Trip, safety and tag circuit breakers listed in (16) above.

- (19) On ADC control panel (centre console)

- (a) Place ADC 2 switch in ON position.
- (b) If necessary, press and release amber ADC 2 warning light : this light must go off.

- (20) Slightly pull control column and check that pulsations are no longer felt.

- (21) On overhead panel :

- (a) On Flight Control Unit, place ANTI STALL SYSTEM 2 switch in OFF position.
- (b) On ARTIFICIAL FEEL No.2 engage switch unit, disengage PITCH switch.

- (22) On ADC control panel (centre console) :

- (a) Place ADC 2 TEST selector switch in NORM position.
- (b) Place ADC 1 and ADC 2 switches in OFF position.

### D. Close-Up

- (1) Remove safety clips and tags and reset circuit breakers

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- (2) Carry out Close Up operations of Procedure to set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).

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### 4. Superstabilization Operational Test (4° Nose Down Function)

#### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Electrical Ground Power Unit

Circuit Breaker Safety Clips

Access Platform 4.240 m (13 ft. 11 in.)

#### B. Prepare

- (1) Take the precautions described in the WARNING paragraph
- (2) Aircraft must be on the ground ; shock absorbers compressed.
- (3) On ADC control panel (centre console), make certain that :
  - ADC 1 and ADC 2 switches are in OFF position
  - ADC 1 and ADC 2 TEST selector switches are in NORM position.
- (4) Make certain that the following circuit breakers are set :

---

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ADC 1 28 V SUP	1-213	1F 74	P12
SAFETY FLT CONT No.1 SUP		1C 651	S20
ADC 1 26 V SUP	2-213	1F 78	A 2
LAT ACCEL MTR 1 26 V SUP		1C 42	A 4
1ST PLT ADC INST SUP		1F 75	B 3
AUTO STAB 1 COMP SUP		1C 37	E 5
ADC 1 115 V SUP		1F 73	F 3
SAFETY FLT CONT No.2 SUP	5-213	2C 651	D17
ADC 2 28 V SUP		2F 74	F12
SAFETY FLT CONT COMP No.1 115 V SUP	13-215	1C 652	E 6
SAFETY FLT CONT COMP No.1 26 V SUP		1C 653	F 6

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
2ND PLT ADC INST SUP	13-216	2F 75	A14
LAT ACCEL MTR 2 26 V SUP		2C 42	B16
SAFETY FLT CONT COMP No.2 26 V SUP		2C 653	C16
SAFETY FLT CONT COMP No.2 115 V SUP		2C 652	C17
AUTOSTAB 2 COMP SUP		2C 37	D17
ADC 2 26 V SUP		2F 78	F14
ADC 2 115 V SUP		2F 73	F15
ROOF PNL LT TEST SUP	15-216	L1002	D13

(5) Set the following circuit breakers

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT & NAV BUS 14 X S	2-213	X 355	H 2
NAV INST BUS 13 X S	13-216	X 345	G 4

(6) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW "A" SYS SUP	1-123	G 292	M17
RH UC WEIGHT SW & DOWN- LOCK "A" SYS SUP		G 295	M18
STICK SHAKER SUP		W 513	P15
LH UC WEIGHT SW & DOWN- LOCK "B" SYS SUP	3-213	G 293	B 8
RH UC WEIGHT SW "B" SYS SUP		G 294	B 9

(7) Set Flight Controls in Blue electrical mode  
(Ref. 27-00-00, Servicing).

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C. Test

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- (1) Remove safety clips and tags and set the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW A SYS SUP	1-213	G 292	M17
LH UC WEIGHT SW & DOWN- LOCK B SYS SUP	3-213	G 293	B 8

- (2) On ADC control panel (centre console)
- (a) Place ADC 1 switch in ON position.
  - (b) If necessary, press and release amber ADC 1 warning light ; this light must go off.
- (3) On overhead panel :
- (a) On Flight Control Unit, place ANTI STALL SYSTEM 1 switch in ON position.  
SYST 1 FAIL warning light must illuminate.
  - (b) On AUTO STAB No.1 unit, engage PITCH switch ;  
SYST 1 FAIL warning light must go off.
- (4) Move vane of LH angle-of-attack sensor (zone 113) until an angle-of-attack value greater than 20 degrees is displayed on the angle-of-attack indicator on Captain's instrument panel.  
On ICOVOL indicator (First Officer's instrument panel) markers associated with elevons must indicate 4 degrees nose down.
- (5) On overhead panel, on Flight Control Unit, place ANTI STALL SYSTEM 1 switch in OFF position. At ICOVOL indicator (First Officer's instrument panel) markers associated with elevons must return to 0 degrees.
- (6) On ADC control panel (centre console), place ADC 1 switch in OFF position.
- (7) On overhead panel, on AUTOSTAB No.1 unit disengage PITCH switch.
- (8) Trip, safety and tag the following circuit breakers :

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW A SYS SUP	1-213	G 292	M17
LH UC WEIGHT & DOWN- LOCK B SYS SUP	3-213	G 293	B 8

- (9) Remove safety clips and tags and set the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RH UC WEIGHT SW & DOWN- LOCK A SYS SUP	1-213	G 295	M18
RH UC WEIGHT SW B SYS SUP	3-213	G 294	B 9

- (10) On ADC control panel (centre console)

- (a) Place ADC 2 switch in ON position.
- (b) If necessary, press then release amber ADC 2 warning light ; this light must go off.

- (11) On overhead panel :

- (a) On Flight Control Unit, place ANTI STALL SYSTEM 2 switch in ON position.  
SYST 2 FAIL warning light must illuminate.
- (b) On AUTO STAB No.2 unit engage PITCH switch.  
SYST 2 FAIL warning light must go off.

- (12) Move vane of RH angle-of-attack sensor (zone 114) until an angle-of-attack value greater than 20 degrees is displayed on the angle-of-attack indicator on First Officer's instrument panel.  
On ICOVOL indicator (First Officer's instrument panel) the markers associated with elevons must indicate 4 degrees nose down.

- (13) On overhead panel, on Flight Control Unit, place ANTI STALL SYSTEM 2 switch in OFF position. On ICOVOL indicator (First Officer's instrument panel) markers asso-

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ciated with elevons must return to 0 degrees.

- (14) On ADC control panel (centre console), place ADC 2 switch in OFF position.
- (15) On overhead panel, on AUTO STAB No.2 unit, disengage PITCH switch.

### D. Close up.

- (1) Remove safety clips and tags and set circuit breakers.
- (2) Carry out Close up operations of Procedure to set Flight Controls in Blue electrical mode (Ref. 27-00-00, Servicing).
- (3) Trip, safety and tag the following circuit breakers.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT & NAV BUS 14 X S	2-213	X 355	H 2
NAV INST BUS 13 X S	13-216	X 345	G 4

- (4) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

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### 5. Autopilot Disconnection (for an angle of attack greater than 18°) Operational Test

#### A. Equipment and Materials

DESCRIPTION	PART NO.
-------------	----------

Electrical Ground Power Unit

#### B. Prepare

- (1) Carry out Prepare operations of procedure to engage AP1 and AP2 (Ref. 22-10-00, Servicing, paragraphs 2 and 4).
- (2) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW "A" SYS SUP	1-213	G 292	M17
RH UC WEIGHT SW "B" SYS SUP	3-213	G 294	B 9

#### C. Test

- (1) On AFCS control unit (Captain's station instrument panel, upper section) check that either AP 1 or AP 2 switch can be engaged.
- (2) On ADC control panel (at centre console) :
  - (a) Place TEST selector switches for ADC 1 and ADC 2 systems in position 1.
  - (b) After 30 seconds approx., blue ADC 1 and ADC 2 TEST indicator lights must illuminate.
  - (c) Press, then release amber ADC 1 and ADC 2 warning lights : the lights must go off.
- (3) On overhead panel :
  - (a) On AUTO STAB units No.1 and No.2, engage the 3

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switches ; PITCH, ROLL and YAW.

- (b) On ELECTRIC TRIM unit, engage switches 1 and 2.
- (4) On AFCS control unit, check that engagement of AP 1 or AP 2 switches is impossible.
- (5) On ADC control panel (at centre console), place TEST selector switches for ADC 1 and ADC 2 systems in NORM position.

### D. Close-Up

- (1) Carry out Close-Up operations of procedure to engage AP1 and AP2 (Ref. 22-10-00, Servicing, paragraphs 2 and 4).

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### 6. Auto Trim Inhibit Function Operational Test

#### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Electrical Ground Power Unit

Access Platform - 4.240 m  
(13 ft. 11 in.)

Circuit Breaker Safety Clips

#### B. Prepare

- (1) Carry out Prepare operations of procedure to engage AP1 and AP2 (Ref. 22-10-00, Servicing, paragraphs 2 and 4).

NOTE : At overhead panel, on ELECTRIC TRIM unit, engage switch 1 only.

- (2) Trip, safety and tag the following circuit breakers :

---

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW "A" SYS SUP	1-213	G 292	M17
RH UC WEIGHT SW "A" SYS SUP	3-213	G 294	B 9

---

- (3) If required, move the vanes of LH and RH angle-of-attack sensors (Zones 113 and 114) so as to read an angle-of-attack less than 13° on angle-of-attack indicators located on Captain's and First Officer's instrument panels.

#### C. Test

- (1) On AFCS control unit, engage AP 1 switch.
- (2) On AFCS datum adjust unit, move AUTO PILOT switch to NOSE UP position.

At centre console, the pitch trim wheel must rotate.

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Release AUTO PILOT switch.

- (3) Move the vanes of LH and RH angle-of-attack sensors (Zones 113 and 114) so as to read an angle-of-attack greater than  $16^{\circ}$  on angle-of-attack indicators located on Captain's and First Officer's instrument panels.

NOTE : Move gradually and simultaneously the 2 vanes so as to avoid activation of ADC warning (General warning and angle-of-attack comparison warning).

- (4) On AFCS datum adjust unit, move AUTO PILOT switch to NOSE DOWN position.

At centre console, the pitch trim wheel must not rotate.

Release AUTO PILOT switch.

- (5) At overhead panel, on ELECTRIC TRIM unit, disengage switch 1 and engage switch 2.
- (6) Repeat the tests described in paragraphs 6.B. (3) to 6.C.(4) inclusive.

### D. Close-Up

- (1) Carry out Close-Up operations of procedure to engage AP1 and AP2 (Ref. 22-10-00, Servicing, paragraphs 2 and 4).
- (2) Remove safety clips and tags and reset the circuit breakers.

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### 7. Emergency Flight Control Mode Operational Test

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) The aircraft must be on the ground with shock-absorbers compressed.
- (3) Carry out prepare operations of procedure to engage AP1 and AP2 (Ref. 22-10-00, Servicing, paragraphs 2 and 4).
- (4) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW "A" SYS SUP	1-213	G 292	M17
RH UC WEIGHT SW & DOWN-LOCK "A" SYS SUP		G 295	M18
LH UC WEIGHT SW & DOWN-LOCK "B" SYS SUP	3-213	G 293	B 8
RH UC WEIGHT SW "B" SYS SUP		G 294	B 9

- (5) Reset the force detectors and the SFC computer before each test by pressing for 5 seconds approx., NULL RESET button located on the front panel of SFC computer (1C650) on shelf 6-215.

NOTE : Do not apply any force to Captain's and First Officer's control columns during the reset procedure.

- (6) On AFCS control unit, engage AP 1 switch.

NOTE : On overhead panel, engage AUTO STAB system No.1

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only.

### C. Test

- (1) On Captain's control column, at the junction of the handwheel yoke, press emergency flight control test button and hold it.

The EMERG CONT caption light must illuminate on Captain's control column.

- (2) Move Captain's control column slightly so as to avoid disconnection of autopilot 1.

On IC0VOL indicator on First Officer's instrument panel, check that the elevons deflect in pitch configuration.

- (3) Move slowly Captain's handwheel. Do not apply a load too heavy so as to avoid disconnection of autopilot 1.

On IC0VOL on First Officer's instrument panel, check that outer and middle elevons deflect in roll configuration.

- (4) Repeat steps (2) and (3) on First Officer's control column and handwheel ; identical results.

- (5) On Captain's control column, at the junction of the handwheel yoke, release emergency flight control test button.

On Captain's control column, the EMERG CONT caption light must go off.

- (6) Reset the force detectors and the SFC computer before each test by pressing for 5 seconds approximately NULL RESET button located on the front panel of SFC computer (2C650) on shelf 6-216.

NOTE : Do not apply any force to Captain's and First Officer's control columns during the reset procedure.

- (7) On overhead panel, on AUTO STAB unit No.2, engage the 3 switches ; PITCH, ROLL and YAW.

- (8) On AFCS control unit, engage AP 2 switch

- (9) Repeat tests described from paragraph 7.C (1) to paragraph 7.C (4) inclusive.

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- R (10) On Captain's control column, at the junction of the handwheel yoke, release emergency flight control test button.
- On Captain's control column, the EMERG CONT caption light must go off.

### D. Close-Up

- (1) Carry out Close-up operations of procedure to engage AP1 and AP2 (Ref. 22-10-00, Servicing, paragraphs 2 and 4).

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### 8. Wobbler Warning Functional Test

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Simulator - Pressure Sensors Or Pressure Generator - Air Data System	87-209-455
2 Adapters - Pitot Tube	853BFT025
2 Blanking Plugs - Pitot Tube Drain Port	853BFT026
2 Adapters - Static Ports	T875IE22783002
Access Platform 4.240 m (13 ft. 11 in.)	
Circuit Breaker Safety Clips	

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Aircraft must be on the ground, shock absorbers compressed.
- (3) On centre console make certain that :
  - (a) Pitch trim wheel is set to Neutral.
  - (b) On ADC control panel :
    - (b1) ADC 1 and ADC 2 switches are in OFF position.
    - (b2) ADC 1 and ADC 2 TEST selector switches are in NORM position.
- (4) On Captain's and First Officer's airspeed indicators (located respectively on Captain's and First Officer's instrument panels) make certain that mode selection buttons are in N (Normal) position.
- (5) Make certain that the following circuit breakers are set.

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ADC 1 28 V SUP	1-213	1F 74	P12
SAFETY FLT CONT No.1 SUP		1C 651	S20
ADC 1 26 V SUP	2-213	1F 78	A 2
1ST PLT ADC INST SUP		1F 75	B 3
PITCH ART FEEL COMP 2 SUP		1C 244	E 4
AUTO STAB 1 COMP SUP		1C 37	E 5
ADC 1 115 V SUP		1F 73	F 3
SAFETY FLT CONT No.2 SUP	5-213	2C 651	D17
ADC 2 28 V SUP		2F 74	F12
TRIM SYNCHRO SYS 1 SUP	13-215	1C 163	E 5
SAFETY FLT CONT COMP No.1 115 V SUP		1C 652	E 6
SAFETY FLT CONT COMP No.1 26 V SUP		1C 653	F 6
2ND PLT ADC INST SUP	13-216	2F 75	A14
TRIM SYNCHRO SYS 2 SUP		2C 163	A16
SAFETY FLT CONT COMP No.2 26 V SUP		2C 653	C16
SAFETY FLT CONT COMP No.2 115 V SUP		2C 652	C17
AUTOSTAB 2 COMP SUP		2C 37	D17
ADC 2 26 V SUP		2F 78	F14
ADC 2 115 V SUP		2F 73	F15
PITCH ART FEEL COMP 2 SUP		2C 244	G18
ROOF PNL LT TEST SUP	15-216	L1002	D13

(6) Set the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT & NAV BUS 14 X S	2-213	X 355	H 2
NAV INST BUS 13 X S	13-216	X 345	G 4

(7) Trip, safety and tag the following circuit breakers :

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW A SYS SUP	1-213	G 292	M17
RH UC WEIGHT SW & DOWN- LOCK A SYS SUP		G 295	M18
STICK SHAKER SUP		W 513	P15
LH UC WEIGHT SW & DOWN- LOCK B SYS SUP	3-213	G 293	B 8
RH UC WEIGHT SW B SYS SUP		G 294	B 9

(8) Set Flight Controls in mechanical mode (Ref, 27-00-00, Servicing).

(9) Depending on the equipment used :

(a) Connect Pressure Sensor simulator to front panel of ADC 1 (1F71) (on shelf 6-215).  
Make certain that on simulator ;

- SIMUL-SENSOR switch is in SENSOR position.
- ALTITUDE COARSE potentiometer is set to 1013
- AIRSPEED COARSE potentiometer is set to 4

Or

(b) Connect pressure generator to Pitot heads and static ports ; ADC 1 and ADC 2 systems ; and make certain that generator is shut down with hoses to ambient air.

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### C. Test of SFC System No.1 with Artificial Feel System No.1

- (1) On ADC control panel (centre console).
  - (a) Place ADC 1 switch in ON position.
  - (b) If required press amber ADC 1 warning light then release it ; it must go off.  
Flag must disappear from angle of attack indicator on Captain's instrument panel.
- (2) Move vane of LH angle-of-attack sensor (zone 113) so as to read an angle-of-attack equal to  $18^{\circ}$  on angle-of-attack indicator located on Captain's instrument panel. (Move vane slowly to avoid triggering ADC general warning).
- (3) On overhead panel :
  - (a) On Flight Control Unit, place ANTI STALL SYSTEM 1 switch in ON position.
  - (b) On ARTIFICIAL FEEL engage switch unit No.1 engage PITCH switch.
- (4) Slightly pull Captain's or First Officer's control column and hold it.
- (5) Move vane of LH angle-of-attack sensor (zone 113) so as to increase slowly angle-of-attack till activation of wobbler warning (Pulsations felt at control column).  
  
On Captain's instrument panel, the angle-of-attack indicator must display an angle-of-attack equal to  $19^{\circ}$  plus or minus  $0.5^{\circ}$ .
- (6) Tilt RH angle-of-attack sensor vane (zone 114) downwards until it abuts stop.
- (7) On ADC control panel (centre console).
  - (a) Place ADC 2 switch in ON position.
  - (b) If required, press then release amber ADC 2 warning light ; it must go off.  
Wobbler warning is no longer activated.
  - (c) Place ADC 2 switch in OFF position.  
Wobbler warning is activated.
- (8) Push control column beyond neutral position (control

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column slightly in nose down position).  
Wobbler warning is no longer activated.

- (9) On overhead panel, on ARTIFICIAL FEEL No.1 engage  
switch unit disengage PITCH switch.

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### D. Test of SFC System No.1 with Artificial Feel System No.2

- (1) On ADC control panel (centre console).
  - (a) Place ADC 1 and ADC 2 switches in ON position.
  - (b) If required, press then release amber ADC 1 and ADC 2 warning lights ; they must go off. Flags must not be visible on angle-of-attack indicators located on Captain's and First Officer's instrument panel
- (2) Move RH angle-of-attack sensor vane (zone 114) so as to read an angle-of-attack value equal to  $19^{\circ}$  on angle-of-attack indicator located on First Officer's instrument panel (move vane slowly to avoid triggering ADC general warning).
- (3) Move LH angle-of-attack sensor vane (zone 113) until an angle-of-attack value equal to  $18^{\circ}$  is displayed on angle-of-attack indicator of Captain's instrument panel (move vane slowly to avoid triggering ADC general warning).
- (4) On overhead panel.
  - (a) On Flight Control Unit, place ANTI STALL SYSTEM 1 switch in ON position.
  - (b) On ARTIFICIAL FEEL No.2 engage switch unit, engage PITCH switch.
- (5) Slightly pull Captain's or First Officer's control column and hold it.
- (6) Move LH angle-of-attack sensor vane (zone 113) so as to increase slowly angle-of-attack value till wobbler warning is triggered off. (Pulsations at control column). On Captain's instrument panel, the angle-of-attack indicator must display an angle-of-attack value equal to  $19^{\circ}$  plus or minus  $0.5^{\circ}$ .
- (7) Push control column beyond neutral position (control column slightly in nose down position). Wobbler warning is no longer activated.
- (8) On overhead panel
  - (a) On Flight Control Unit, place ANTI STALL SYSTEM 1 switch in OFF position.

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- (b) On ARTIFICIAL FEEL No.2 engage switch unit disengage PITCH switch.

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### E. Test of SFC System No.2 with Artificial Feel System No.1

- (1) On ADC control panel (centre console)
  - (a) Place ADC 1 and ADC 2 switches in ON position.
  - (b) If required, press then release amber ADC 1 and ADC 2 warning lights ; they must go off.  
Flags must disappear on angle-of-attack indicators on Captain's and First Officer's instrument panels
- (2) Move LH angle-of-attack sensor vane (zone 113) until an angle-of-attack value equal to  $19^{\circ}$  is read on angle-of-attack indicator located on Captain's instrument panel (Move vane slowly to avoid triggering ADC general warning).
- (3) Move RH angle-of-attack sensor vane (zone 114) till an angle-of-attack value equal to  $18^{\circ}$  is read on angle-of-attack indicator located on First Officer's instrument panel (Move vane slowly to avoid triggering ADC general warning).
- (4) On overhead panel :
  - (a) On Flight Control Unit, place ANTI STALL SYSTEM 2 switch in ON position.
  - (b) On ARTIFICIAL FEEL No.1 engage switch unit, engage PITCH switch.
- (5) Pull slightly Captain's or First Officer's control column and hold it.
- (6) Move RH angle-of-attack sensor vane (zone 114) so as to increase slowly the value of angle-of-attack until wobbler warning is triggered off. (Pulsations felt at control column).  
On First Officer's instrument panel, angle-of-attack indicator must display an angle-of-attack value equal to  $19^{\circ}$  plus or minus  $0.5^{\circ}$ .
- (7) Return control column beyond neutral position (control column slightly in nose down position).  
Wobbler warning is no longer activated.
- (8) On overhead panel, on ARTIFICIAL FEEL No.1 engage switch unit, disengage PITCH switch.
- (9) On ADC control panel (centre console) place ADC 1 switch in OFF position.

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### F. Test of SFC System No.2 with Artificial Feel System No.2

- (1) On ADC control panel (centre console).
  - (a) Place ADC 2 switch in ON position.
  - (b) If required, press amber ADC 2 warning light then release ; it must go off.  
Flag must disappear on angle-of-attack indicator (First Officer's instrument panel).
- (2) Move RH angle-of-attack sensor vane (zone 114) till an angle-of-attack value equal to  $18^{\circ}$  is read on angle-of-attack indicator on First Officer's instrument panel (move vane slowly to avoid triggering ADC general warning).
- (3) On overhead panel.
  - (a) On Flight Control Unit, place ANTI STALL SYSTEM 2 switch in ON position.
  - (b) On ARTIFICIAL FEEL No.2 engage switch unit, engage PITCH switch.
- (4) Pull slightly Captain's or First Officer's control column and hold it.
- (5) Move RH angle-of-attack sensor vane (zone 114) so as to increase slowly the value of angle-of-attack until wobbler warning is triggered off. (Pulsations felt at control column).

On First Officer's instrument panel, angle-of-attack indicator must display an angle-of-attack value equal to  $19^{\circ}$  plus or minus  $0.5^{\circ}$ .
- (6) Tilt LH angle-of-attack sensor vane (zone 113) downwards until it abuts stop.
- (7) On ADC control panel (centre console).
  - (a) Place ADC 1 switch in ON position.
  - (b) If required, press then release amber ADC 1 warning light ; it must go off.  
Wobbler warning is no longer activated.
  - (c) On ADC control panel (centre console) place ADC 1 switch in OFF position.  
Wobbler warning is activated.

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- (8) Return control column beyond neutral position (control column slightly in nose down position).  
Wobbler warning is no longer activated.

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### G. Check of SFC system No.1 priority over SFC system No.2

- (1) On ADC control panel (centre console)
  - (a) Place ADC 1 and ADC 2 switches in ON position.
  - (b) If required, press and release amber ADC 1 and ADC 2 warning lights : they must go off.  
Flags must disappear from Captain's and First Officer's instrument panel angle-of-attack indicators.
- (2) On overhead panel :
  - (a) On Flight Control Unit, place ANTI STALL SYSTEM 1 and 2 switches in ON position.
  - (b) On ARTIFICIAL FEEL No.1 and No.2 engage switch units engage PITCH switches.
- (3) Adjust LH and RH angle-of-attack sensor vanes (zones 113 and 114) so as to obtain :
  - (a) 18.1 degrees plus or minus 0.2 degrees on Captain's instrument panel angle-of-attack indicator.
  - (b) 19.9 degrees plus or minus 0.2 degrees on First Officer's instrument panel angle-of-attack indicator.
- (4) Slightly pull Captain's or First Officer's control column and hold it in this position.  
  
Wobbler warning (pulsations at control column) is not activated.
- (5) On overhead panel, on Flight Control Unit :
  - (a) Place ANTI STALL SYSTEM 1 switch in OFF position.  
Wobbler warning is activated.
  - (b) Place ANTI STALL SYSTEM 1 switch in ON position.  
Wobbler warning is no longer activated.
- (6) On ADC control panel (centre console)
  - (a) Place ADC 1 switch in OFF position.
    - Wobbler warning is activated.
    - On overhead panel, on ARTIFICIAL FEEL No.1 engage switch unit, PITCH switch must disen-

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gage.

- (b) Place ADC 1 switch in ON position.
  - (c) If required, press then release amber ADC 1 warning light : this light must go off.  
Wobbler warning is no longer activated.
- (7) On overhead panel, on ARTIFICIAL FEEL No.1 engage switch unit, engage PITCH switch.
- (8) Depending on equipment used :
- (a) On Pressure Sensor Simulator, place SIMUL-SENSOR switch in SIMUL position then adjust AIRSPEED potentiometer so as to read a speed greater than 270 kts on airspeed indicator on Captain's instrument panel.  
Wobbler warning is activated.
- or
- (b) On shelf 6-216, disconnect quick-disconnect PITOT and STATIC adapters on ADC 2.  
Operate pressure generator and slowly increase value of Delta P pressure difference applied to total pressure system so as to read a speed greater than 270 kts on Captain's instrument panel airspeed indicator.  
Wobbler warning is activated.
- (9) Depending on equipment used :
- (a) On Pressure Sensor Simulator, slowly adjust AIRSPEED potentiometer so as to display a speed of 160 kts on Captain's instrument panel airspeed indicator.  
Wobbler warning is no longer activated.
- or
- (b) On Pressure Generator, slowly reduce value of Delta P pressure difference applied to total pressure system so as to read a speed of 160 kts on Captain's instrument panel airspeed indicator.  
Wobbler warning is no longer activated.
- (10) Move LH angle-of-attack sensor vane (zone 113) so as to read 20 degrees on Captain's instrument panel angle-of-attack indicator.  
Wobbler warning is activated.

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- (11) Remove safety clips and tags and simultaneously set the following circuit breakers :

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LH UC WEIGHT SW A SYS SUP	1-213	G 292	M17
LH UC WEIGHT SW & DOWN- LOCK B SYS SUP	3-213	G 293	B 8

Wobbler warning is no longer activated.

- (12) Depending on equipment used :

- (a) On Pressure Sensor Simulator, slowly adjust AIRSPEED potentiometer so as to read a speed less than 60 kts on Captain's instrument panel airspeed indicator.  
Wobbler warning is activated.

or

- (b) On Pressure Generator, slowly reduce value of Delta P pressure difference applied to total pressure system so as to read a speed less than 60 kts on Captain's instrument panel airspeed indicator.  
Wobbler warning is activated.

- (13) Depending on equipment used :

- (a) On Pressure Sensor Simulator, slowly adjust AIRSPEED potentiometer so as to read a speed of 160 kts on Captain's instrument panel airspeed indicator.  
Wobbler warning is no longer activated.

or

- (b) On Pressure Generator, slowly increase value of Delta P pressure difference, applied to total pressure system so as to read a speed of 160 kts on Captain's instrument panel airspeed indicator.  
Wobbler warning is no longer activated.

- (14) Trip, safety and tag circuit breakers previously mentioned in (11).

Approximately ten seconds after this operation,

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wobbler warning is activated.

- (15) Move LH angle-of-attack sensor vane (zone 113) so as to read 18 degrees on Captain's instrument panel angle-of-attack indicator.  
Wobbler warning is no longer activated.
- (16) On overhead panel, on Flight Control Unit place ANTI STALL SYSTEM 1 switch in OFF position.  
Wobbler warning is activated.
- (17) On ADC control panel (centre console) place ADC 2 switch in OFF position.  
- Wobbler warning is no longer activated.  
- On overhead panel, on ARTIFICIAL FEEL No.2 engage switch unit, PITCH switch must disengage.
- (18) Depending on equipment used :
- (a) On Pressure Sensor Simulator
- (a1) Reduce value of AIRSPEED potentiometer to 4 then place SIMUL-SENSOR switch in SENSOR position.
- (a2) On ADC control panel (centre console) place ADC 1 switch in OFF position.  
On overhead panel, on ARTIFICIAL FEEL No.1 engage switch unit, PITCH switch must disengage.
- (a3) Disconnect Pressure Sensor Simulator from ADC 1 and, on shelf 6-216, connect Simulator to ADC 2 front panel.
- or
- (b) On Pressure Generator, slowly reduce total pressure system to ambient atmospheric pressure. On shelf 6-216, connect quick-disconnect adapters to ADC 2 front panel.
- (19) On ADC control panel (centre console)
- (a) Place ADC 2 switch in ON position.
- (b) If required, press and release amber ADC 2 warning light : this light must go off.  
Flags must not be visible on airspeed and angle-of-attack indicators on First Officer's instrument panel.

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(20) On overhead panel, on ARTIFICIAL FEEL No.2 engage switch unit, engage PITCH switch.  
Wobbler warning is activated.

(21) Depending on equipment used :

(a) On Pressure Sensor Simulator, place SIMUL-SENSOR switch in SIMUL position, then slowly adjust AIRSPEED potentiometer so as to read a speed greater than 270 kts on First Officer's instrument panel airspeed indicator.  
Wobbler warning is no longer activated.

or

(b) On Pressure Generator, slowly increase value of Delta P pressure difference applied to total pressure system so as to read a speed greater than 270 kts on First Officer's instrument panel airspeed indicator.  
Wobbler warning is no longer activated.

(22) Depending on equipment used :

(a) On Pressure Sensor Simulator, slowly adjust AIRSPEED potentiometer so as to read a speed of 160 kts on First Officer's instrument panel airspeed indicator.  
Wobbler warning is activated.

or

(b) On Pressure Generator, slowly reduce value of Delta P pressure difference applied to total pressure system so as to read a speed of 160 kts on First Officer's instrument panel airspeed indicator.  
Wobbler warning is activated.

(23) Remove safety clips and tags and simultaneously set the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RH UC WEIGHT SW & DOWN- LOCK A SYS SUP	1-213	G 295	M18
RH UC WEIGHT SW B SYS SUP	3-213	G 294	B 9

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Wobbler warning is no longer activated.

(24) Depending on equipment used :

- (a) On Pressure Sensor Simulator, slowly adjust AIRSPEED potentiometer so as to read a speed less than 60 kts on First Officer's instrument panel airspeed indicator.  
Wobbler warning is activated.

or

- (b) On Pressure Generator, slowly reduce value of Delta P pressure difference applied to total pressure system so as to read a speed less than 60 kts on First Officer's instrument panel airspeed indicator.  
Wobbler warning is activated.

(25) Depending on equipment used :

- (a) On Pressure Sensor Simulator, slowly adjust AIRSPEED potentiometer so as to read a speed of 160 kts on First Officer's instrument panel airspeed indicator.  
Wobbler warning is no longer activated.

or

- (b) On Pressure Generator, slowly increase value of Delta P pressure difference applied to total pressure system so as to read a speed of 160 kts on First Officer's instrument panel airspeed indicator.  
Wobbler warning is no longer activated.

(26) Trip, safety and tag circuit breakers previously mentioned in (23). Approximately ten seconds after this operation, wobbler warning is activated.

(27) Return control column beyond neutral position (control column slightly in nose down position).  
Wobbler warning is no longer activated.

### H. Close-Up

(1) On overhead panel, on Flight Control Unit, place ANTI STALL SYSTEM 1 and 2 switches in OFF position.

(2) Depending on the equipment used :

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- (a) On Pressure Sensor Simulator, reduce value of AIRSPEED potentiometer to 4 then place SIMUL-SENSOR switch in SENSOR position.

Or

- (b) On pressure generator ; slowly reduce total pressure system to ambient atmospheric pressure.

- (3) On ADC control panel (centre console) place ADC 1 and ADC 2 switches in OFF position.  
On overhead panel, on ARTIFICIAL FEEL No.1 and ARTIFICIAL FEEL No.2 engage switch units, PITCH switches must disengage.

- (4) Depending on the equipment used :

- (a) Disconnect Pressure Sensor Simulator from front panel of ADC 2.

Or

- (b) Disconnect pressure generator from pitot heads and static ports, ADC 1 and ADC 2 systems.

- (5) Carry out Close up operations of Procedure to set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).

- (6) Remove safety clips and tags and reset circuit breakers

- (7) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT & NAV BUS 14 X S	2-213	X 355	H 2
NAV INST BUS 13 X S	13-216	X 345	G 4

- (8) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

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### 9. Functional Test of Superstabilization Function

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Simulator - Pressure Sensors	87-209-455
Or	
Pressure Generator - Air Data System	T.B.A.
2 Adapters - Pitot Tube	853BFT025
2 Blanking Plugs - Pitot Tube Drain Port	853BFT026
2 Adapters - Static Ports	T8751E22783002
Access Platform - 4.240 m (13 ft. 11 in.)	
Stabilized Supply, DC, 0-5V	
Voltmeter, DC, 0-5V	
Circuit Breaker Safety Clips	

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) The aircraft must be on the ground with shock absorbers compressed.
- (3) On ADC control panel at centre console, make certain that :
  - ADC 1 and ADC 2 switches are in OFF position.
  - TEST selector switches for ADC 1 and ADC 2 systems are in NORM position.
- (4) On Captain's and First Officer's airspeed indicators located respectively on Captain's and First Officer's instrument panels, make certain that mode selection buttons are in N (normal) position.
- (5) Depending on the equipment used :

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- (a) Connect Pressure Sensor Simulator to front panel of ADC 1 (1F71) (on shelf 6-215).  
On simulator, make certain that :

- SIMUL-SENSOR switch is in SENSOR position.
- ALTITUDE COARSE potentiometer indicates 1013
- AIRSPEED COARSE potentiometer indicates 4.

Or

- (b) Connect pressure generator to pitot heads and static ports, ADC 1 and ADC 2 systems. Make certain that generator is shut down with hoses to ambient air.

- (6) Set Flight Controls in Blue electrical mode (Ref. 27-00-00, Servicing).

- (7) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ADC 1 28 V SUP	1-213	1F 74	P12
SAFETY FLT CONT No.1 SUP		1C 651	S20
ADC 1 26 V SUP	2-213	1F 78	A 2
LAT ACCELMTR 26 V SUP		1C 42	A 4
1ST PLT ADC INST SUP		1F 75	B 3
AUTO STAB 1 COMP SUP		1C 37	E 5
ADC 1 115 V SUP		1F 73	F 3
SAFETY FLT CONT No.2 SUP	5-213	2C 651	D17
ADC 2 28 V SUP		2F 74	F12
TRIM SYNCHRO SYS 1 SUP	13-215	1C 163	E 5
SAFETY FLT CONT COMP No.1		1C 652	E 6
115 V SUP			
SAFETY FLT CONT COMP No.1		1C 653	F 6
26 V SUP			
2ND PLT ADC INST SUP	13-216	2F 75	A14
TRIM SYNCHRO SYS 2 SUP		2C 163	A16
LAT ACCELMTR 2 26 V SUP		2C 42	B16
SAFETY FLT CONT COMP No.2		2C 653	C16
26 V SUP			
SAFETY FLT CONT COMP No.2		2C 652	C17
115 V SUP			
AUTO STAB 2 COMP SUP		2C 37	D17

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ADC 2 26 V SUP		2F 78	F14
ADC 2 115 V SUP		2F 73	F15
ROOF PNL LT TEST SUP	15-216	L1002	D13
(8) Set the following circuit breakers			

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT & NAV BUS 14 X S	2-213	X 355	H 2
NAV INST BUS 13 X S	13-216	X 345	G 4
(9) Trip, safety and tag the following circuit breakers :			

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW "A" SYS SUP	1-213	G 292	M17
RH UC WEIGHT SW & DOWN- LOCK "A" SYS SUP		G 295	M18
STICK SHAKER SUP		W 513	P15
LH UC WEIGHT SW & DOWN- LOCK "B" SYS SUP	3-213	G 293	B 8
RH UC WEIGHT SW "B" SYS SUP		G 294	B 9

(10) On shelf 8-215, remove protective caps from test connectors on autostabilization computer No.1 (1C31).

(11) On shelf 8-216, remove protective caps from test connectors on autostabilization computer No.2 (2C31).

(12) On shelf 6-215, remove protective caps from test connectors on SFC computer No.1 (1C650).

(13) On shelf 6-216, remove protective caps from test connectors on SFC computer No.2 (2C650).

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### C. Check of Rate Gyro Term

- (1) On ADC control panel at centre console, place ADC 1 switch in ON position.
- (2) Depending on equipment used :
  - (a) On Pressure Sensor Simulator, place SIMUL SENSOR switch in SIMUL position then adjust AIRSPEED potentiometer so as to read a speed equal to 160 kts on Captain's instrument panel airspeed indicator.
- Or
- (b) Start up pressure generator and increase value of Delta P pressure difference applied to total pressure system so as to read a speed equal to 160 kts on Captain's instrument panel airspeed indicator.
- (3) On ADC control panel at centre console, press amber ADC 1 warning light, then release. The light must go off. Flags on airspeed indicator and angle-of-attack indicator (on Captain's instrument panel) must disappear.
- (4) Move the vane of LH angle-of-attack sensor (Zone 113) so as to obtain an angle-of-attack of 10° on angle-of-attack indicator on Captain's instrument panel.
- (5) At overhead panel :
  - (a) On Flight Control Unit, place ANTI STALL SYSTEM 1 switch in ON position.
  - (b) On AUTO STAB No.1 unit, engage PITCH, ROLL and YAW switches.
  - (c) On Flight Control Unit, SYST 1 FAIL warning light must go off.
- (6) On shelf 8-215, with the stabilized power supply on, simultaneously and gradually apply - 2.4VDC between the following pins on autostabilization computer No.1 (1C31) test connectors.
  - Positive (+) supply terminal connected to pins 39 and 43 of connector ZA.
  - Negative (-) supply terminal connected to pins 43 and 72 of connector ZA, and to pins 48 and 72 of connector ZB.

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On ICOVOL indicator (on First Officer's instrument panel), the elevons must deflect approx. 3 degrees. Wait 10 seconds approx. ; read and note elevon deflection for reference.

- (7) Slowly move the vane of LH angle-of-attack sensor (Zone 113) so as to read an angle-of-attack of + 19°6 plus or minus 0.3° on angle-of-attack indicator located on Captain's instrument panel.

On ICOVOL indicator (on First Officer's instrument panel), the elevons must deflect downwards during angle-of-attack variation. At the end of deflection, the elevons must be set at 3° plus or minus 1° in nose down attitude with respect to their initial position noted in paragraph (6) above.

Move the vane of LH angle-of-attack sensor (Zone 113) in the reverse direction so as to read an angle-of-attack of 10° on angle-of-attack indicator located on Captain's instrument panel.

On ICOVOL indicator (on First Officer's instrument panel), the elevons must return to their initial position.

- (8) On shelf 8-215, gradually decrease voltage on the pins of test connectors ZA and ZB of autostabilization computer No.1 (1C31).
- (9) On overhead panel :
- (a) On AUTO STAB No.1 unit disengage PITCH, ROLL and YAW switches.
  - (b) On Flight Control Unit, place ANTI STALL SYSTEM 1 switch in OFF position.
- (10) On ADC control panel (centre console) place ADC 1 switch in OFF position.
- (11) If Pressure Sensor Simulator is used ; disconnect simulator from ADC 1, then on shelf 6-216 connect it to front panel of ADC 2 (Take care not to change values of ALTITUDE and AIRSPEED potentiometers).
- (12) On ADC control panel (centre console).
- (a) Place ADC 2 switch in ON position.
  - (b) Press then release amber ADC 2 warning light ; it

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must go off.

Flags must not be visible on airspeed indicator and angle-of-attack indicator of First Officer's instrument panel.

- (13) Repeat tests described from paragraph 9-C-(4) to paragraph 9-C-(10) inclusive, taking into account the following table :

REPLACE	BY
ADC 1	ADC 2
Captain's instrument panel	First Officer's instrument panel
LH angle of attack sensor (zone 113)	RH angle of attack sensor (zone 114)
ANTI STALL SYSTEM 1	ANTI STALL SYSTEM 2
AUTO STAB No.1	AUTO STAB No.2
SYST 1 FAIL	SYST 2 FAIL
Shelf 8-215	Shelf 8-216
Autostabilization Computer No.1 1C31	Autostabilization Computer No.2 2C31

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### D. Check of Term Function of Speed

- (1) On ADC control panel (centre console)
  - (a) Place ADC 1 switch in ON position.  
Amber ADC 1 warning light must illuminate.
  - (b) Press amber ADC 1 warning light then release ;  
it must go off. Flags must disappear on airspeed  
indicator and angle-of-attack indicator located  
on Captain's instrument panel.
- (2) On overhead panel
  - (a) On Flight Control Unit, place ANTI STALL SYSTEM 1  
switch in ON position.
  - (b) On AUTO STAB No.1 unit, engage PITCH ROLL and YAW  
switches.
  - (c) On Flight Control Unit, SYST 1 FAIL warning  
light must go off.
- (3) On shelf 6-215, connect a voltmeter to pins 22 (+) and  
pin 60 (-) of each connector ZA and ZB of SFC computer  
No.1 (1C650).
- (4) Depending on equipment used :
  - (a) On Pressure Sensor Simulator, place SIMUL-SENSOR  
switch in SIMUL position, then slowly adjust  
AIRSPEED potentiometer so as to read a speed equal  
to 160 kts on airspeed indicator of Captain's ins-  
trument panel. Adjust this speed so as to read a  
voltage of 0 volts plus or minus 50 mV on voltme-  
ters.

Or

  - (b) Start up pressure generator and increase value  
of Delta P pressure difference applied to  
total pressure system so as to read a speed of  
160 kts on Captain's instrument panel airspeed in-  
dicator. Adjust this speed so as to read 0 volts  
plus or minus 50 mV on voltmeters.
- (5) On shelf 6-215, shunt pins 22 and 60 of test connectors  
ZA and ZB on SFC computer No.1 (1C650) (in lieu of  
voltmeters).
- (6) Depending on equipment used :

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- (a) On Pressure Sensor Simulator ; slowly adjust AIRSPEED potentiometer so as to reduce speed by 5 kts plus or minus 0.5 kts (Captain's instrument panel airspeed indicator).

Or

- (b) On pressure generator : slowly reduce value of total pressure so as to reduce speed by 5 kts plus or minus 0.5 kts (Captain's instrument panel airspeed indicator).

- (7) Move the vane of LH angle-of-attack sensor (Zone 113) so as to read an angle-of-attack of  $17^{\circ}$  plus or minus  $0.3^{\circ}$  on angle-of-attack indicator located on Captain's instrument panel.

- (8) On shelf 6-215, remove simultaneously the shunts connecting pins 22 and 60 of test connectors ZA and ZB on SFC computer No.1 (1C650).

On ICOVOL indicator (on First Officer's instrument panel), the elevons must deflect in nose down direction then return to their initial position. Check that maximum variation is of  $3^{\circ}$  plus or minus  $1^{\circ}$  in nose down position approx..

- (9) At overhead panel :

- (a) On AUTO STAB No.1 unit, disengage PITCH, ROLL and YAW switches.

- (b) On Flight Control Unit, place ANTI STALL SYSTEM 1 switch in OFF position.

- (10) On ADC control panel at centre console, place ADC 1 switch in OFF position.

- (11) If Pressure Sensor Simulator is used : disconnect Simulator from ADC 1 and on shelf 6-216 connect it to front panel of ADC 2.

- (12) Repeat tests described from paragraph 9-D-(1) to paragraph 9-D-(10)) inclusive, taking into consideration the following table :

---

REPLACE

BY

---

ADC 1  
Captain's instrument panel

ADC 2  
First Officer's instru-

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---

REPLACE

---

BY

---

LH angle-of-attack sensor  
(Zone 113)  
ANTI STALL SYSTEM 1  
AUTO STAB No.1  
SYST 1 FAIL

Shelf 6-215  
SFC computer No.1  
1C650

ment panel  
RH angle-of-attack sensor  
(Zone 114)  
ANTI STALL SYSTEM 2  
AUTO STAB No.2  
SYST 2 FAIL

Shelf 6-216  
SFC computer No.2  
2C650

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E. Check of 4° nose down Function.

This test is identical with superstabilization operational test described in paragraph 4 of this topic.

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### F. Check of SFC inhibit conditions

- (1) On ADC control panel (centre console)
  - (a) Place ADC 1 switch in ON position.  
Amber ADC 1 warning light must illuminate.
  - (b) Press and release amber ADC 1 warning light :  
this light must go off.  
Flags must not be visible on airspeed and angle-of-attack indicators on Captain's instrument panel.
- (2) Move LH angle-of-attack sensor vane (zone 113) so as to read an angle-of-attack value equal to 17 degrees, plus or minus 0.3 degrees on Captain's instrument panel angle-of-attack indicator.
- (3) Depending on equipment used :
  - (a) On Pressure Sensor Simulator, place SIMUL-SENSOR switch in SIMUL position, then slowly adjust AIRSPEED potentiometer so as to read a speed equal to 155 kts on Captain's instrument panel airspeed indicator.  
  
or
  - (b) Start up Pressure Generator and increase value of Delta P pressure difference applied to total pressure system so as to read a speed equal to 155 kts on Captain's instrument panel airspeed indicator.
- (4) On overhead panel :
  - (a) On Flight Control Unit, place ANTI STALL SYSTEM 1 switch in ON position.
  - (b) On AUTOSTAB No.1 unit engage PITCH, ROLL and YAW switches.
  - (c) On Flight Control Unit, SYST 1 FAIL warning light must go off.
- (5) On shelf 6-215, shunt pins 22 and 60 of test connectors ZA and ZB on SFC computer No.1 (1C 650).
- (6) Remove safety clips and tags and set the following circuit breakers :

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW A SYS SUP	1-213	G 292	M17
LH UC WEIGHT SW & DOWN- LOCK B SYS SUP	3-213	G 293	B 8

(7) On shelf 6-215 :

(a) Simultaneously remove shunts connecting pins 22 and 60 of test connectors ZA and ZB on SFC computer No.1 (1C 650).

Check on ICOVOL indicator (First Officer's instrument panel) that elevons do not move.

(b) Install shunts again.

(8) Depending on equipment used :

(a) On Pressure Sensor Simulator, slowly adjust AIRSPEED potentiometer so as to read a speed less than 60 kts on Captain's instrument panel airspeed indicator.

or

(b) On Pressure Generator, slowly reduce value of Delta P pressure applied to total pressure system so as to read a speed less than 60 kts on Captain's instrument panel airspeed indicator.

(9) On shelf 6-215, simultaneously remove shunts connecting pins 22 and 60 of test connectors ZA and ZB on SFC computer No.1 (1C 650).  
At ICOVOL indicator (First Officer's instrument panel) elevons must deflect in nose down direction then return to initial position.

(10) Trip, safety and tag circuit breakers previously mentioned in (6).

(11) On shelf 6-215, shunt pins 22 and 60 of test connectors ZA and ZB on SFC computer No.1 (1C 650).

(12) Depending on equipment used :

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- (a) On Pressure Sensor Simulator, slowly adjust AIRSPEED potentiometer so as to read a speed greater than 270 kts on Captain's instrument panel airspeed indicator.

or

- (b) On Pressure Generator, slowly increase value of total pressure so as to read a speed greater than 270 kts on Captain's instrument panel airspeed indicator.

- (13) On shelf 6-215, simultaneously remove shunts connecting pins 22 and 60 of test connectors ZA and ZB on SFC computer No.1 (1C 650).  
Check on ICOVOL indicator (First Officer's instrument panel), that elevons do not deflect.

Install shunts again.

- (14) Depending on equipment used :

- (a) On Pressure Sensor Simulator, slowly adjust AIRSPEED potentiometer so as to read a speed of 155 kts on Captain's instrument panel airspeed indicator.

or

- (b) On Pressure Generator, slowly reduce value of total pressure so as to read a speed of 155 kts on Captain's instrument panel airspeed indicator.

- (15) On ADC control panel (centre console) :

- (a) Place ADC 2 switch in ON position.  
Amber ADC 2 warning light must illuminate.
- (b) Press amber ADC 2 warning light then release, this light must go off.

- (16) If necessary, cancel ADC warning on Master Warning Panel on overhead panel.

- (17) Tilt RH angle-of-attack sensor vane (zone 114) downwards until angle-of-attack comparison warning is activated (ADS warning on Master Warning Panel on overhead panel).

- (18) On shelf 6-215, simultaneously remove shunts connecting pins 22 and 60 of test connectors ZA and ZB on SFC

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computer No.1 (1C 650).

Check on ICOVOL indicator (First Officer's instrument panel) that elevons do not move.

(19) On overhead panel :

(a) On AUTO STAB No.1 unit, disengage PITCH, ROLL and YAW switches.

(b) On Flight Control Unit, place ANTI STALL SYSTEM 1 switch in OFF position.

(20) On ADC control panel (centre console), place ADC 1 switch in OFF position.

(21) Move RH angle-of-attack sensor vane (zone 114) so as to read an angle-of-attack of 17 degrees on First Officer's instrument panel angle-of-attack indicator.

(22) If Pressure Sensor Simulator is used :

(a) On ADC control panel (centre console), place ADC 2 switch in OFF position.

(b) Disconnect Simulator from ADC 1 and on shelf 6-216 connect it to front face of ADC 2.

(c) On ADC control panel (centre console), place ADC 2 switch in ON position then press and release amber ADC 2 warning light ; this light must go off.

Flags must not be visible on airspeed and angle-of-attack indicators on First Officer's instrument panel.

(23) Repeat test from paragraph 9. F. (3) to paragraph 9. F. (20) inclusive taking into account the following table :

---

REPLACE :

BY :

---

ANTI STALL SYSTEM 1

ANTI STALL SYSTEM 2

AUTO STAB No.1

AUTO STAB No.2

6-215... SFC No.1 (1C650)

6-216... SFC No.2 (2C650)

G292 (M17)

G295 (M18)

G293 (B8)

G294 (B9)

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REPLACE :	BY :
ADC 2	ADC 1
ADC 1	ADC 2
RH angle-of-attack sensor (zone 114)	LH angle-of-attack sensor (zone 113)

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### G. Check of Autostabilization Threshold Increase

- (1) On ADC control panel (centre console)
  - (a) Place ADC 1 switch in ON position.
  - (b) If required, press then release amber ADC 1 warning light ; it must go off.  
Flag must disappear on angle-of-attack indicator of Captain's instrument panel.
- (2) On Captain's instrument panel angle-of-attack indicator, check that angle-of-attack value is less than  $13^{\circ}$  ; if not move LH angle of attack sensor vane (zone 113).
- (3) On overhead panel :
  - (a) On Flight Control Unit, place ANTI STALL SYSTEM 1 switch in ON position.
  - (b) On AUTO STAB No.1 unit, engage PITCH, ROLL and YAW switches.
  - (c) On Flight Control Unit, SYST 1 FAIL warning light must go off.
- (4) On shelf 8-215, with the stabilized power supply on, progressively apply 0.6VDC, between the following pins on autostabilization computer No.1 (1C31) test connector 2A :
  - Positive (+) supply terminal connected to pins 43 and 72.
  - Negative (-) supply terminal connected to pin 39.

Increase this voltage until, on overhead panel :

- On AUTO STAB No.1 unit, PITCH switch disengages.
- On Flight Control unit, SYST 1 FAIL warning light illuminates.

- (5) Move LH angle-of-attack sensor vane (zone 113) so as to read an angle-of-attack value greater than  $16^{\circ}$  on angle-of-attack indicator located on Captain's instrument panel.
- (6) On overhead panel
  - (a) On AUTO STAB No.1 unit engage PITCH switch and check that it remains engaged.

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- (b) On Flight Control Unit, SYST 1 FAIL warning light must go off.
- (7) Move LH angle-of-attack sensor vane (zone 113) so as to read an angle of attack value less than  $13^\circ$  on Captain's instrument panel angle-of-attack indicator.
- On overhead panel :
- On AUTO STAB No.1 unit, PITCH switch must disengage.
  - On Flight Control Unit, SYST 1 FAIL warning light must illuminate.
- (8) On shelf 8-215, cancel progressively voltage applied to pins of autostabilization computer No.1 (1C31) test connector ZA.
- (9) On overhead panel, on Flight Control Unit place ANTI STALL SYSTEM 1 switch in OFF position. SYST 1 FAIL warning light must go off.
- (10) On ADC control panel (centre console)
- (a) Place ADC 1 switch in OFF position
  - (b) Place ADC 2 switch in ON position.
  - (c) If required, press amber ADC 2 warning light then release ; it must go off.  
Flag must not be visible on angle-of-attack indicator of First Officer's instrument panel.
- (11) Repeat tests described from paragraph 9-G-(2) to paragraph 9-G-(10) (a) inclusive, taking into account the following table :

REPLACE	BY
Captain's instrument panel	First Officer's instrument panel
ANTI STALL SYSTEM 1	ANTI STALL SYSTEM 2
AUTO STAB No.1	AUTO STAB No.2
SYST 1 FAIL	SYST 2 FAIL
LH angle-of-attack sensor (zone 113) 8-215	RH angle-of-attack sensor (zone 114) 8-216

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---

REPLACE

BY

---

Autostabilization Computer  
No.1 (1C31)

Autostabilization Com-  
puter No.2 (2C31)

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### H. Check of Logic Conditions

#### (1) On ADC control panel (centre console)

- (a) Place ADC 1 and ADC 2 switches in ON position.
- (b) If required press amber ADC 1 and ADC 2 warning lights then release ; they must go off.

Flags must disappear on Captain's and First Officer's instrument panel angle-of-attack indicators and airspeed indicators.

#### (2) On overhead panel

- (a) On AUTO STAB No.1 unit, engage PITCH switch.
- (b) On Flight Control Unit.

(b1) Place ANTI STALL SYSTEM 1 switch in ON position.

(b2) Place ANTI STALL SYSTEM 2 switch in ON position : SYST 2 FAIL warning light must illuminate.

- (c) On AUTO STAB No.2 unit, engage PITCH switch. On Flight Control Unit, SYST 2 FAIL warning light must go off.

#### (d) On Flight Control Unit

(d1) Place ANTI STALL SYSTEM 1 switch in OFF position.

On AUTO STAB No.1 unit, PITCH switch must disengage.

(d2) Place ANTI STALL SYSTEM 1 switch in ON position.

SYST 1 FAIL warning light must illuminate.

- (e) On AUTO STAB No.1 unit, engage PITCH switch. On Flight Control Unit, SYST 1 FAIL warning light must go off.

- (f) On Flight Control Unit, place ANTI STALL SYSTEM 2 switch in OFF position. On AUTO STAB No.2 unit, PITCH switch must disengage.

#### (3) On ADC control panel (centre console) place ADC 2

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switch in OFF position.

- (4) Trip, safety and tag the following circuit breaker

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
---------	-------	--------------------	-------------

SAFETY FLT CONT COMP No.1 115 V SUP	13-215	1C 652	E 6
--	--------	--------	-----

On overhead panel :

- On AUTO STAB No.1 unit, PITCH switch must disengage.
- On Flight Control Unit, SYST 1 FAIL warning light must illuminate.

- (5) On overhead panel, on Flight Control Unit, place ANTI STALL SYSTEM 1 switch in OFF then in ON position. During this operation, SYST 1 FAIL warning light must remain illuminated.

- (6) On circuit breaker panel 13-215, set circuit breaker 1C652.

- (7) On overhead panel, on AUTO STAB No.1 unit engage PITCH switch.  
On Flight Control Unit, SYST 1 FAIL warning light must go off.

- (8) Depending on equipment used :

- (a) On Pressure Sensor Simulator, place SIMUL - SENSOR switch in SIMUL position then adjust AIRSPEED potentiometer slowly so as to read a speed greater than 270 kts on airspeed indicator of Captain's instrument panel.

Or

- (b) Start up pressure generator and increase value of Delta P pressure difference applied to total pressure system so as to read a speed greater than 270 kts on airspeed indicator of Captain's instrument panel.

- (9) On circuit breaker panel 13-215.

- (a) Trip, safety and tag circuit breaker 1C652.  
On overhead panel :

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- On Flight Control Unit, SYST 1 FAIL warning light must illuminate.
  - On AUTO STAB No.1 unit, PITCH switch must remain engaged.
- (b) Set circuit breaker 1C652.  
On overhead panel, on Flight Control Unit, SYST 1 FAIL warning light must go off.
- (10) Depending on equipment used :
- (a) On Pressure Sensor Simulator ; slowly adjust AIRSPEED potentiometer so as to read 160 kts on airspeed indicator of Captain's instrument panel.
- Or
- (b) On pressure generator ; slowly reduce value of total pressure so as to read 160 kts on airspeed indicator of Captain's instrument panel.
- (11) On ADC control panel (centre console) place ADC 1 switch in OFF position.
- On overhead panel :
- On AUTO STAB No.1 unit, PITCH switch must disengage.
  - On Flight Control Unit, SYST 1 FAIL warning light must illuminate.
- (12) On overhead panel, on Flight Control Unit place ANTI STALL SYSTEM 1 switch in OFF position. SYST 1 FAIL warning light must go off.
- (13) If Pressure Sensor Simulator is used, disconnect simulator from ADC1, then, on shelf 6-216 connect it to front panel of ADC2.
- (14) Repeat tests described from paragraph 9-H-(1) to paragraph 9-H-(12) inclusive, taking into account the following table :

---

REPLACE

BY

---

ADC 1

ADC 2

Captain's instrument panel

First Officer's  
instrument panel

AUTO STAB 1

AUTO STAB 2

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---

REPLACE

BY

---

ANTI STALL SYSTEM 1

ANTI STALL SYSTEM 2

SYST 1 FAIL

SYST 2 FAIL

13-215 - 1C652 - E6

13-216 - 2C652 - C17

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### J. Close-Up

- (1) On ADC control panel (centre console), place ADC1 and ADC2 switches in OFF position.
- (2) On overhead panel :
  - (a) On Flight Control Unit, place ANTI STALL SYSTEM 1 and 2 switches in OFF position.
  - (b) On AUTO STAB units No.1 and No.2 disengage switches remaining engaged.
- (3) Depending on equipment used :
  - (a) Disconnect Pressure Sensor Simulator from front panel of ADC.

Or

  - (b) On pressure generator, slowly reduce total and static pressure systems to ambient atmospheric pressure, then disconnect pressure generator from pitot heads and static ports, ADC1 and ADC2 systems.
- (4) Carry out Close-Up operations of procedure to set flight controls in Blue electrical mode (Ref. 27-00-00, Servicing).
- (5) Remove safety clips and tags and reset circuit breakers
- (6) Install protective caps on computer test connectors.
- (7) Trip, safety and tag the following circuit breakers :

---

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT & NAV BUS 14 X S	2-213	X 355	H 2
NAV INST BUS 13 X S	13-216	X 345	G 4

---

- (8) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

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### 10. Check of Logic Conditions Common to Both SFC

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
VOR/ILS Ramp Test Set	
Circuit Breaker Safety Clips	

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) On ADC control panel (centre console), check that :
  - ADC 1 and ADC 2 switches are in OFF position.
  - ADC 1 and ADC 2 TEST selector switches are in NORM position.
- (3) Set flight controls in Blue electrical mode (Ref. 27-00-00, Servicing).
- (4) Make certain that the following circuit breakers are set.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ADC 1 28 V SUP	1-213	1F 74	P12
SAFETY FLT CONT No.1 SUP		1C 651	S20
ADC 1 26 V SUP	2-213	1F 78	A 2
LAT ACCELMTR 1 26 V SUP		1C 42	A 4
1ST PLT ADC INST SUP		1F 75	B 3
AUTO STAB 1 COMP SUP		1C 37	E 5
ADC 1 115 V SUP		1F 73	F 3
SAFETY FLT CONT No.2 SUP	5-213	2C 651	D17
ADC 2 28 V SUP		2F 74	F12
TRIM SYNCHRO SYS 1 SUP	13-215	1C 163	E 5
SAFETY FLT CONT COMP No.1		1C 652	E 6
115 V SUP			
SAFETY FLT CONT COMP No.1		1C 653	F 6

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
26 V SUP			
2ND PLT ADC INST SUP	13-216	2F 75	A14
TRIM SYNCHRO SYS 2 SUP		2C 163	A16
LAT ACCELMTR 2 26 V SUP		2C 42	B16
SAFETY FLT CONT COMP No.2 26 V SUP		2C 653	C16
SAFETY FLT CONT COMP No.2 115 V SUP		2C 652	C17
AUTO STAB 2 COMP SUP		2C 37	D17
ADC 2 26 V SUP		2F 78	F14
ADC 2 115 V SUP		2F 73	F15
ROOF PNL LT TEST SUP	15-216	L1002	D13
(5) Set the following circuit breakers			

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT & NAV BUS 14 X S	2-213	X 355	H 2
NAV INST BUS 13 X S	13-216	X 345	G 4
(6) Trip, safety and tag the following circuit breakers :			

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW A SYS SUP	1-213	G 292	M17
RH UC WEIGHT SW & DOWN- LOCK A SYS SUP		G 295	M18
LH UC WEIGHT SW & DOWN- LOCK B SYS SUP	3-213	G 293	B 8
RH UC WEIGHT SW B SYS SUP		G 294	B 9

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### C. Test of Autostabilization Systems

- (1) On ADC control panel (centre console)
  - (a) Place ADC 1 and ADC 2 switches in ON position. Amber ADC 1 and ADC 2 warning lights may illuminate.
  - (b) If required, press amber ADC 1 and ADC 2 warning lights, then release : they must go off.
- (2) Move LH and RH angle-of-attack sensor vanes (zones 113 and 114) so as to read 0 on Captain's and First Officer's instrument panel angle-of-attack indicators.
- (3) On overhead panel :
  - (a) On Flight Control Unit, place ANTI STALL SYSTEM 1 and 2 switches in ON position. SYST 1 FAIL and SYST 2 FAIL warning lights must illuminate.
  - (b) On AUTO STAB No.1 unit engage PITCH switch. On Flight Control Unit, SYST 1 FAIL warning light must go off.
  - (c) On AUTO STAB No.2 unit engage PITCH switch. On Flight Control Unit, SYST 2 FAIL warning light must go off.
- (4) Trip, safety and tag the following circuit breaker

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SAFETY FLT CONT COMP No.1 115 V SUP	13-215	1C 652	E 6

- On overhead panel :
- (a) On AUTO STAB No.1 unit, PITCH switch must disengage.
  - (b) On Flight Control Unit, SYST 1 FAIL warning light must illuminate.
- (5) On overhead panel, on AUTO STAB No.1 unit check that PITCH switch does not remain engaged when it is engaged again.

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- (6) On ADC control panel (centre console) place ADC 2 switch in OFF position.

On overhead panel :

- (a) On AUTO STAB No.2 unit, PITCH switch must disengage.
- (b) On Flight Control Unit, SYST 2 FAIL warning light must illuminate.

- (7) On overhead panel :

- (a) On Flight Control Unit, place ANTI STALL SYSTEM 2 switch in OFF position. SYST 2 FAIL warning light must go off.
- (b) On AUTO STAB No.1 unit, check that PITCH switch does not remain engaged when it is engaged again.
- (c) On AUTO STAB No.2 unit, engage PITCH switch.
- (d) On Flight Control Unit, place ANTI STALL SYSTEM 1 switch in OFF position.
- (e) On AUTO STAB No.2 unit, disengage PITCH switch.
- (f) On AUTO STAB No.1 unit, engage PITCH switch.

- (8) On circuit breaker panel 13-215, set circuit breaker 1C652.

On overhead panel, on Flight Control Unit, SYST 1 FAIL warning light must go off.

- (9) On ADC control panel (centre console)

- (a) Place ADC 2 switch in ON position.  
AMBER ADC 2 warning light may illuminate.
- (b) If required, press amber ADC 2 warning light then release it ; it must go off.

- (10) On overhead panel :

- (a) On Flight Control Unit, place ANTI STALL SYSTEM 1 and 2 switches in ON position.  
SYST 2 FAIL warning light must illuminate.
- (b) On AUTO STAB No.2 unit, engage PITCH switch.  
On Flight Control Unit, SYST 2 FAIL warning

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light must go off.

(11) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
---------	-------	--------------------	-------------

SAFETY FLT CONT COMP No.2 115 V SUP	13-216	2C 652	C17
--	--------	--------	-----

On overhead panel :

(a) On AUTO STAB No.2 unit, PITCH switch must disengage.

(b) On Flight Control Unit, SYST 2 FAIL warning light must illuminate.

(12) On overhead panel, on AUTO STAB No.2 unit check that PITCH switch does not remain engaged when it is engaged again.

(13) On ADC control panel (centre console), place ADC 1 switch in OFF position.

On overhead panel :

(a) On AUTO STAB No.1 unit, PITCH switch must disengage.

(b) On Flight Control Unit, SYST 1 FAIL warning light must illuminate.

(14) On overhead panel :

(a) On Flight Control Unit, place ANTI STALL SYSTEM 1 switch in OFF position.  
SYST 1 FAIL warning light must go off.

(b) On AUTO STAB No.2 unit, check that PITCH switch does not remain engaged when it is engaged again.

(c) On AUTO STAB No.1 unit, engage PITCH switch.

(d) On Flight Control Unit, place ANTI STALL SYSTEM 2 switch in OFF position.

(e) On AUTO STAB No.1 unit, disengage PITCH switch.

(f) On AUTO STAB No.2 unit, engage PITCH switch.

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- (15) On circuit breaker panel 13-216, set circuit breaker 2C 652. On overhead panel, on Flight Control Unit, SYST 2 FAIL warning light must go off.
- (16) On ADC control panel (centre console)
  - (a) Place ADC 1 switch in ON position.  
Amber ADC 1 warning light may illuminate.
  - (b) If necessary, press amber ADC 1 warning light then release it ; it must go off.
- (17) On overhead panel :
  - (a) On Flight Control Unit, place ANTI STALL SYSTEM 1 and 2 switches in ON position.  
SYST 1 FAIL warning light must illuminate.
  - (b) On AUTO STAB No.1 unit, engage PITCH switch.  
On Flight Control Unit, SYST 1 FAIL warning light must go off.

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- D. Autopilot disconnection test and Auto trim Inhibit Function Test

These tests are identical with operational tests described in paragraphs 5 and 6 of this topic.

NOTE : "Autopilot disconnection" and "Auto trim Inhibit" functions are overridden when Autopilot system is in LOC TRACK and GS CAPTURE phases.

This safety feature is checked during Autopilot functional test. (Ref. 22-10-00, Adjustment/Test, paragraph 3 W : Functional Test, check of LOC and GLIDE modes).

- E. Tests of Autostabilization Disconnection Inhibit Function in LOC TRACK and GS CAPTURE Phases

These tests are dealt with in 22-10-00, Adjustment/Tests paragraph 3 W (Autopilot. Functional Test. Check of LOC and GLIDE modes).

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### F. Close-Up

- (1) Carry out Close-Up operations of Procedure to set flight controls in Blue electrical mode (Ref. 27-00-00, Servicing).
- (2) Remove safety clips and tags and reset circuit breakers
- (3) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT & NAV BUS 14 X S	2-213	X 355	H 2
NAV INST BUS 13 X S	13-216	X 345	G 4

- (4) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

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### 11. Emergency Flight Control Mode Functional Test

**NOTE :** Deflection value of each pair of symmetrical elevons (outer, middle and inner elevons) shall be noted when carrying out procedure described in paragraph C : Test of Emergency Flight Control Mode for Roll and Pitch axes. When a load is applied to control column only (or to control handwheel only) deflection of two symmetrical elevons shall be identical, whatever the angular value of this deflection.

If a difference in deflection is noted, it will then be necessary to check Blue control CT resolver voltage gradient, if Blue electrical mode is operative; or Green control CT resolver voltage gradient if the Green electrical mode is operative.

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breakers Safety Clips	
Riggin Pins-Synchro Pack	D925252000

#### B. Prepare

- (1) Take the precautions described in the previous WARNING paragraph.
- (2) The aircraft must be on the ground with shock-absorbers compressed.
- (3) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ADC1 28V SUP	1-213	1F 74	F12
ADC1 115V SUP	2-213	1F 73	F 3
ADC2 28V SUP	5-213	2F 74	F12
ADC2 115V SUP	13-216	2F 73	F15

- (4) Trip, safety and tag the following circuit breakers

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW A SYS SUP	1-213	G 292	N17
RH UC WEIGHT SW & DOWN- LOCK A SYS SUP		G 295	N18
LH UC WEIGHT SW & DOWN- LOCK B SYS SUP	3-213	G 293	B 8
RH UC WEIGHT SW B SYS SUP		G 294	B 9
(5) Set Flight Controls in Blue electrical mode (Ref. 24-00-00, Servicing).			
(6) Check that pitch and roll trim controls are set to zero.			
(7) Remove panel 121FB, and immobilize pitch and roll resolvers with rigging pins D925252003 and D925252001.			
(8) On front face of SFC computer (1C650 on shelf 6-215) press NULL RESET push-button for 5 seconds approximately.			
<b>NOTE :</b> Do not apply any force to Captain's and First Officer's control columns and handwheels during the reset procedure.			
(9) At junction of Captain's handwheel yoke, remove frangible guard cover from EMERG CONT engage switch/caption light (Ref. 27-39-00, Removal/Installation).			
(10) On ADC control panel (centre console) make certain that ADC1 TEST selector switch is in NORM position. Place ADC1 switch in ON position. - If ADC1 warning light illuminates press and release it; warning light must go off.			
(11) At overhead panel, on AUTO STAB No.1 unit, engage PITCH and ROLL switches - These switches must remain engaged.			
C. Test of Emergency Flight Control Mode for Roll and Pitch Axes.			
(1) At the junction of Captain's handwheel yoke, press and			

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release EMERG CONT switch/caption light.

- Caption light must illuminate.

- (2) Move control column in nose-up direction. Do not rotate control handwheel.

- Check on ICOVOL indicator that elevons deflect upwards to a maximum indicated value of 12°.

Check that deflection angle is equal for each elevon, whatever the load applied to control column.

- (3) Release control column to neutral, then move it in nose-down direction. Do not rotate control handwheel.

- Check on ICOVOL indicator that elevons deflect downwards to a maximum indicated value of 12°. Check that deflection angle is equal for each elevon, whatever the load applied to control column.

NOTE : If during step 2 or 3 above, deflection of one elevon differs from that of the others, repeat step at which fault occurred (for confirmation of fault).  
In this case, check voltage gradient of the Blue control CT resolver of PFCU driving the elevon whose deflection is faulty.

- (4) Carry out steps (2) and (3) on First Officer's control column

- perform the same check as in steps (2) and (3)

- (5) Rotate Captain's control handwheel (in both directions)

- Check on ICOVOL indicator that only outer and middle elevons deflect in roll configuration to a maximum indicated value of 19°.

- (6) Repeat step (5) above on First Officer's control handwheel.

- perform the same check as in step (5).

- (7) At Captain's control handwheel yoke, press and release EMERG CONT engage switch/caption light.

- Caption light must go off.

- (8) At overhead panel, on AUTO STAB No.1 unit, disengage PITCH and ROLL switches.

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- (9) On ADC control panel, (centre console) place ADC1 switch in OFF position.
- (10) Make certain that ADC2 TEST selector switch is in NORM position, and place ADC2 switch in ON position.
- If ADC2 warning light illuminates, press and release light; light must go off.
- (11) At overhead panel, on AUTO STAB No.2 unit, engage PITCH and ROLL switches.
- These switches must remain engaged.
- (12) On front face of SFC computer (2C650 on shelf 6-216) press NULL RESET push-button for 5 seconds approximately.
- NOTE : Do not apply any force to Captain's and First Officer's control column during the reset procedure.
- (13) Repeat steps (1) to (7) inclusive, described above.
- Checks and results shall be identical.
- (14) At overhead panel, on Flight Control Unit, place O & M ELEVONS and IN.ELEVONS switches in GREEN position.
- Gong must sound
  - PFC warning light must illuminate
  - On ICOVOL indicator, the 6 magnetic indicators associated with outer, middle and inner elevons must indicate G.
- (15) Press and release PFC warning light
- This light must go off.
- (16) Repeat steps (1) to (7) above
- Check and results must be identical; however, in NOTE of paragraph (3), it shall be necessary to check voltage gradient of Green control CT resolver, instead of the Blue CT resolver.
- (17) At overhead panel, on AUTO STAB No.2 Unit, disengage PITCH and ROLL switches.
- (18) On ADC control panel, place ADC2 switch in OFF position, then place ADC1 in ON position.
- (19) At overhead panel, on AUTO STAB No.1 unit, engage PITCH and ROLL switches.
- These switches must remain engaged.

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- (20) Repeat steps (1) to (9) inclusive described above.
- Checks and results shall be identical. However, in NOTE of paragraph (3), it shall be necessary to check voltage gradient of Green control CT resolver, instead of the Blue CT resolver.
- (21) At overhead panel, on Flight Control Unit, place O & M ELEVONS, IN ELEVONS switches in BLUE position, then press and release RESET push-button on RH side of each switch.
- On ICOVOL indicator, the magnetic indicators associated with outer, middle and inner elevons shall indicate B.

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### D. Check of Logic Conditions

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NOTE : This check can be carried out without hydraulic pressure.

- (1) On ADC control panel (centre console) place ADC 1 switch in ON position.  
If amber ADC 1 warning light illuminates, press this light then release it ; it must go off.
- (2) On overhead panel :
  - (a) On Flight Control Unit, place ANTI STALL SYSTEM 1 switch in ON position.
  - (b) On AUTO STAB No.1 unit, engage PITCH and ROLL switches.
- (3) On Captain's control column, at the junction of the handwheel yoke press EMERG CONT switch then release it ; caption light must illuminate.
- (4) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SAFETY FLT CONT COMP No.1 115 V SUP	13-215	1C 652	E 6

- (a) On overhead panel :
  - On AUTO STAB No.1 unit, PITCH and ROLL switches must disengage.
  - On Flight Control Unit, SYST 1 FAIL warning light must illuminate.
- (b) Reset circuit breaker 1C652.

R  
R  
R

- (5) On Captain's control column, at the junction of the handwheel yoke, press EMERG CONT switch then release it ; caption light must go off.

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- (6) On overhead panel :

On AUTO STAB No.1 unit, engage PITCH and ROLL switches.  
On Flight Control Unit SYST 1 FAIL warning light must go off.

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- (7) On Captain's control column, at the junction of the handwheel yoke, press EMERG CONT switch then release it ; caption light must illuminate.
- (8) On overhead panel :
- R On AUTO STAB No.1 unit, disengage ROLL switch.  
PITCH switch must disengage.  
On Flight Control Unit, SYST 1 FAIL warning light must illuminate.
- R (9) On Captain's control column at the junction of the  
R handwheel yoke press EMERG CONT switch then release  
R it ; caption light must go off.
- R (10) On overhead panel :
- On AUTO STAB No.1 unit, engage PITCH and ROLL switches.  
On Flight Control Unit, SYST 1 FAIL warning light must go off.
- R (11) On Captain's control column at the junction of the  
R handwheel yoke press EMERG CONT switch then release  
R it ; caption light must illuminate
- R (12) On ADC control panel (centre console), place ADC 1  
switch in OFF position.  
On overhead panel :
- On Flight Control Unit, SYST 1 FAIL warning light must illuminate.
  - On AUTO STAB No.1 unit, ROLL and PITCH switches must remain engaged.
- (13) On Captain's control column, at the junction of the handwheel yoke, press EMERG CONT switch then release it ; caption light must go off.  
On overhead panel, on AUTO STAB No.1 unit PITCH switch must disengage.
- (14) On overhead panel :
- (a) On AUTO STAB No.1 unit, disengage ROLL switch
  - (b) On Flight Control Unit, place ANTI STALL SYSTEM 1 switch in OFF position.
- (15) Repeat tests described from paragraph 11-D-(1) to paragraph 11-D-(11) inclusive, taking into account the following table :

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REPLACE :

BY :

---

ADC 1

ADC 2

ANTI STALL SYSTEM 1

ANTI STALL SYSTEM 2

AUTO STAB No.1

AUTO STAB No.2

13-215 - 1C 652 - E 6

13-216 - 2C 652 - C17

SYST 1 FAIL

SYST 2 FAIL

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### E. Check of Flight Control Comparator Inhibit Function

- (1) With Flight Controls in Blue electrical mode, trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER		MAP REF.
INNER ELEVON MON BLUE SUP	2-213	2C	47	D 1
MID & OUTER ELEVON MON BLUE SUP		2C	46	D 2

Flight Controls change automatically to Green mode for the 6 elevons.

On ICOVOL indicator (First Officer's instrument panel) the 6 magnetic indicators associated with the elevons must display G.

- (2) Reset circuit breakers 2C47 and 2C46 then trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER		MAP REF.
INNER ELEVON MON GRN SUP	2-213	1C	47	G 1
MID & OUTER ELEVON MON GRN SUP		1C	46	G 2

Flight Controls change automatically to MECH mode for the 6 elevons.

On ICOVOL indicator (First Officer's instrument panel) the 6 magnetic indicators associated with elevons must display M.

- (3) Reset circuit breakers 1C47 and 1C46.

- (4) On overhead panel, on Flight Control Unit :

(a) Check that O & M ELEVONS, INNER ELEVONS and RUDDER switches are in BLUE position.

(b) Press then release the 3 RESET push-buttons.  
Flight controls change to BLUE mode.  
On ICOVOL indicator (First Officer's instrument panel) magnetic indicators must display B.

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- (5) On ADC control panel (centre console) place ADC 1 and ADC 2 switches in ON position.  
If amber ADC 1 or ADC 2 warning lights illuminate press and release them ; they must go off.
- (6) On overhead panel, on AUTO STAB No.1 unit engage PITCH and ROLL switches.
- (7) On Captain's control column at the junction of the handwheel yoke, press EMERG CONT switch then release ; caption light must illuminate.
- (8) Trip then set the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
INNER ELEVON MON BLUE SUP	2-213	2C 47	D 1
MID & OUTER ELEVON MON BLUE SUP		2C 46	D 2

Check on ICOVOL indicator (First Officer's instrument panel) that magnetic indicators display B.

- (9) On overhead panel :

R On AUTO STAB No.1 unit, disengage PITCH and ROLL switches.

R (10) On Captain's control column at the junction  
R of the handwheel yoke, press EMERG CONT switch  
R then release it ; caption light must go off.

R (11) On overhead panel :

R On AUTO STAB No.2 unit, engage PITCH and ROLL switches.

R (12) Repeat operation (7) & (8). Results must be identical.

R (13) On overhead panel, on AUTO STAB No.2 unit disengage PITCH and ROLL switches.

(14) On Captain's control column, at the junction of the handwheel yoke, press EMERG CONT switch then release it. The caption light must go off.

(15) On ADC control panel (centre console), place ADC 1 and ADC 2 switches in OFF position.

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### F. Close-Up

- (1) Carry out Close-Up operations of procedure to set Flight Controls in electrical mode (Ref. 27-00-00, Servicing).
- (2) On Captain's control column at the junction of the handwheel yoke, install frangible guard cover on EMERG CONT switch as per instructions detailed in 27-39-00, Removal/Installation.
- (3) Remove safety clips and tags and reset circuit breakers
- (4) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

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### 12. Functional Test of Overspeed Warning Activation Function

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Simulator - Pressure Sensors Or Pressure Generator - Air Data System	87-209-455
2 Adapters - Pitot Tube	853BFT025
2 Blanking Plugs - Pitot Tube Drain Port	853BFT026
2 Adapters - Static Ports	T8751E22783002
Stabilized Supply, DC, 0-5 V	
Voltmeter, DC. 0-5 V	
Access Platform 4.240 m (13 ft. 11 in.)	

#### B. Prepare

- (1) Operate the relevant control to set the droop nose to 0° position and put visor up (Ref. 27-62-00).
- (2) The aircraft must be on the ground with shock-absorbers compressed.
- (3) On ADC control panel (at centre console) make certain that :
  - ADC1 and ADC2 switches are in OFF position.
  - TEST selector switches for ADC1 and ADC2 systems are in NORM position.
- (4) On Captain's and First Officer's airspeed indicators and altimeters located respectively on Captain's and First Officer's instrument panels, make certain that mode selection buttons are in N (normal) position.
- (5) Depending on the equipment used :
  - (a) Connect Pressure Sensor Simulator to front panel of ADC 1 1F71 (on shelf 6-215) and make certain

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that :

- SIMUL - SENSOR switch is in SENSOR position
- ALTITUDE COARSE potentiometer is set to 1013
- AIRSPEED COARSE potentiometer is set to 4.

or

- (b) Connect pressure generator to pitot heads and static ports, ADC1 and ADC2 systems, and make certain that generator is shut down with hoses to ambient air.

- (6) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
NAV INS 1ST PLT SW SUP	1-213	1F 34	E15
ATT INS 1ST PLT SW SUP		1F 13	G16
RAD/INS 1ST PLT SW SUP		1F 26	G17
AUDIO WARN SYS SUP 1		W 371	M21
ADC 1 28 V SUP		1F 74	P12
STICK SHAKER SUP		W 513	P15
AUDIO WARN O/SPEED SUP 1		W 374	S19
SAFETY FLT CONT No.1 SUP		1C 651	S20
ADC 1 26 V SUP	2-213	1F 78	A 2
1ST PLT ADC INST SUP		1F 75	B 3
HSI TRUE 1ST PLT INS 1		1F 21	B 6
SUP & IND			
ADI 1ST PLT INS 1 SUP &		1F 15	B 7
IND			
INS 1 HTR SUP		1F 14	E 6
ADC 1 115 V SUP		1F 73	F 3
INS 1 SUP		1F 20	F 6
SAFETY FLT CONT No.2 SUP	5-213	2C 651	D17
ADC 2 28 V SUP		2F 74	F12
AUDIO WARN SYS SUP 2		W 372	C17
AUDIO WARN O/SPEED SUP 2		W 373	C18
SAFETY FLT CONT COMP	13-215	1C 652	E 6
No.1 115 V SUP			
SAFETY FLT CONT COMP		1C 653	F 6
No.1 26 V SUP			
2ND PLT ADC INST SUP	13-216	2F 75	A14
ADI 2ND PLT INS 2 SUP &		2F 15	C13
IND			

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HSI TRUE 2ND PLT INS 2 SUP & IND		2F 21	C15
SAFETY FLT CONT COMP No.2 26 V SUP		2C 653	C16
SAFETY FLT CONT COMP No.2 115 V SUP		2C 652	C17
INS 2 SUP		2F 20	D14
ADC 2 26 V SUP		2F 78	F14
ADC 2 115 V SUP		2F 73	F15
INS 2 HTR SUP		2F 14	G15
NAV INS 1ST PLT SW SUP	15-216	2F 34	C21
ATT INS 1ST PLT SW SUP		2F 13	D21
RAD/INS 1ST PLT SW SUP		2F 26	E21

(7) Set the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT & NAV BUS 14 X S	2-213	X 355	H 2
NAV INST BUS 13 X S	13-216	X 345	G 4

(8) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(9) At Flight Engineer's panel, on EQUIPMENT BAY COOLING unit, make certain that electronics racks ventilation operates.

**CAUTION :** IF DURING A TEST, THE "FLOW" LIGHTS ON EQUIPMENT BAY COOLING UNIT AT FLIGHT ENGINEER'S PANEL ILLUMINATE, INDICATING A FAILURE IN THE COOLING SYSTEM, IMMEDIATELY STOP THE INERTIAL NAVIGATION SYSTEMS (I.N.S.). (BY PLACING MSU MODE SELECTOR SWITCHES IN OFF POSITION).

(10) At Flight Engineer's station, make certain that the selector switches on MSU units are in OFF position. On compass-coupler unit, place DG-MAG switch in MAG position.

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### C. Test

- (1) On ADC control panel (centre console), place ADC1 switch in ON position.
- (2) Depending on equipment used :
  - (a) On Pressure Sensor Simulator :
    - (a1) Place SIMUL-SENSOR switch in SIMUL position
    - (a2) Set ALTITUDE potentiometer to 220.
    - (a3) Set AIRSPEED potentiometer to 280.
  - or
  - (b) Operate pressure generator and :
    - (b1) Apply an absolute pressure of 220 mb (3.191psi) to static pressure system.
    - (b2) Apply a pressure difference ( $\Delta P$ ) of 280 mb (4.061psi) to the total pressure system.
- (3) On ADC control panel (centre console) press amber ADC1 warning light then release : the light must go off.
- B (4) On Captain's instrument panel flags must clear.
  - B Adjust pitot and static pressures or simulator
  - B ALTITUDE and AISPEED so that the altimeter reads
  - B 36,000 ft. and the airspeed indicator reads
  - B 400 Kts. Check machmeter value is between 1 and 1.14,
  - B adjust airspeed as required.
- (5) Check that stick shaker is not activated (If it is, move LH angle-of-attack sensor vane, zone 113, so as to read an angle-of-attack value less than  $16^{\circ}.5$  on angle-of-attack indicator of Captain's instrument panel).
- (6) At Captain's station, on AFCS control unit, place RAD/INS switches in INS position.
- (7) On Captain's instrument panel :
  - place ATT INS1/INS3 switches in INS1 position.
  - place NAV INS1/NAV INS2 switches in NAV INS1 position.

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- (8) On First Officer's instrument panel :
- place ATT INS2/INS3 switches in INS2 position.
  - place NAV INS1/NAV INS2 switches in NAV INS2 position.
- (9) On Captain's console turn DIGITS potentiometer in BRIGHT direction (at mid-range)
- (10) At Flight Engineer's station, place the switch on MSU INS1 unit in STBY position.
- (11) Wait till flag G disappears on Attitude Director indicator (ADI) on Captain's instrument panel.
- Note pitch attitude angle  $\theta$  on ADI, then multiply this value by coefficient 425. Result is in mV.
- (12) On shelf 6.215, connect a voltmeter to pins ZB36 (-) and ZB60 (+) of test connector on front panel of SFC computer No.1 (1C650).
- Voltage to be  $\pm 20\%$  of value computed in step 11.
- (13) Remove voltmeter, and with stabilized power supply on, progressively apply a positive voltage of approx. 0 to 4 volts to pins ZB36 (-) and ZB60 (+) of SFC computer No.1.
- When voltage applied to SFC computer is greater by approximately 2.55 volts than voltage read in previous operation, check that OVERSPEED warning (warbling) is activated.
- (14) Move LH angle-of-attack sensor vane (zone 113) so as to read an angle-of-attack greater than  $16^{\circ}.5$  on angle-of-attack indicator of Captain's instrument panel.
- Check that OVERSPEED warning is no longer activated as soon as vibrations are felt at control column and aural stall warning is set off.
- (15) Reduce angle-of-attack to a value less than  $16^{\circ}.5$ .
- Check that OVERSPEED warning is activated as soon as vibrations at control column and aural stall warning stop.
- (16) Switch off voltage applied to test connector of SFC computer No.1.
- OVERSPEED warning is no longer activated.
- (17) At Flight Engineer's station, place switch on INS1 MSU control unit in OFF position.

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- (18) On ADC control panel (centre console) place ADC1 switch in OFF position.
- (19) If Pressure Sensor Simulator is used ; disconnect simulator from ADC1 and, on shelf 6-215 connect it to front panel of ADC2 (Take care not to change value of ALTITUDE and AIRSPEED potentiometers).
- (20) On ADC control panel (centre console), place ADC2 switch in ON position.  
Amber ADC2 warning light must illuminate. After 30 seconds approximately, press then release amber ADC2 warning light ; the light must go off.
- B (21) On First Officer's instrument panel, flags must clear.  
B Adjust pitot and static pressures or simulator  
B ALTITUDE and AISPEED so that the altimeter reads  
B 36,000 ft. and the airspeed indicator reads 400 Kts.  
B Check machmeter value is between 1 and 1.14, adjust  
B airspeed as required.
- (22) Check that stick shaker is not activated (If it is, move RH angle-of-attack sensor vane, zone 114, so as to read an angle-of-attack value less than 16°.5 on angle-of-attack indicator on First Officer's instrument panel).
- (23) On First Officer's console, turn DIGITS potentiometer in BRIGHT direction (at mid-range)
- (24) At Flight Engineer's station, place switch on INS2 MSU control unit in STBY position.
- (25) Wait till flag G disappears on Attitude Director Indicator on First Officer's instrument panel.  
  
Note pitch attitude angle  $\theta$  on ADI, then multiply this value by coefficient 425.
- (26) On shelf 6-216, connect a voltmeter to pins ZB36 (-) and ZB60 (+) of test connector on front panel of SFC computer No.2 (2C650). Voltage must be close to value computed in the previous operation.
- (27) Remove voltmeter and, with stabilized power supply on, progressively apply a positive voltage of approx. 0 to 4 volts to pins ZB36 (-) and ZB60 (+) of SFC computer No.1.  
When voltage applied to SFC computer is greater by approximately 2.55 volts than voltage read in previous

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operation, check that OVERSPEED WARNING (warbling) is activated.

- (28) Move RH angle-of-attack sensor vane (zone 114) so as to read an angle-of-attack value greater than  $16^{\circ}.5$  on angle-of-attack indicator of First Officer's instrument panel. Check that OVERSPEED warning is no longer activated as soon as vibrations are felt at control column and aural stall warning is set off.
- (29) Reduce angle of attack to a value less than  $16^{\circ}.5$ . Check that OVERSPEED warning is activated as soon as vibrations at control column and aural stall warning stop.
- (30) Switch off voltage applied to test connector of SFC computer No.2. OVERSPEED warning is no longer activated.
- (31) At Flight Engineer's station, place switch on INS2 MSU control unit in OFF position.
- (32) On ADC control panel (centre console) place ADC2 switch in OFF position.

### D. Close-Up

- (1) Depending on equipment used :
  - (a) Disconnect Pressure Sensor Simulator from front panel of ADC, to which it is connected.
  - or
  - (b) On pressure generator ; slowly reduce total and static pressure systems to ambient atmospheric pressure then disconnect generator from pitot heads and static ports, ADC1 and ADC2 systems.
- (2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT CONT & NAV BUS 14 X S	2-213	X 355	H 2
NAV INST BUS 13 X S	13-216	X 345	G 4

- (3) De-energize the aircraft electrical network and

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disconnect electrical ground power unit (Ref. 24-41-00,  
Servicing).

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**END OF THIS  
SECTION**

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### SAFETY FLIGHT CONTROL (SFC) COMPUTER - REMOVAL/INSTALLATION

#### 1. General

R SFC computers (electrical identitiers 1C650 and 2C650) are  
R respectively mounted on shelves 6-215 and 6-216 of LH and RH  
R electronics racks.  
R Locating pins are provided on connectors to prevent computer  
R replacement with a computer of a different type.  
R Removal/Installation procedures are identical for both com-  
R puters, therefore only one procedure will be described.  
R Only circuit breakers associated to the computer to be removed,  
R must be tripped.

#### 2. Safety Flight Control Computer

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Access Platform - 4.47 m (14 ft. 8 in.)	

##### B. Prepare

(1) Observe the electrical safety precautions described in 24-00-00, Servicing.

(2) Trip, safety and tag the following circuit breakers :

R (a) For removal of safety flight control computer  
R No.1 (1C650) :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SAFETY FLT CONT No.1 SUP	1-213	1C 651	S20
SAFETY FLT CONT COMP No.1 115 V SUP	13-215	1C 652	C16
SAFETY FLT CONT COMP No.1 26 V SUP		1C 653	C17

R (b) For removal of safety flight control computer  
R No.2 (2C650) :

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SAFETY FLT CONT No.2 SUP	5-213	2C 651	D17
SAFETY FLT CONT COMP No.2 26 V SUP	13-216	2C 653	C16
SAFETY FLT CONT COMP No.2 115 V SUP		2C 652	C17
(2) Remove the following access panels :			
(a) 215-BS to gain access to SFC computer No.1 (1C650).			
(b) 216-BS to gain access to SFC computer No.2 (2C650).			
C. Remove			
(1) On computer 1C650 (or 2C650) front face, press unlatching buttons (1) located at the top of both handles. The two movable levers (2) must fall.			
(2) Fully lower both movable levers (2).			
(3) Remove computer by pulling on handles.			
D. Preparation of Replacement Component			
(1) Make certain that computer seating is clean and check rack connectors for correct condition (no corrosion).			
(2) Check computer for external damage and corrosion, especially at electrical connectors.			
E. Install			
(1) Press both unlatching buttons (1) located at the top of handles. The two movable levers (2) must fall.			
(2) Position computer on the rails.			
(3) Push computer fully home. Take care not to damage electrical connectors.			
(4) Lift the two movable levers (2) on handles, to achieve locking position.			

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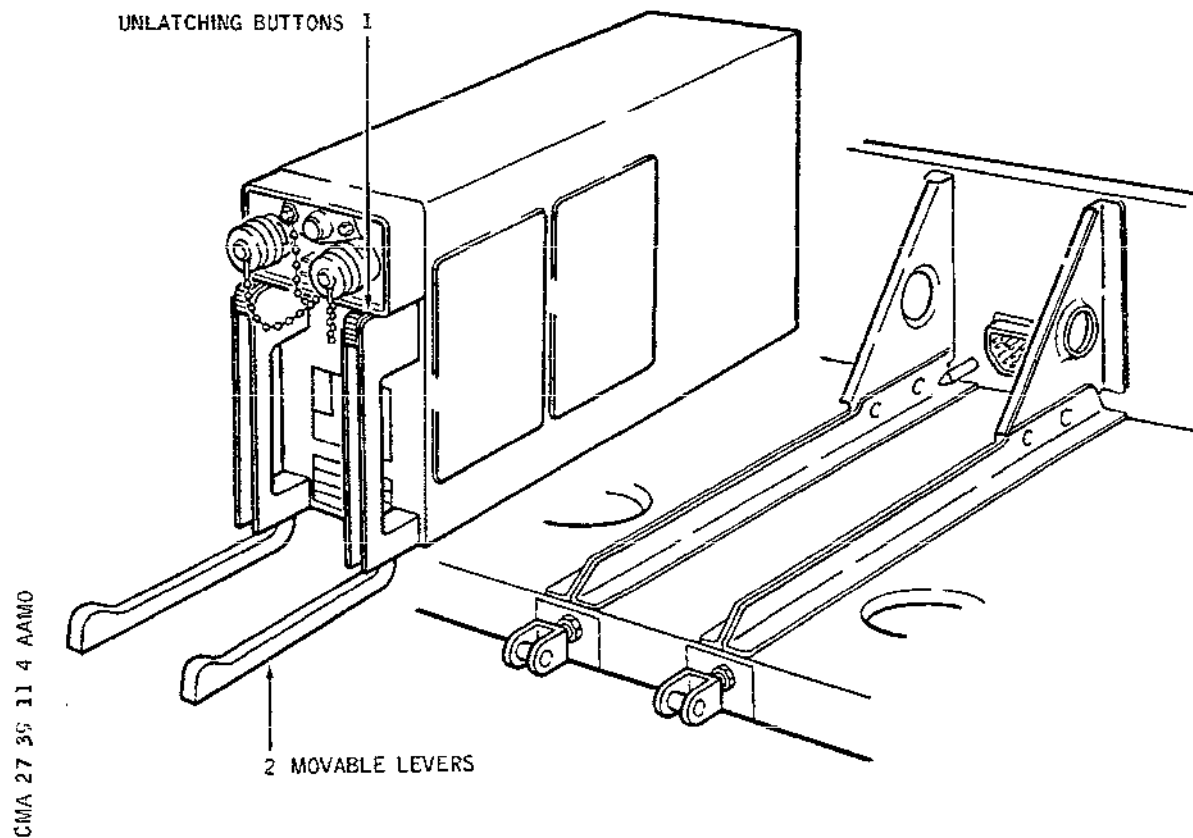
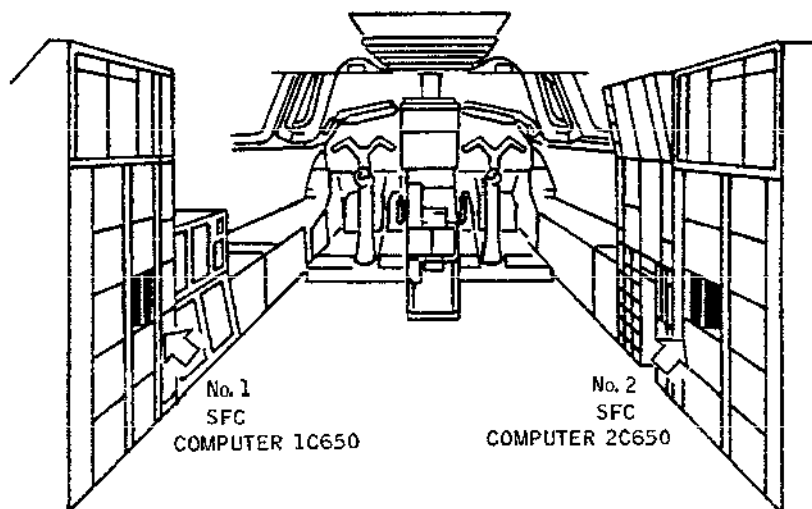
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SFC Computer - Location and Removal  
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- (5) Remove safety clips and tags and reset circuit breakers tripped previously.

### F. Test

- R (1) Perform test described in 27-39-11, Adjustment/Test.

### G. Close-Up

- R (1) Install access panels 215-BS or 216-BS.
- R (2) Remove access platform.

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### SAFETY FLIGHT CONTROL COMPUTERS - ADJUSTMENT/TEST

**WARNING** : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.  
HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.  
HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN 24-00-00, SERVICING.

#### 1. General

The purpose of the tests described below is to check the correct operation of the safety flight control computer after maintenance work has been carried out on this component.

**NOTE** : These tests refer to SFC computer No.1 (1C650).  
For SFC computer No.2 (2C650) follow the references given in parentheses.

#### 2. Test

##### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Electrical Ground Power Unit	
------------------------------	--

Circuit Breaker Safety Clips	
------------------------------	--

##### B. Prepare

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- (1) Take the precautions described in the previous WARNING paragraph.
- (2) Carry-out prepare procedure for engagement of autopilot AP1 (AP2) (Ref. 22-10-00, Servicing, para 2 (4)).

NOTE : Do not perform operations detailed in step (10).

- (3) For SFC computer No.1

- (a) Check that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RH UC WEIGHT SW & DOWN- LOCK "A" SYS SUP	1-213	G 295	M18
PITCH ART FEEL COMP 1 SUP	2-213	1C 244	E 4
RH UC WEIGHT SW "B" SYS SUP	3-213	G 294	B 9

- (b) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW "A" SYS SUP	1-213	G 292	M17
STICK SHAKER SUP		W 513	P15
LH UC WEIGHT SW & DOWN- LOCK "B" SYS SUP	3-213	G 293	B 8

- (4) For SFC computer No.2

- (a) Check that the following circuit breakers are set :

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW "A" SYS SUP	1-213	G 292	M17
LH UC WEIGHT SW & DOWN- LOCK "B" SYS SUP	3-213	G 293	B 8
PITCH ART FEEL COMP 2 SUP	13-216	2C 244	G18

(b) Trip, safety and tag the following circuit  
breakers

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RH UC WEIGHT SW & DOWN- LOCK "A" SYS SUP	1-213	G 295	M18
STICK SHAKER SUP		W 513	P15
RH UC WEIGHT SW "B" SYS SUP	3-213	G 294	B 9

(5) Make certain that pitch trim control is set to zero

(6) On ADC control panel (centre console) check that  
ADC1 (ADC2) switch is in ON position and that ADC1  
(ADC2) amber warning light is extinguished.

### C. Test

(1) On overhead panel

(a) On Flight Control Unit, place ANTI STALL SYS-  
TEM 1 (2) switch in ON position  
- SYST 1 FAIL (SYST 2 FAIL) warning light must  
illuminate.

(b) On AUTO STAB No.1 (No.2) unit, engage PITCH  
switch  
- On flight Control Unit, SYST 1 FAIL (SYST 2  
FAIL) warning light must extinguish

(2) On ADC control panel (centre console)

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- (a) - Place ADC1 (ADC2) TEST selector switch in position 1
  - (a1) ADC1 (ADC2) amber warning light must illuminate
  - (a2) Approximately 30 seconds later, blue TEST indicator light must illuminate
  - (a3) On overhead panel
    - On AUTO STAB No.1 (No.2) unit, PITCH switch must disengage
    - On Flight Control Unit, SYST 1 FAIL (SYST 2 FAIL) warning light must illuminate
- (b) Press then release amber ADC1 (ADC2) warning light, which must extinguish.
- (3) On overhead panel, on ARTIFICIAL FEEL No.1 (No.2) engage switch unit, engage PITCH switch.
- (4) Slightly pull control column and check that pulsations are felt. Return control column beyond neutral position (control column in nose down) and check that pulsations stop.
- (5) On ADC control panel (centre console) :
  - (a) Place ADC1 (ADC2) TEST selector switch in NORM position
    - (a1) ADC1 (ADC2) amber warning light must illuminate
    - (a2) Blue TEST indicator light must extinguish
    - (a3) On overhead panel PITCH switch on ARTIFICIAL FEEL No.1 (No.2) engage switch unit must disengage.
  - (b) Press then release amber ADC1 (ADC2) warning light which must extinguish.
- (6) For SFC computer No.1, remove safety clips and tags and set the following circuit breakers :

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW A SYS SUP	1-213	G 292	M17
LH UC WEIGHT SW & DOWNLOCK B SYS SUP	3-213	G 293	B 8
(7) For SFC computer No.2, remove safety clips and reset the following circuit breakers			

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
RH UC WEIGHT SW & DOWNLOCK A SYS SUP	1-213	G 295	M18
RH UC WEIGHT SW B SYS SUP	3-213	G 294	B 9
(8) On overhead panel			
(a) On ARTIFICIAL FEEL No.1 (No.2) engage switch unit disengage PITCH switch			
(b) On AUTO STAB No.1 (No.2) unit, engage PITCH switch			
(b1) On Flight Control Unit, SYST 1 FAIL (SYST 2 FAIL) warning light must extinguish.			
(b2) Check on ICOVOL indicator (First Officer's instrument panel) that there is no deflection of elevons.			
(c) On AUTO STAB No.1 (No.2) unit engage ROLL and YAW switches			
(d) On ELECTRIC TRIM unit engage switch 1 (2).			
(9) Reset force detector and SFC computer assembly by pressing for 5 seconds NULL RESET push button located on front face of SFC computer (unit 1C650 (2C650) on rack 6-215 (6-216)).			
<u>NOTE</u> : No force must be applied to Captain's and First Officer's control column during reset operation.			

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- (10) On AFCS control unit engage AP1 (AP2) switch
- (11) Press and hold emergency flight control TEST button, located on Captain's control handwheel yoke. EMERG CONT caption light must illuminate on Captain's control column.
- (12) Apply force to control column (Do not apply too much force to avoid disconnection of AP1). On ICOVOL indicator (First Officer's instrument panel) check that elevons deflect in pitch configuration.
- (13) Apply force to control handwheel (Do not apply too much force to avoid disconnection of AP1). On ICOVOL indicator (First Officer's instrument panel) check that elevons deflect in roll configuration.
- (14) Release emergency flight control test button on Captain's control handwheel yoke. EMERG CONT caption light must go off on Captain's control column.
- (15) On AFCS control unit disengage AP1 (AP2) switch.

### D. Close-up

- (1) Remove safety clips and tags and reset circuit breakers
- (2) Carry out close-up operations for engagement of autopilot AP1 (AP2) (Ref. 22-10-00, Servicing, Para. 2 (4)).

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### FORCE DETECTOR - REMOVAL/INSTALLATION

#### 1. General

Removal/Installation procedures of Force detectors mounted on Captain's and First Officer's control columns are identical, therefore only the Removal/Installation procedure of Captain's control column force detector is dealt with in this section.

CAUTION : DURING REMOVAL/INSTALLATION OPERATIONS HANDLE FORCE DETECTORS WITH CARE TO AVOID SHOCKS.

#### A. Equipment and Materials

	DESCRIPTION	PART NO.
R	Rigging pin - Pitch/Roll shaft	D925367000
	Cable grip	D921620000
	Special Materials (Ref. 20-30-00 No.109)	
	General Lubricants (Ref. 20-30-00 No.51)	
	Lockwire (dia 0.041 in. (1 mm)) Corrosion Resistant Steel	
	Access platform 9 ft. 8 in. (2.96 m)	
	Warning notices.	

#### B. Prepare

- (1) Open access doors 113DB and 121AB to gain access to torque tubes.
- (2) Open doors 121DB to gain access to integral trim assembly.
- (3) Turn Pitch trim wheel to full nose down position.
- (4) Disconnect, on integral trim lever, rods linking integral trim assembly to pitch and roll mechanical control synchro pack.  
To remove attachment bolts of pitch mechanical control it is necessary to apply small jerking movements to

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control column in nose down direction.

**NOTE** : For installing or removing attachment bolts it is necessary to press plunger on head of bolt to release the locking balls.

- (5) Set Pitch and Roll trim controls to zero.
- (6) Remove Captain's or First Officer's control column protective gaiter 211DS or 212DS corresponding to Force detector to be removed.
  - (a) Remove gaiter attachment clamp on control column.
  - (b) Remove gaiter attach plate on three piece base housing.
  - (c) Open zip fastener, remove gaiter and gaskets.
- (7) Remove control column upper protective casing 211ES or 212ES.
- (8) Insert rigging pin D925367000, Linking Pitch and Roll torque tubes, in mixing cam.
- (9) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
No.1 INPH SUP	1-213	R 89	K19
**ON A/C ALL			
STICK SHAKER SUP	1-213	W 513	P15
SAFETY FLT CONT No.1 SUP		1C 651	S20
INS COMPTR SUP 3	2-213	F 3	A 6
ADI 1ST INS 1 SUP & IND		1F 15	B 7
HSI TRUE 1ST PLT INS 1		1F 21	B 6
SUP & IND			
No.2 INPH SUP	3-213	R 90	H 2
**ON A/C ALL			
SAFETY FLT CONT No.2 SUP	5-213	2C 651	D17
AP/FD COMP 1 SUP	13-215	1C 18	A 5
TRIM COMP1 SUP		1C 162	C 5
SAFETY FLT CONT COMP No.1,		1C 652	E 6
115V SUP			
SAFETY FLT CONT COMP No.1,		1C 653	F 6

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
26V SUP			
SAFETY FLT CONT COMP No.2, 13-216	2C	652	C16
115V SUP			
SAFETY FLT CONT COMP No.2,	2C	653	C17
26V SUP			

**WARNING :** DISPLAY WARNING NOTICES ON ENGINES 1, 2, AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.

DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

### C. Remove

- (1) Remove control handwheel (Ref. 27-11-11, Removal/Installation).
- (2) Unsafety turnbuckles (13) and fully slacken cables.
- (3) Disconnect electrical connectors (1) and remove clamps (2) securing electrical wires on control column.
- (4) Cut lockwire, loosen nut (3).
- (5) Remove retaining disk (4).
- (6) Install cable grip D921620000 on cables to keep them tightened when chains are disconnected from pulley.
- (7) Remove pins (5) and separate chains on each side of control column.
- (8) Remove pulley (6) and friction washer (7).
- (9) Remove Force detector (10).

\*\*ON A/C 001-005,

### D. Preparation of Replacement Component

**WARNING :** BEFORE INSTALLATION, MAKE CERTAIN THAT FORCE DE-

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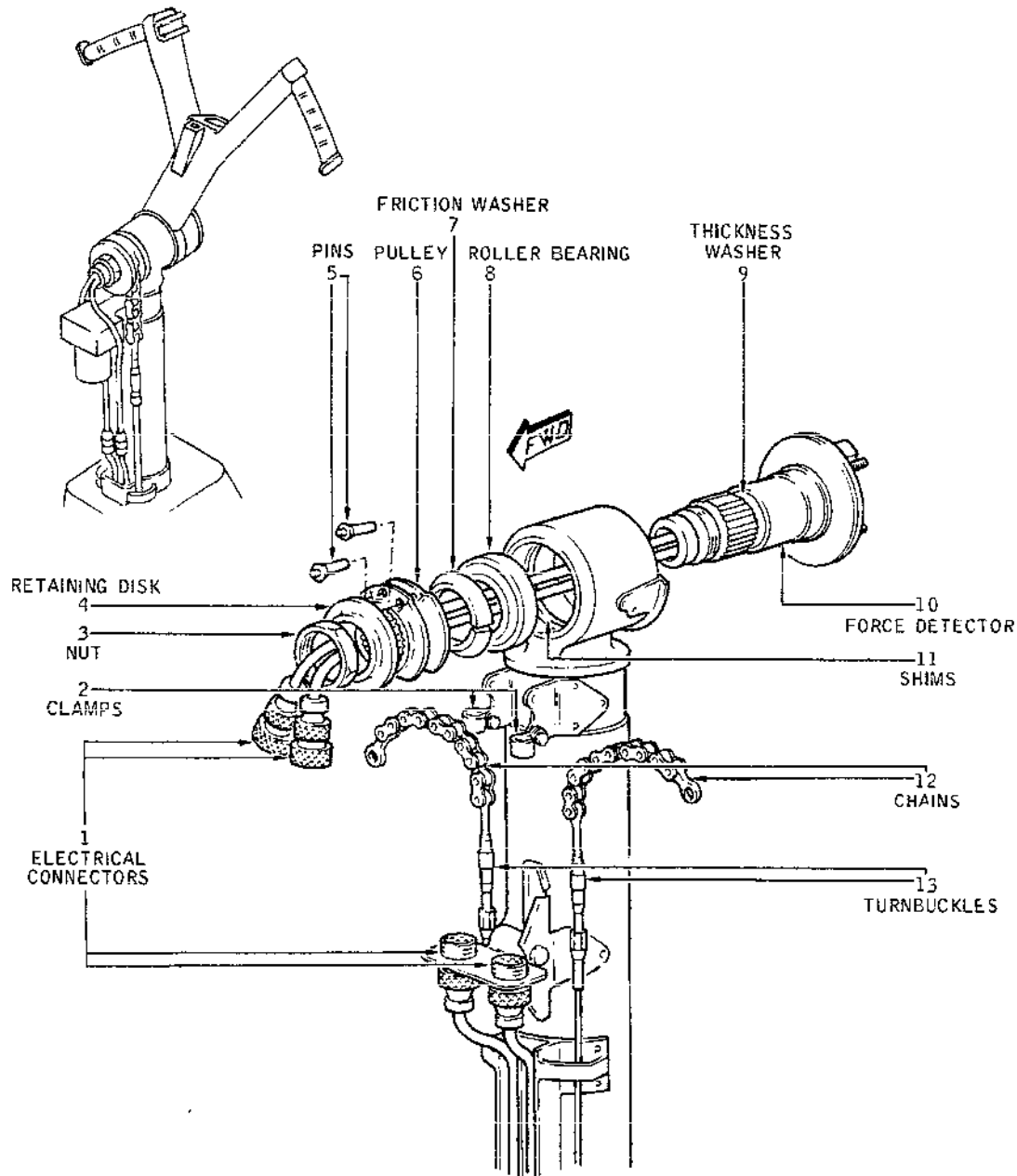
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Force detector  
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TECTOR (10) IS EQUIPPED WITH THICKNESS WASHER (9), 0.018 in. (0.457 mm) ON ITS CONTACT SURFACE. IF NOT, INSTALL THICKNESS WASHER ON FORCE DETECTOR CONTACT SURFACE IN ACCORDANCE WITH PROCEDURE DETAILED IN CHAPTER 20-25-14.

After SB 27-014

For A/C 001-005,

### D. Preparation of Replacement Component

Before installation, determine type of force detector.

- (1) If force detector is of the pre-mod type, it shall be equipped with a shouldered bush (9). The pre-mod force detector equipped with shouldered bush has the same overall dimensions as the force detector/Bonded washer assembly.

The shouldered bush must not be bonded to force detector as bush is of the self centering type.

NOTE : On force detector/bonded washer assembly the washer can be removed and replaced by a shouldered bush.

- (2) If force detector is of the post-mod type, it shall be installed without shouldered bush or bonded washer. This post-mod type is a long bodied force detector, the overall dimensions of which are the same as those of the force detector/bonded washer type.

### E. Install

- (1) Install force detector (10) in head of control column.
- (2) Install friction washer (7), pulley (6) and retaining disk (4).
- (3) Install and tighten nut (3)  
Torque to  $270 \pm 15$  lbf. in. ( $3.05 \pm 0.17$  m.daN)
- (4) Measure total axial float of Force detector in head of control column.
- (5) Remove nut (3), retaining disk (4), pulley (6), Friction washer (7) and Force detector (10).
- (6) Remove bearing (8).
- (7) Select shims so that axial float is between 0.002 and 0.004 in. (0.0508 mm and 0.1016 mm).

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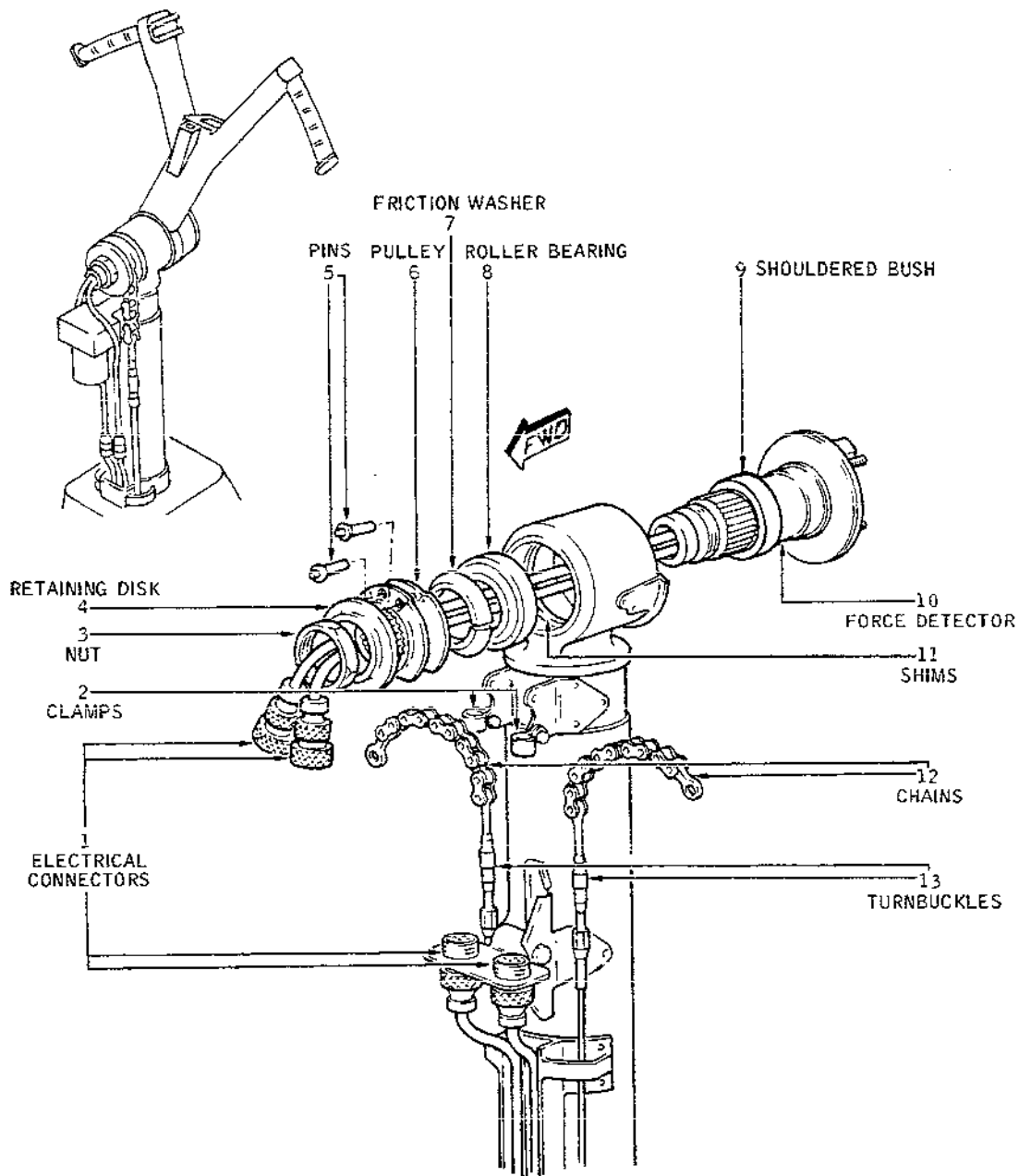
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Force detector  
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Available set of shims :  
Shim 0.010 in. (0.254 mm)  
Shim 0.005 in. (0.1270 mm)  
Shim 0.002 in. (0.0508 mm)

- (8) Install these shims (11) in column head with product No.51 to hold them clear of the bearing housing fillet radius.
- (9) Install bearing (8) in column head with product No.109.
- (10) Install Force detector (10) in head of control column.
- (11) Install friction washer (7) and pulley (6).
- (12) Install chains (12) on pulley and attach them with pins (5).
- (13) Install retaining disk (4), nut (3). Torque to between  $270 \pm 15$  lbf. in. ( $3.05 \pm 0.17$  m.daN) Wirelock.
- (14) Check that Force detector total axial float in column head is between 0.002 and 0.004 in. (0.0508 and 0.1016 mm).  
Repeat previous paragraph (5), (6), (7), (8), (9), (10), (11), (12) and (13) to obtain these values.
- (15) Install control handwheel (Ref. 27-11-11, Removal/Installation).
- (16) Unscrew turnbuckles (13) and disconnect cables from chains (12).
- (17) Turn control handwheel several times and make certain that operation is carried out freely without chafing.
- (18) Connect chains (12) to cables with turnbuckles (13).
- (19) Remove equipment D921620000.
- (20) Connect electrical connectors (1), install clamps (2) attaching cables to column.
- (21) Tighten cables as follows :

NOTE : During the following operations (a), (b), (c), (d) and (e) check that marks engraved on control handwheel and column head line up correctly, plus or minus 1 mm (0.003 in.).

- (a) Tighten cables to initial tension of 90 daN

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(202.7 lb).

- (b) Remove rigging pin D925367000 and carry out 20 displacements of control handwheel from stop to stop.
- (c) Insert rigging pin D925367000 and reduce cable tension to 60 daN (135 lb).
- (d) Remove rigging pin D925367000 and carry out 20 displacements of control handwheel from stop to stop.
- (e) Reinsert rigging pin D925367000 and finally adjust cable tension to 33 plus or minus 3 daN (74.2 plus or minus 6.75 lb.).

NOTE : No thread must remain visible on turnbuckles when final tension is obtained.

(f) Safety cable turnbuckles.

(22) Remove pin D925367000.

(23) Install and secure control column upper protective casing 211ES or 212ES.  
Make certain that clearance between casing and handwheel is 0.05 in. (1.2 mm).  
No friction or binding whatsoever should occur when handwheel is moved.

(24) Turn pitch trim wheel to full nose down position.

(25) Connect rods linking integral trim assembly lever to synchro pack, to integral trim assembly lever of Pitch and Roll mechanical controls. Torque to between 27 and 32 lbf. in. (0.30 and 0.36 m.daN).  
Safety with cotter pin.

NOTE : For installing attachment bolts of pitch mechanical control it is necessary to apply small jerking movements to control column in nose down direction.

(26) Set Pitch control wheel to zero.

(27) Install gaiter 211DS or 212DS on control column base.

(a) Attach gaiter to three piece base housing with gaskets and attach plate.

(b) Close gaiter with zip fastener.

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(c) Attach gaiter and upper casing to control column using attachment clamp.

(28) Remove safety clips and tags and reset circuit breakers.

### F. Tests

- (1) Carry out the following tests (Ref. 27-31-11, Adjustment/Test and 27-39-71, Adjustment/Test).
- (2) Set Flight Controls in mechanical mode (Ref. 27-00-00, Servicing).
- (3) Fully turn control handwheel to the right (Roll configuration), then release; On IC0VOL indicator (Flight Control Surface Position indicator) check that elevons return to neutral.  
Repeat the same operation to the left (Roll configuration); if elevons do not return to neutral, proceed with a further force detector Removal/Installation procedure.
- (4) Shut down pressurization of hydraulic systems (Ref. 27-00-00, Servicing, Procedure to set Flight controls in mechanical mode).

### G. Close-Up

- (1) Close access doors 121AB, 113DB, 121DB.
- (2) Remove access platform.
- (3) Remove warning notices.

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### FORCE DETECTOR - ADJUSTMENT/TEST

WARNING : MAKE CERTAIN THAT THE POSITIONS OF NOSE AND MAIN GEAR DOORS CORRESPOND WITH THE ACTUAL POSITIONS OF THE RESPECTIVE OPERATING HANDLES.

HANDLE LOCKED, INDICATOR PLATE SHOWING WHITE : DOORS CLOSED.

HANDLE LOCKED, INDICATOR PLATE SHOWING RED : DOORS OPEN.

MAKE CERTAIN THAT THE LANDING GEAR POSITION INDICATED ON THE GEARS POSITION INDICATING UNIT CORRESPONDS WITH THE ACTUAL POSITION OF THE LANDING GEAR.

BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

MAKE CERTAIN THAT LANDING GEAR AND SHORTENING MECHANISM SAFETY DEVICES ARE IN POSITION.

OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DESCRIBED IN 24-00-00, SERVICING.

#### 1. General

The purpose of the following tests is to check force detectors for correct operation.

#### 2. Test

##### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Electrical Ground Power Unit	
------------------------------	--

##### B. Prepare

(1) Take the precautions described in the previous warning paragraph.

(2) Carry out Prepare paragraph operations of Autopilot No.1 and No.2 engagement procedure (Ref. 22-10-00, Servicing, paragraphs 2 and 4).

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- (3) Aircraft must be in Ground configuration : shock absorbers compressed.
- (4) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
LH UC WEIGHT SW "A" SYS SUP	1-213	G 292	M17
RH UC WEIGHT SW & DOWNLOCK "A" SYS SUP		G 295	M18
SAFETY FLT CONT No.1 SUP		1C 651	S20
LH UC WEIGHT SW & DOWNLOCK "B" SYS SUP	3-213	G 293	B 8
RH UC WEIGHT SW "B" SYS SUP		G 294	B 9
SAFETY FLT CONT No.2 SUP	5-213	2C 651	D17
SAFETY FLT CONT COMP No.1 115V SUP	13-215	1C 652	E 6
SAFETY FLT CONT COMP No.1 26V SUP		1C 653	F 6
SAFETY FLT CONT COMP No.2 26V SUP	13-216	2C 653	C16
SAFETY FLT CONT COMP No.2 115V SUP		2C 652	C17

### C. Test

- (1) Before test, reset force detector + SFC computer by pressing NULL RESET button located on front panel of SFC computer (unit 1C650 on shelf 6-215) during 5 seconds approximately.

NOTE : No force must be applied to Captain's and First Officer's control columns during reset (reset must be carried out after replacement of the computer or of the force detectors).

- (2) On AFCS control unit, engage AP1 switch ; this switch must remain engaged.
- (3) At Captain's handwheel yoke press and hold Emergency Flight Control system test button. EMERG CONT caption

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light must illuminate on Captain's control column. On ICOVOL indicator (Flight Control Surface Position Indicator) (First Officer's instrument panel) check that elevons do not deflect.

- (4) Depending on the force detector to be checked :
- (a) Apply a force to Captain's or First Officer's control column (do not apply too much force to avoid disconnecting AP1). On ICOVOL indicator (First Officer's instrument panel), check that elevons deflect in Pitch configuration.
  - (b) Apply a force to Captain's or First Officer's control handwheel (do not apply too much force to avoid disconnecting AP1). On ICOVOL indicator (First Officer's instrument panel) check that outer and middle elevons deflect in roll configuration.
- (5) At Captain's handwheel yoke, release Emergency Flight Control system test button. On Captain's control column, EMERG CONT caption light must go off.
- (6) On AFCS control unit, disengage AP1 switch.
- (7) At overhead panel, on AUTOSTAB unit No. 1, disengage PITCH, ROLL and YAW switches.
- (8) Reset force detector + SFC computer before any test by pressing NULL RESET button located on front panel of SFC computer (unit 2C650, on shelf 6-216) during 5 seconds approximately.
- NOTE : No load must be applied to Captain's and First Officer's control columns during reset (reset must be carried out after replacement of computer or force detectors).
- (9) On AFCS control unit, engage AP2 switch ; this switch must remain engaged.
- (10) Repeat tests described from paragraph 2.C (3) to paragraph 2 C (5) inclusive. Results must be identical.
- (11) On AFCS control unit, disengage AP2 switch.

### D. Close-Up

- (1) Carry out Close-Up operations of Autopilot No.1 and No.2 engagement procedure (Ref. 22-10-00, Servicing,

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Paragraphs 2 and 4).

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### EMERGENCY FLIGHT CONTROL SYSTEM ENGAGE SWITCH - (EMERG CONT SWITCH) - REMOVAL/INSTALLATION

#### 1. General

The Emergency Flight Control System Engage Switch (EMERG CONT switch) is located in a recess in the Captain's control handwheel yoke.

#### 2. EMERG CONT Switch

##### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Electrical Ground Power Unit	
------------------------------	--

Common Greases (Ref. 20-30-00, No.113)	
---	--

##### B. Prepare

WARNING : DISPLAY WARNING NOTICES ON ENGINES 1, 2, AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY HYDRAULIC GROUND POWER UNIT.  
DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

(1) Trip, safety and tag the following circuit breakers :

---

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
<hr/>			
SAFETY FLT CONT No.1 SUP	1-213	1C 651	S20
SAFETY FLT CONT No.2 SUP	5-213	2C 651	D17
SAFETY FLT CONT COMP No.1 115V SUP	13-215	1C 652	E 5
SAFETY FLT CONT COMP No.1 26V SUP		1C 653	F 6
SAFETY FLT CONT COMP No.2 26V SUP	13-216	2C 653	C16
SAFETY FLT CONT COMP No.2		2C 652	C17

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
---------	-------	--------------------	-------------

115V SUP

### C. Remove

- (1) Remove screws (4), retaining plate (5) and frangible guard cover (3) from EMERG CONT switch.
- (2) Lift caption light (2) and rotate the two securing screws [detail A (8)] until the two locking pads [detail A (9)] are completely visible.
- (3) Disengage switch as far as cable will allow.
- (4) Remove potting compound from base of switch.
- (5) Unsolder connectors at base of switch and remove switch.

### D. Preparation of Replacement Component

- (1) Disengage caption light (2) and rotate the two securing screws [detail A (8)] so that locking pads [detail A (9)] are completely visible.

### E. Install

- (1) Remove protective cover (6).
- (2) Remove screws (7), then disconnect connectors 1C655A and 1C655B.
- (3) Solder wires on switch (Ref. 20-27-19) as per correct connection illustrated in diagram (detail B).
- (4) Apply potting compound to electrical connections at base of switch (Ref. 20-27-13).
- (5) Insert switch in recess and push fully home. (TOP engraving on switch body (1) must be facing forward).
- (6) Fully rotate the two securing screws [detail A (8)]. (Locking pads [detail A (9)] must no longer be visible).

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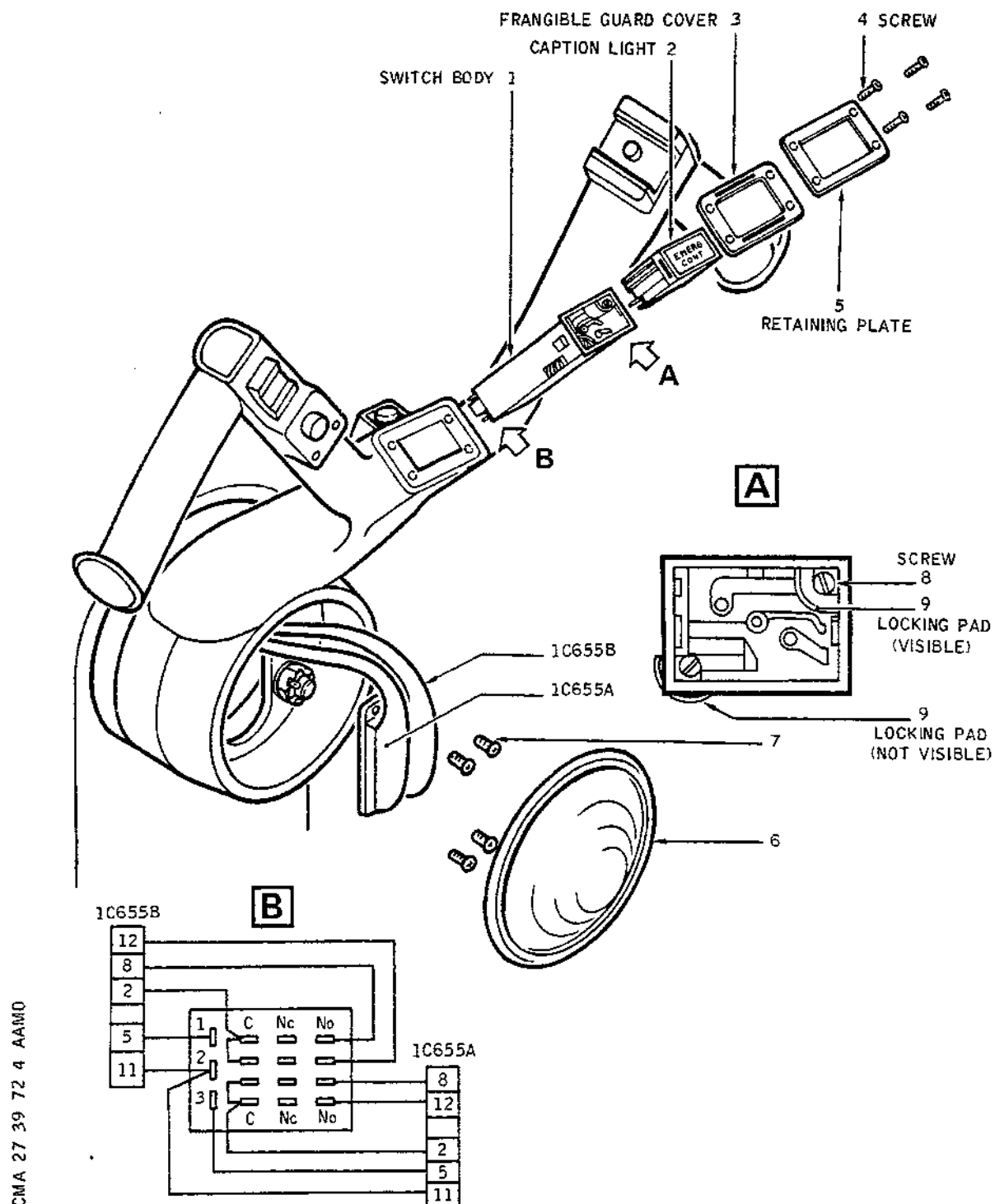
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EFCS Engage Switch - Removal/Installation  
Figure 401

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- (7) Install caption light (2).
- (8) Connect connectors 1C655A and 1C655B.
- (9) Fully tighten screws (7).
- (10) Install protective cover (6).

### F. Tests

- (1) Carry out tests described in 27-11-11, Adjustment/Test.

### G. Close-Up

- (1) Install frangible guard cover (3) on EMERG CONT switch.

CAUTION 1 : MAKE CERTAIN THAT BREAK LINE UNDERCUTS ARE FACING DOWNWARDS, ADJACENT TO EMERG CONT SWITCH.

CAUTION 2 : DO NOT TOUCH EMERG CONT SWITCH SO AS TO AVOID UNTIMELY ENGAGEMENT OF THE EMERGENCY FLIGHT CONTROL MODE.

- (2) Install retaining plate (5).
- (3) Smear screws (4) with product No.113.
- (4) Fully tighten screws (4) to secure assembly.

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### VISOR AND DROOP NOSE SYSTEM - DESCRIPTION AND OPERATION

#### 1. General

During take-off and landing the nose fairing and the visor, which it houses, are lowered (drooped) to improve the pilots' field of vision. In flight, the nose and visor are raised to present clean aerodynamic lines; the visor also protects the windshield from extreme frictional heat. (Ref. Fig. 001 ).

The selector switch, for normal operation of the visor and droop nose, caution warning lights, magnetic indicators and windshield wipers override switch are grouped together on the co-pilot's dash panel. Use of the gated, normal system, switch progressively lowers and raises the visor and nose using power from the green hydraulic system and the normal and essential d.c. electrical supplies.

If the normal system fails, the visor and nose can be lowered, but not raised, using the standby system powered by the yellow hydraulic system and the essential d.c. electrical supply. The standby control switches are located on the centre console and are set in a pivoted guard to prevent inadvertent operation and to ensure that they are used in correct sequence. Use of the standby switches isolates the normal system, lowers the visor, and releases the nose uplocks and collet locks on the nose actuator (Ref. 27-62-00) to permit the nose to free-fall under its own weight and aerodynamic pressure.

In the event of total hydraulic and/or electrical failure, the nose uplocks can be released mechanically to permit the nose to free fall to the 5 deg. down position. As the nose lowers it automatically releases the visor uplock and allows the visor to free fall.

The audio warning sounds if the airspeed exceeds mach 0.95 with the visor down or released from its uplock, or if it exceeds 270 kt. when the nose is below 5 deg. The audio warning electrical circuits are connected via the visor uplock microswitches and the nose transmitter unit (Ref. 31-23-00).

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The nose fairing also accommodates the radome (Ref. 53-51-11), the pitot heads and the ADC incidence sensors (Ref. 34-11-00), the weather radar scanner (Ref. 34-41-00) and the No.1 DME aerial (Ref. 34-51-00). A structural description of the visor and droop nose is given in 53-51-00. The hydraulic system for operating the visor and droop nose is covered in 27-62-00.

#### 2. Visor Mechanism (Ref. Fig. 002 )

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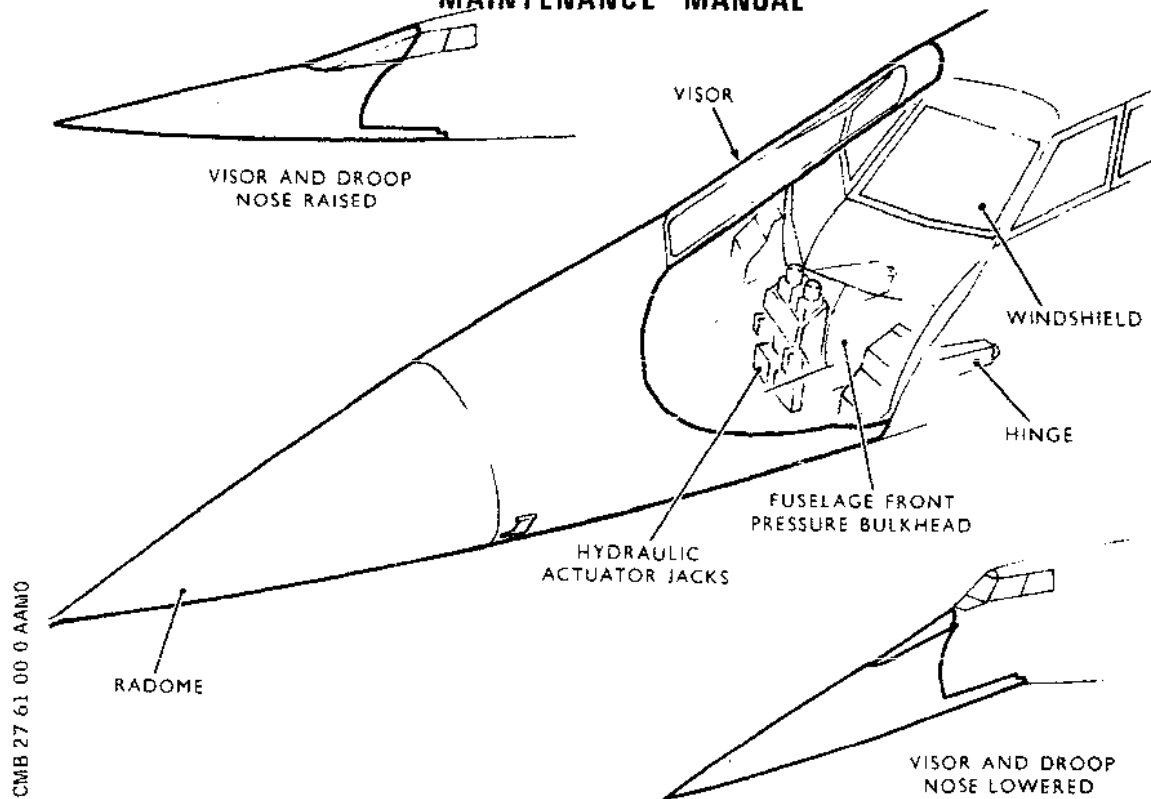
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Visor and Droop Nose  
Figure 001

The visor is supported by a rigid framework of legs and struts mounted on carriages that run on curved rails. When the visor and framework assembly is moved by the action of the hydraulic visor actuating jack and a hinged 'A' frame, the rails guide it to the raised or lowered position. The rails are supported by side brackets braced with adjustable struts, and have attachments that permit differential expansion to avoid distortion. An uplock secures the visor in the raised position, and a mechanical emergency release system is fitted to open the uplock in the event of hydraulic or electrical failure. A spring assisting mechanism aids free fall of the visor to the fully down position when the emergency release system is used. Visor location fittings comprising hooks and a roller on the visor, and a stop pin assembly on the windshield frame engage during the final upward movement of the visor to retain the visor in its correct location with the windshield frame.

### 3. Visor Uplock (Ref. Fig. 003 )

The visor uplock is bolted to the mid bulkhead on the nose fairing. It comprises self locking twin hooks with duplicate, interconnected toggle mechanisms, a hydraulic jack

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(Ref. 27-62-00), and two microswitches (M32 and M37) for the visor and nose indication circuit.

When the visor is not engaged in the uplock, the uplock hooks are held open by springs. When the visor is raised its locking rollers engage the hooks and rotate them to the locked position where each is secured by its spring loaded toggle mechanism. Extension of the jack trips the toggle mechanisms and the hooks are freed to release the visor. The toggle mechanisms are mechanically linked to the visor emergency release mechanism by a cam lever which also operates the striker arm for the left hand microswitch. The right hand microswitch striker arm is operated by a striker on the visor locking rollers.

#### 4. Visor Spring Assisting Mechanism (Ref. Fig. 004 )

The spring assisting mechanism consists of two spring-pots, levers and cables assembled on cross-shafts at the rear of the nose fairing forward bulkhead. The resultant spring-pot tension upon the A-frame to which the forward ends of the cables are attached ensures that during operation of the emergency mechanical release system the visor will free fall to the lowered position and be retained there.

#### 5. Visor Emergency Release (Ref. Fig. 005 )

The emergency release system mechanically releases the visor uplock in the event of normal and standby system failure. The system mechanism, consisting of connecting rods and levers, is tripped by a cam on the nose fuselage pressure bulkhead to release the visor uplock during nose lowering.

#### 6. Droop Nose Mechanism (Ref. Fig. 006 )

The droop nose mechanism comprises the hinges about which the nose pivots, the guide rails and carriages, the side load links that take the lateral stresses imposed on the nose, and the nose actuator jacks. (Ref. 27-62-00). All these units secure the nose to the fuselage. The nose, raised and lowered by the twin hydraulic actuator jacks, has three positions: up, intermediate (5 deg. down) and down (12 1/2 deg. down). The twin jacks provide a fail safe measure and ensure adequate damping during nose movement. In the raised position the nose is secured by twin nose uplocks; in the 5 deg. down and the fully lowered positions the nose is supported by the jacks.

#### 7. Nose Uplocks (Ref. Fig. 007 )

The nose uplocks are bolted to the nose jacks trunnion members on the fuselage forward pressure bulkhead. Each uplock comprises a self-locking hook and its mechanism, a hydraulic jack

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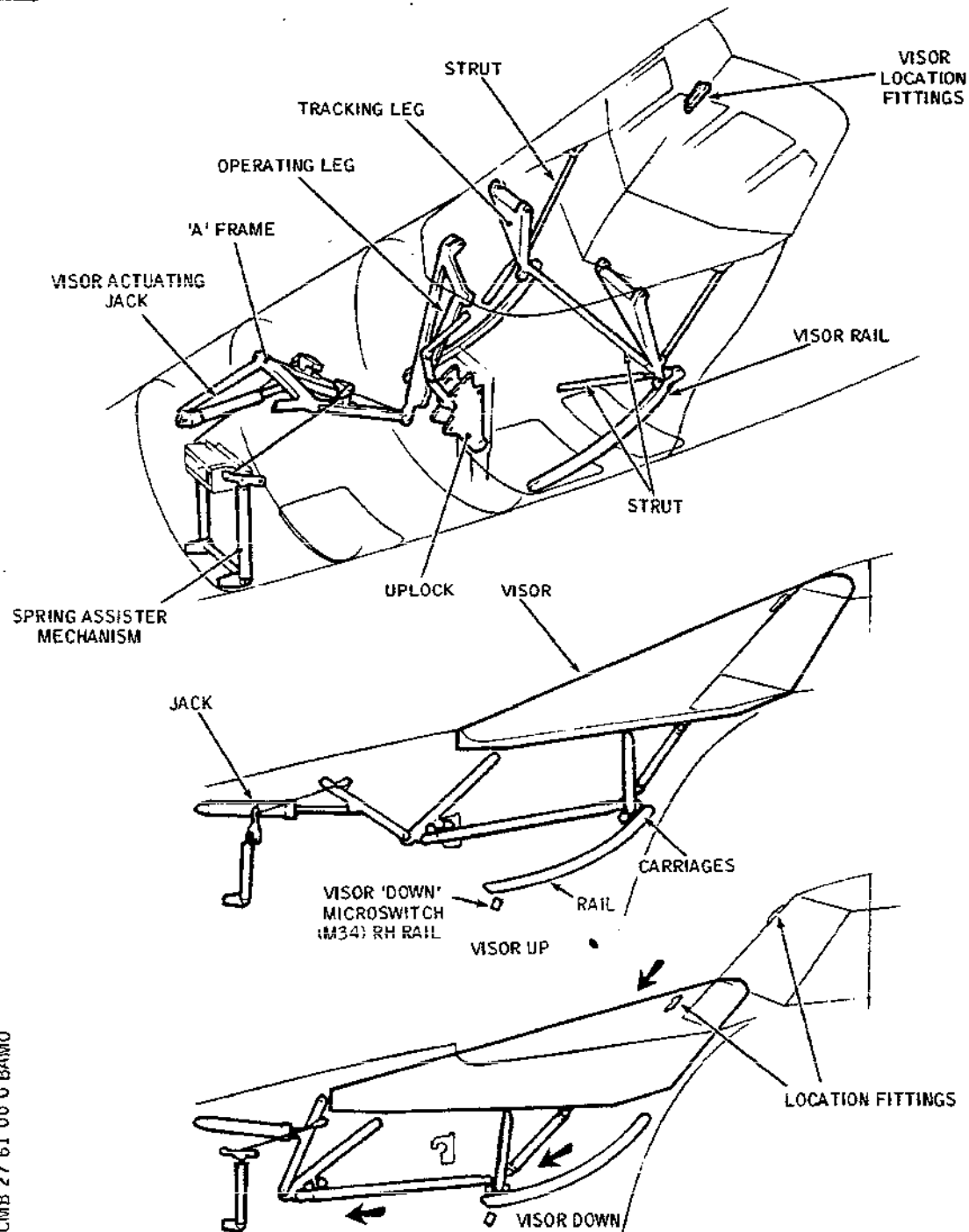
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Visor Mechanism  
Figure 002

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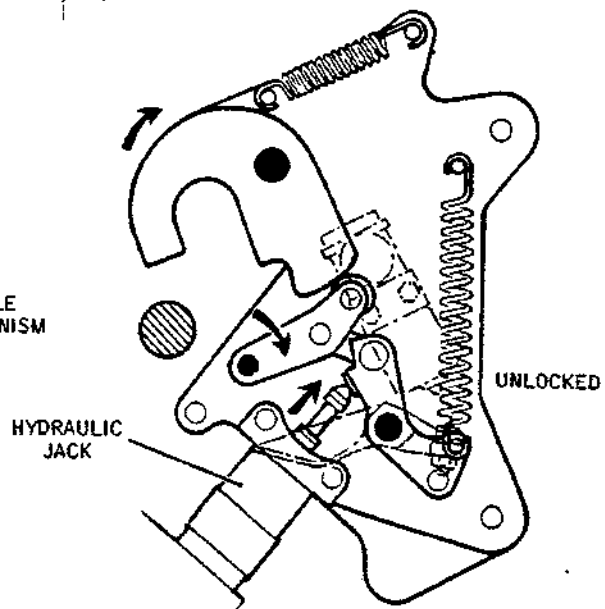
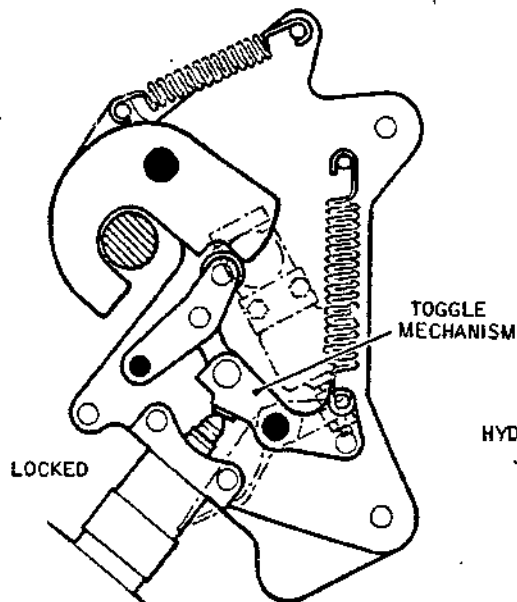
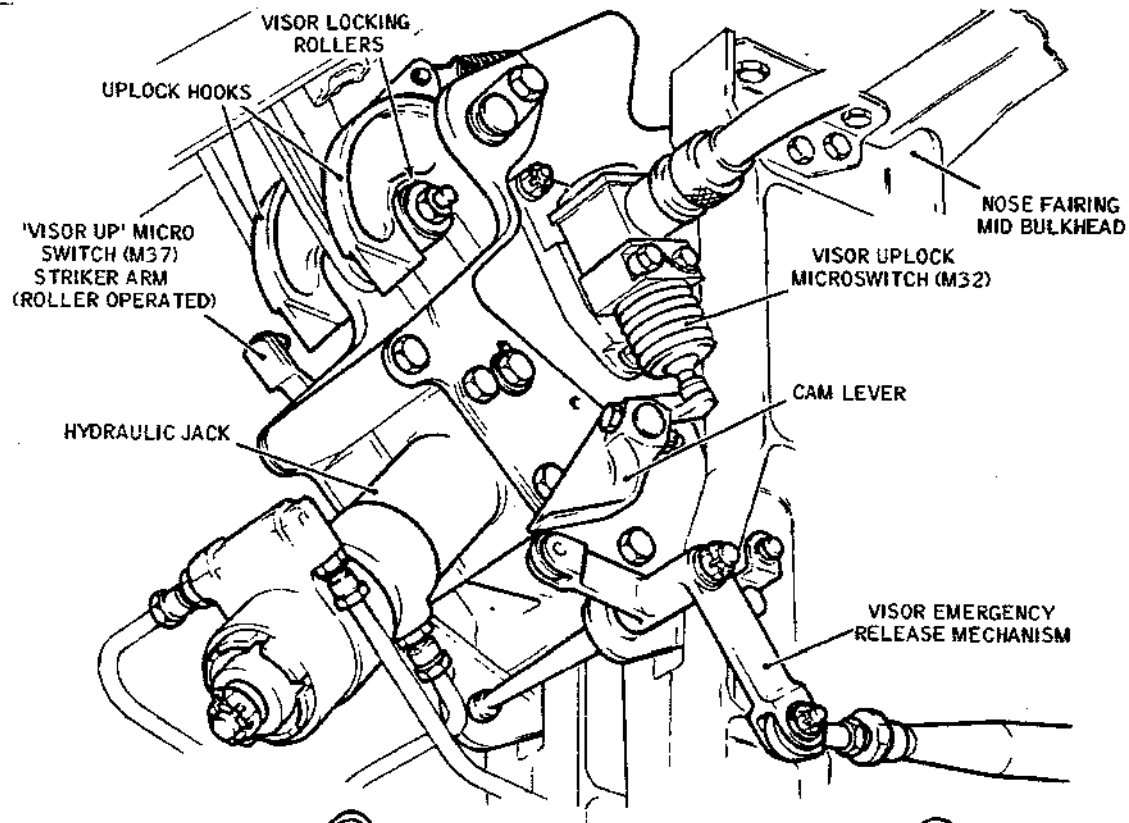
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Visor Uplock  
Figure 003

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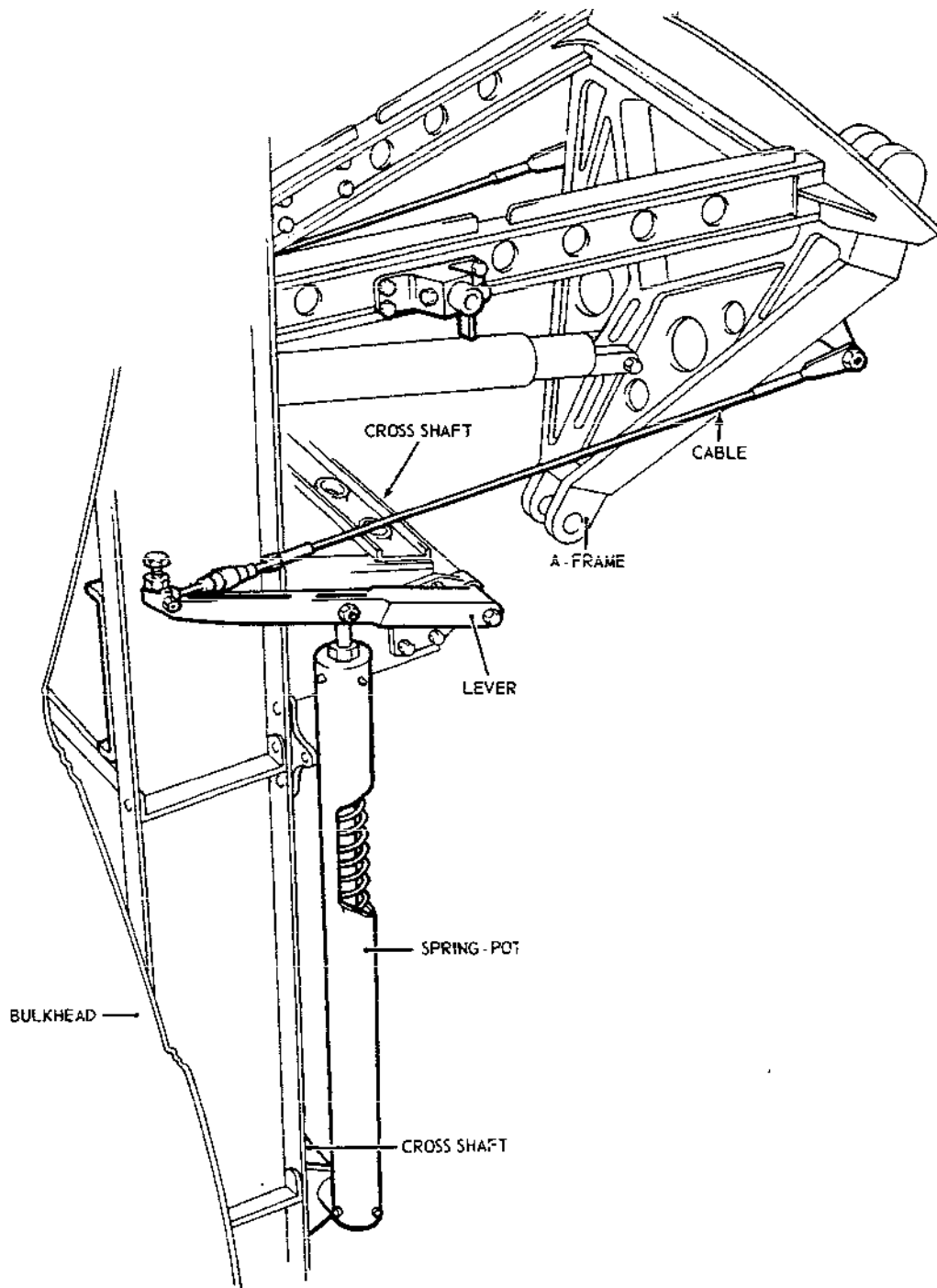
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Spring Assistor Mechanism  
Figure 004

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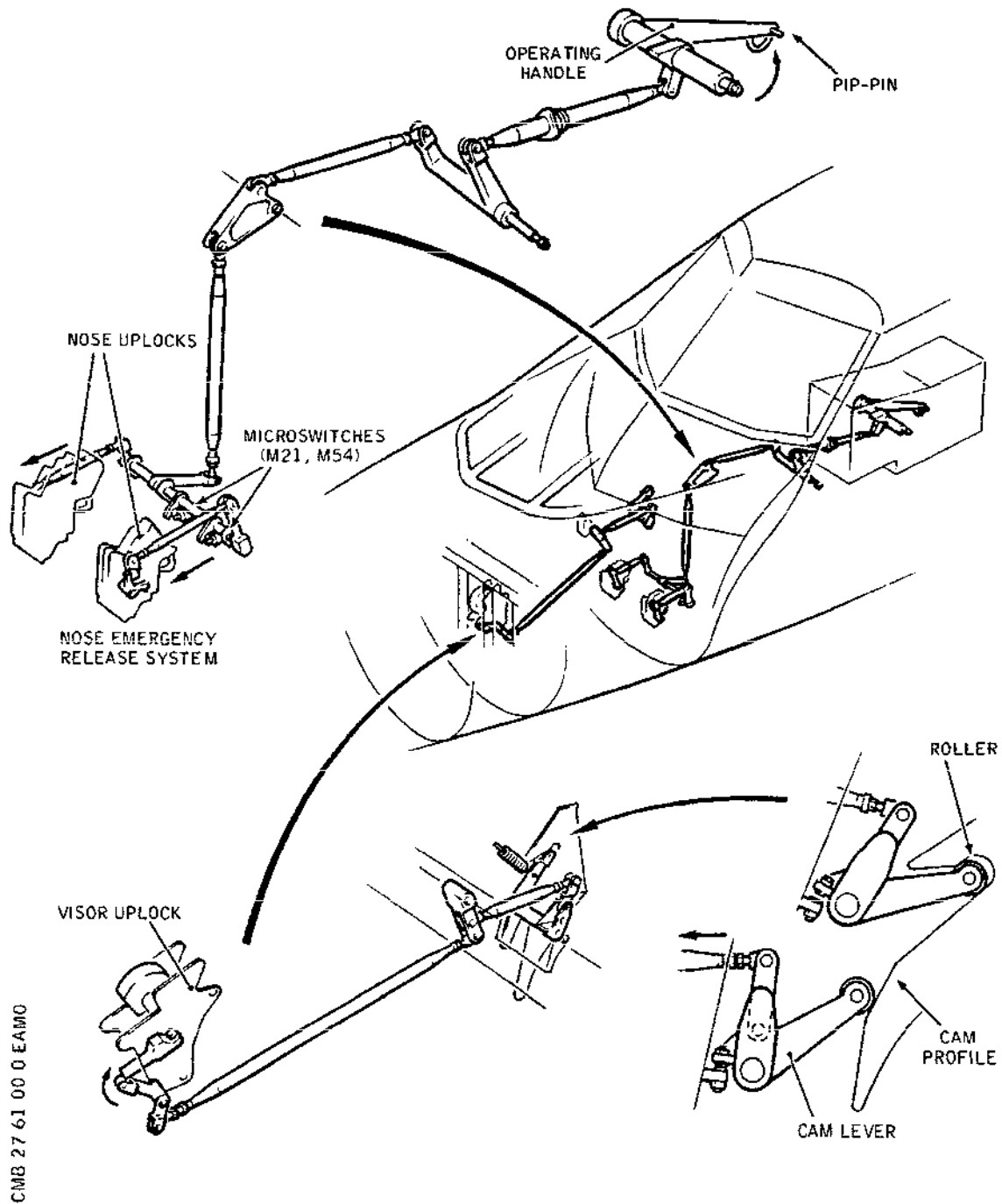
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Visor and Nose Emergency Release System  
Figure 005

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(Ref. 27-62-00), for releasing the hook, and two microswitches for nose control and indication circuits.

The uplock hook is held open by a light spring until the nose is raised, the nose fairing uplock pin then engages the hook and rotates it to the locked position where it is secured by the spring loaded toggle mechanism. To release the hook, the hydraulic jack is extended to trip the toggle mechanism; the nose is then free to droop. The uplock mechanism is mechanically linked to the nose emergency release lever which, when operated, trips the mechanism to free the hook.

### 8. Nose Position Transmitter Unit (Ref. Fig. 008 )

The nose position transmitter is positioned on the floor of the forward fuselage equipment bay (Zone 121), above the droop nose left hand hinge arm. It provides information on the position of the droop nose in the form of electrical signals to the air intake control system, weather radar, air data computer and visual indication. The unit, which is secured to the floor with six bolts, contains ADC potentiometers, weather radar synchros and nose position indication microswitches together with the gear trains through which they are actuated by a common input lever. This lever extends through the equipment bay floor and is connected to a link rod on the droop nose hinge arm. As the nose raises or lowers the input lever moves accordingly to operate the unit. In case of link rod fracture, the input lever is spring-loaded to return to the up (0 deg) position to prevent high incidence signals; a fail-safe box will contain the rod.

### 9. Nose Emergency Release System (Ref. Fig. 005 )

If both the normal and the standby systems fail, the droop nose can be released from its uplocks using the emergency release system. This comprises a mechanical linkage of struts and levers connecting the nose uplock mechanism with an operating handle on the pilots centre console.

Operation of the handle will release both uplocks simultaneously and actuate two microswitches (M21 and M54) fitted to the forward face of the pressure bulkhead, to isolate the system electrics. When not in use the handle, which is hinged at its base, is stowed against the side of the console and is secured with a pip-pin.

### 10. Operation

- R A. Normal System Operation (Ref. Fig.009 and 010)  
(Ref. Fig.011 and 013)

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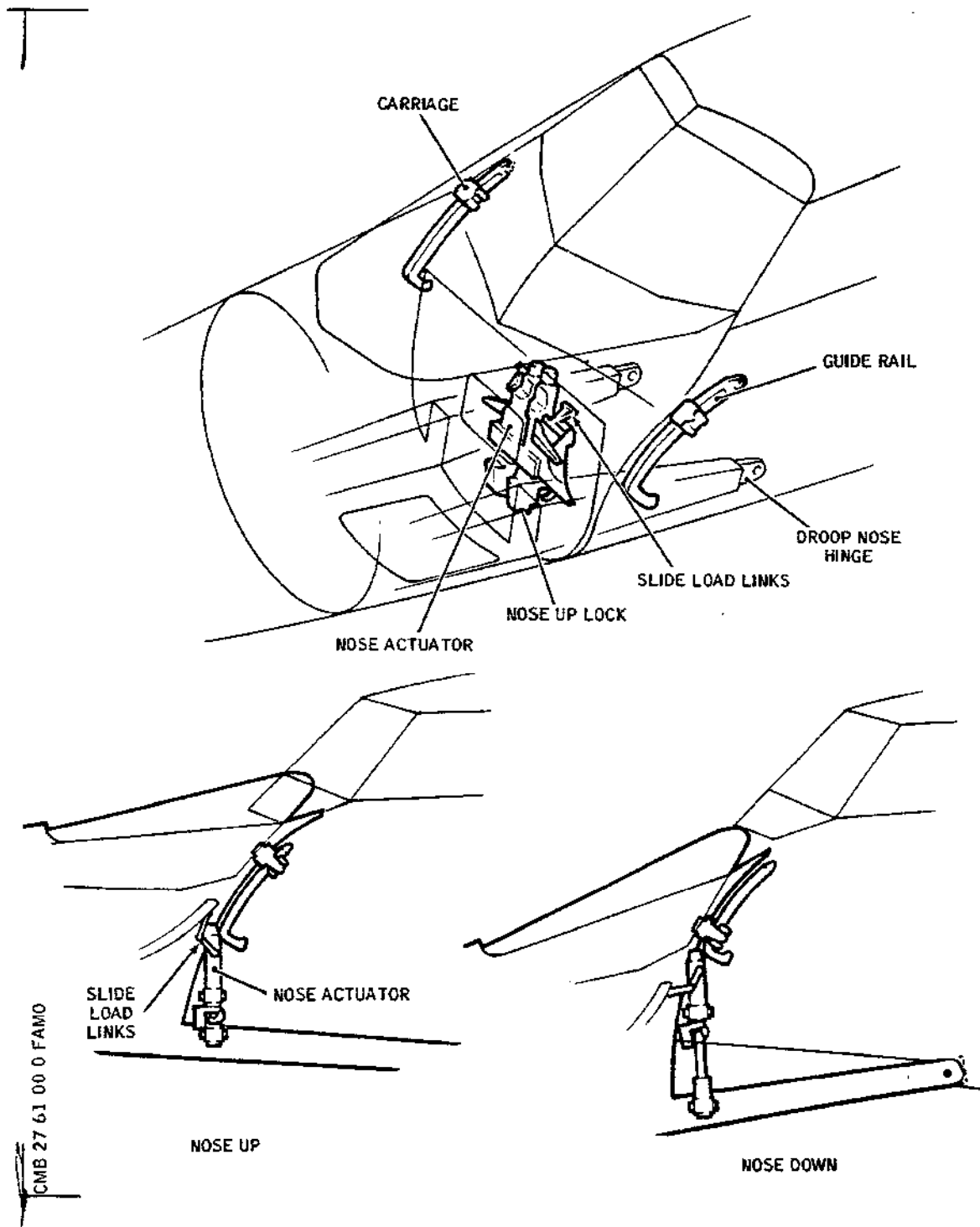
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Droop Nose Mechanism  
Figure 006

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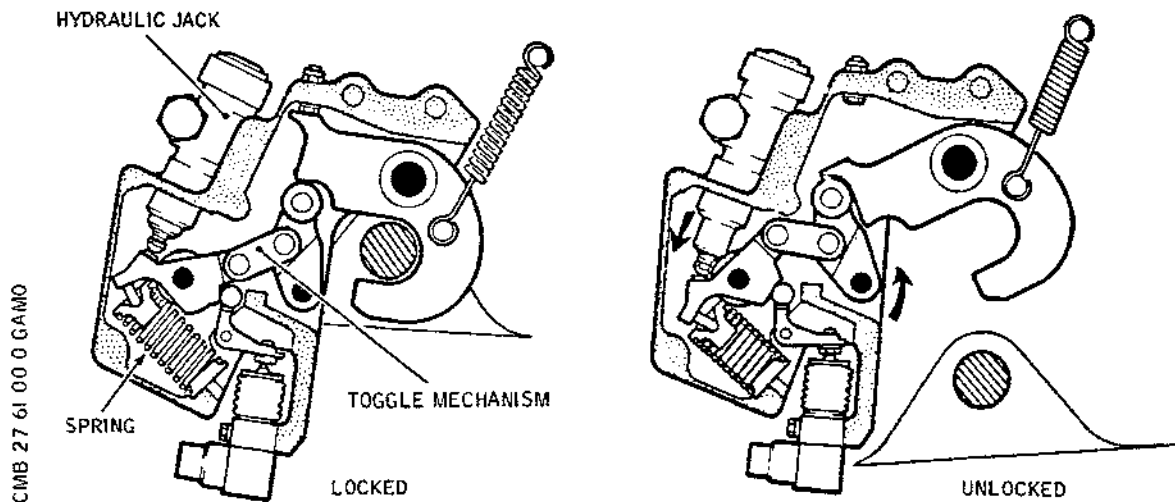
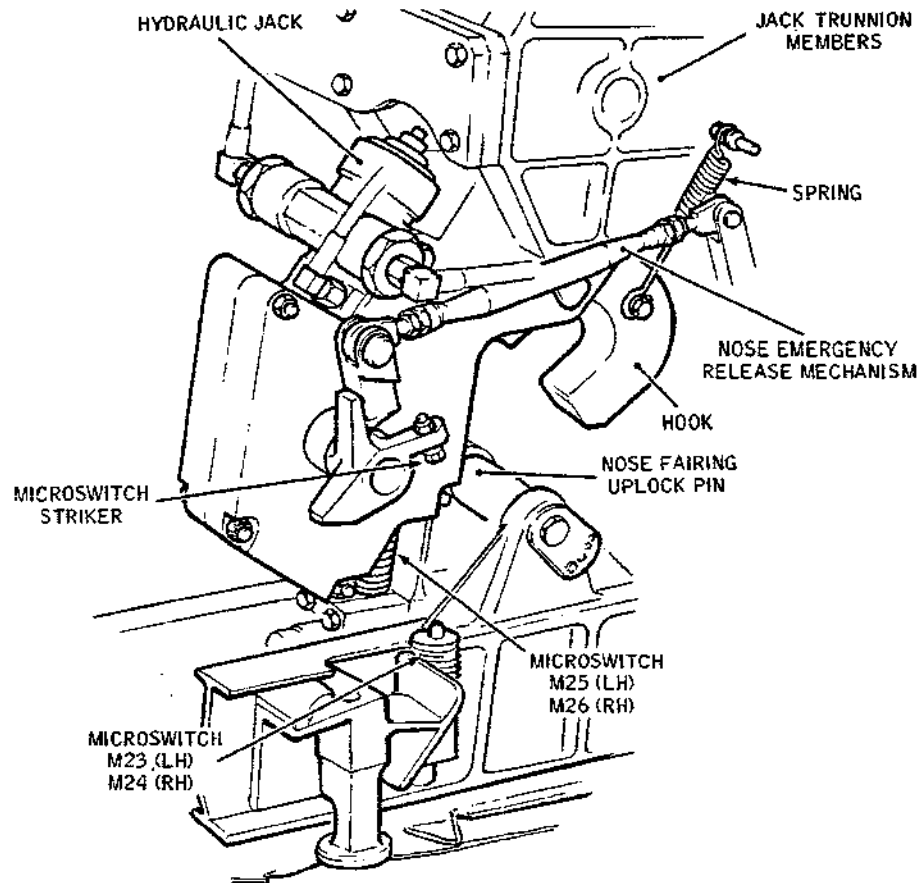
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Droop Nose Uplocks  
Figure 007

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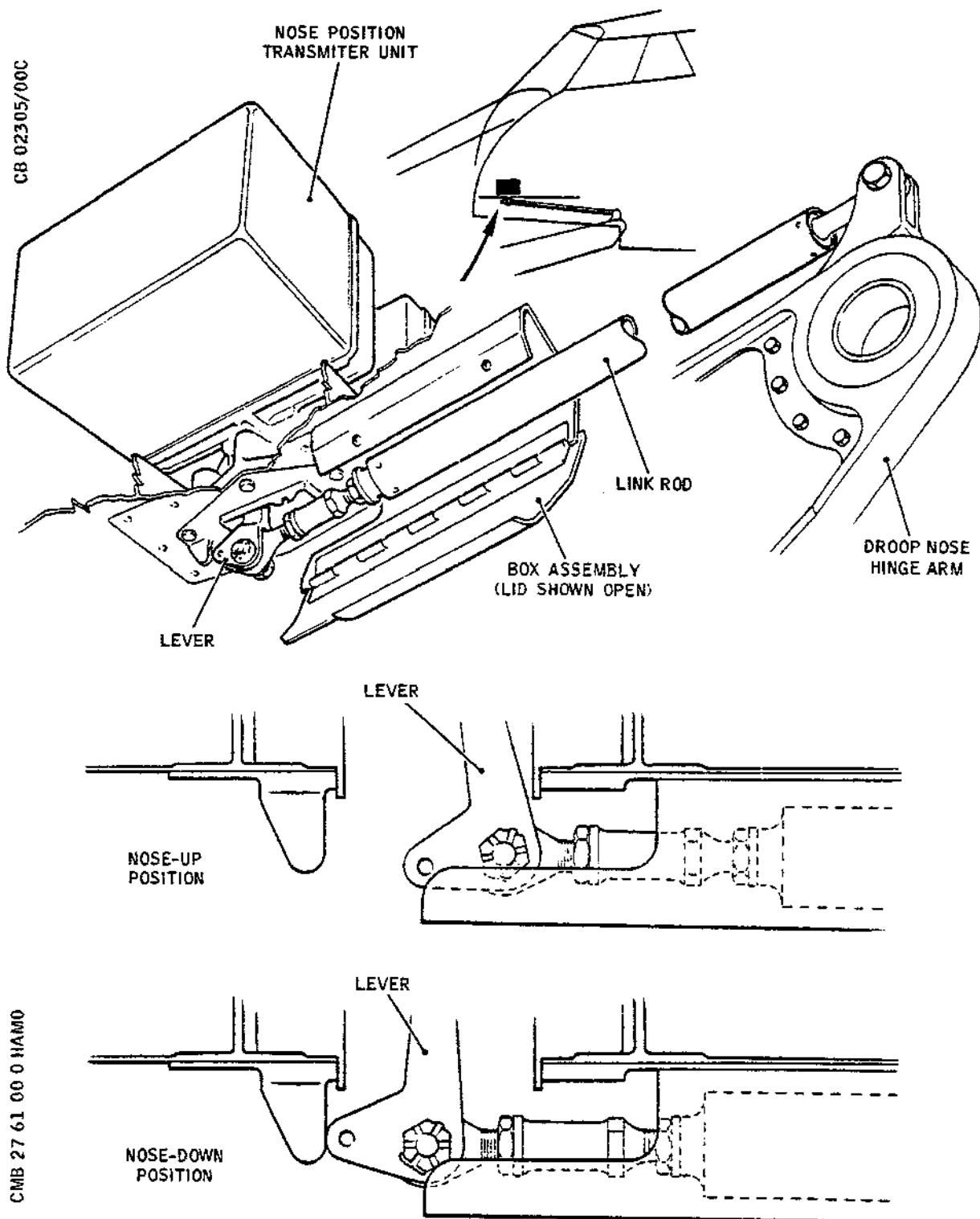
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Nose Position Transmitter Unit  
Figure 008

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When the nose and visor are up, (nose and visor selector switch at UP) all solenoids controlling the hydraulic selector valves are de-energized and all pipes in the visor and droop nose system are connected to green system return. The NOSE and the VISOR magnetic indicators are energized via the nose transmitter unit nose 'up' micro-switch and the visor 'up' microswitch respectively to show UP. All three captions are extinguished.

Setting the selector switch to VIS/0 deg. energizes the down solenoid of the visor selector valve to hydraulically release and lower the visor. It also energizes the 5 deg. and 12 1/2 deg. cylinders selector valve solenoids of the actuator jacks to pressurize the jacks to hold the nose in its uplocks to remove the weight from the uplock hooks. When the visor uplock opens, microswitch M32 energizes the uplock relay which illuminates the red unlocked caption. As the visor moves away from the uplock, microswitch M37 energizes the visor up relay to cancel UP on the visor magnetic indicator. When the visor is down, the visor 'down' microswitches M34 and M60 extinguish the red caption, and energise the VISOR magnetic indicator to show DOWN. The visor remains pressurized down.

Setting the selector switch to 5 deg. energizes the nose uplocks selector valve solenoid to hydraulically release the uplocks. Electrical supplies to the 5 deg. cylinder solenoids are maintained via the nose uplock microswitches until the nose is released thereby preventing snatch on the uplocks. The 5 deg. cylinder solenoids are then de-energized and the nose lowered to 5 deg. When the nose uplocks open, the red caption is illuminated via the nose uplocks microswitches and the nose transmitter unit. When the nose reaches 5 deg. the transmitter unit extinguishes the caption and energizes the NOSE magnetic indicator to show 5 deg.

Selection of DOWN on the selector switch de-energizes the 12 1/2 deg. cylinder solenoids to hydraulically release the collet locks and lower the nose to 12 1/2 deg. The nose is retained in this position by hydraulic pressure. As the nose is released from the collet locks, the collet locks microswitches illuminate the 5 deg. L and the red captions. When the nose is fully down, the nose transmitter unit extinguishes the red and 5 deg. L captions, illuminates the green arrow caption and energizes the NOSE magnetic indicator to show DOWN.

To raise the nose, the selector switch is moved to 5 deg. this energizes the 12 1/2 deg. cylinder selector solenoids

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to hydraulically raise the nose to the 5 deg. position. When the 12 1/2 deg. cylinders have reached the end of their travel they are automatically engaged by the nose actuator collet locks. As the nose rises the nose transmitter unit extinguishes the green arrow caption, cancels the DOWN indication on the NOSE magnetic indicator and illuminates the red and 5 deg. L captions. When the nose reaches 5 deg. and engages in the collet locks the nose transmitter unit extinguishes the red and 5 deg. L captions and energizes the NOSE magnetic indicator to show 5 deg.

NOTE: Except when the nose is down, operation of either collet lock switch will illuminate the 5 deg. L caption and it will also illuminate the red caption when the nose is at 5 deg.

The nose is raised to its 'up' position by selecting VIS/0 deg. This energizes the 5 deg. cylinder selector solenoids; system pressure then raises the nose, which engages automatically in its uplocks. As the nose rises, the red caption is illuminated by the nose transmitter unit. When the nose is up, the red caption is extinguished by the nose uplocks microswitches and the nose transmitter unit energizes the magnetic indicator to show UP.

To raise the visor the selector switch is set to UP.  
This:

- (1) De-energizes the 5 deg. cylinder selector solenoids on the nose actuator and the visor selector valve 'down' solenoid.
- (2) Energizes the visor selector valve 'up' solenoid, to depressurize the visor down circuit and the droop nose jacks and to hydraulically raise the visor.

The 'up' solenoid will energize only if the nose uplocks are engaged and the windscreen wipers (parked) relays are energized. If the relays fail and prevent the visor from being raised, the relays can be by-passed by the WIPERS/O/RIDE switch after first ensuring that the wipers are in the parked position. To ensure that the collet locks remain engaged when hydraulic pressure is removed from the nose actuator, the 12 1/2 deg. cylinder selector solenoids remain energized until completion of the visor 'up' movement. When the visor begins to rise the red caption illuminates via the visor 'down' microswitch. The visor is guided in its final upward movement by its roller and hook assemblies engaging with the location fitting on the windshield. When the visor is engaged in its uplock the

EFFECTIVITY: ALL

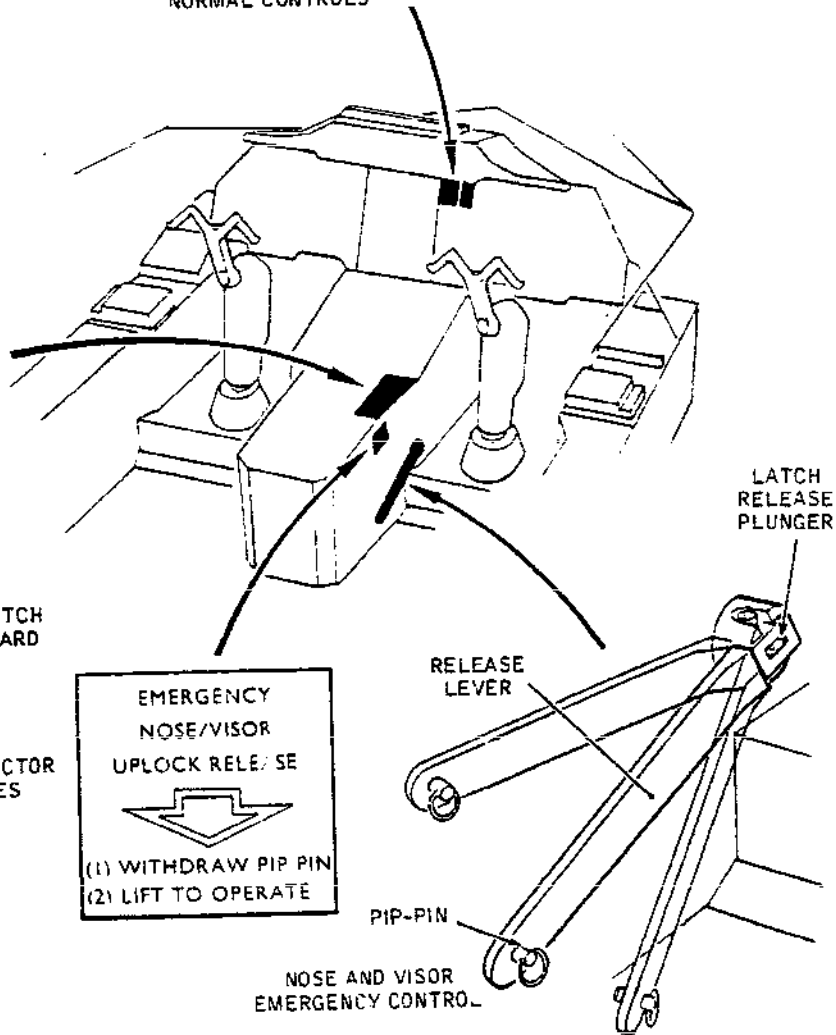
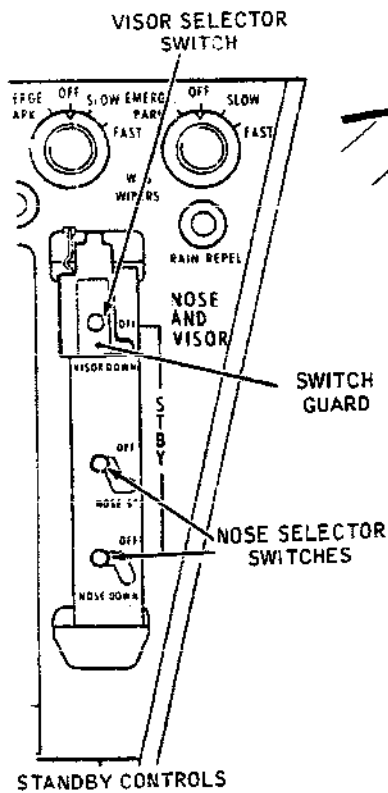
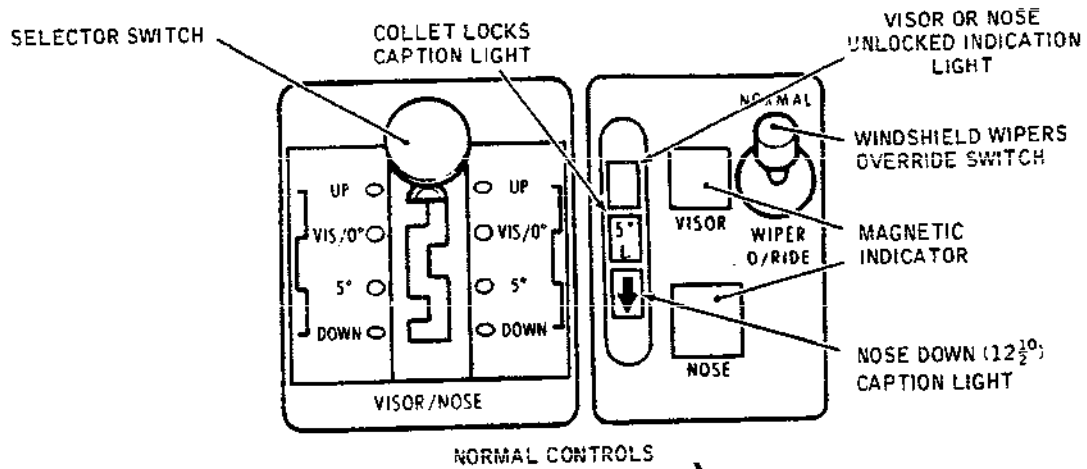
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CB 01995/01D



Visor and Droop Nose Controls and Indicators  
Figure 009

R

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visor 'up' microswitch energizes the VISOR magnetic indicator to show UP, and de-energizes one of the 12 1/2 deg. cylinder solenoids: the visor uplock microswitch de-energizes the visor uplock relay to extinguish the red caption and de-energize the other 12 1/2 deg. cylinder solenoid.

Outputs from the selector switch provide data to the AIDS flight recorder.

**NOTE:** The windscreen wipers must not be operated when the visor is up.

### B. Standby System Operation (Ref. Fig.009 and 012)

When the visor standby selector switch is set to VISOR DOWN:

- (1) The normal control system is isolated.
- (2) The visor standby lower selector valve solenoid is energised to release and lower the visor using the yellow hydraulic system.
- (3) The NOSE 5 deg. and the NOSE 12 1/2 deg. standby switches are armed.

When the visor uplock opens, microswitch M32 energizes the uplock relay which illuminates the red unlocked caption. As the visor moves away from the uplock, microswitch M37 energizes the visor up relay to cancel the UP indication on the VISOR magnetic indicator. When the visor is fully lowered, the visor 'down' microswitch extinguishes the red caption and energizes the VISOR magnetic indicator to show DOWN. Lowering the visor using the standby system results in a quantity of hydraulic fluid, equal in volume to the visor jack rod, being transferred from the green to the yellow system. The levels of the green and the yellow system hydraulic reservoirs must be rebalanced after each standby lowering.

Selection of the nose 5 deg. standby switch to NOSE 5 deg. energizes the nose uplocks standby selector valve solenoid to hydraulically release the nose uplocks using the yellow system. The nose will then free fall to the 5 deg. position. Magnetic indicator and caption indication will take effect as for the normal system. The nose is fully lowered by setting the standby nose selector switch to NOSE 12 1/2 deg. This isolates the 12 1/2 deg. cylinder selector valves by energizing the collet locks standby selector valve to hydraulically release the collet locks and permit the nose to free fall to the 12 1/2 deg.

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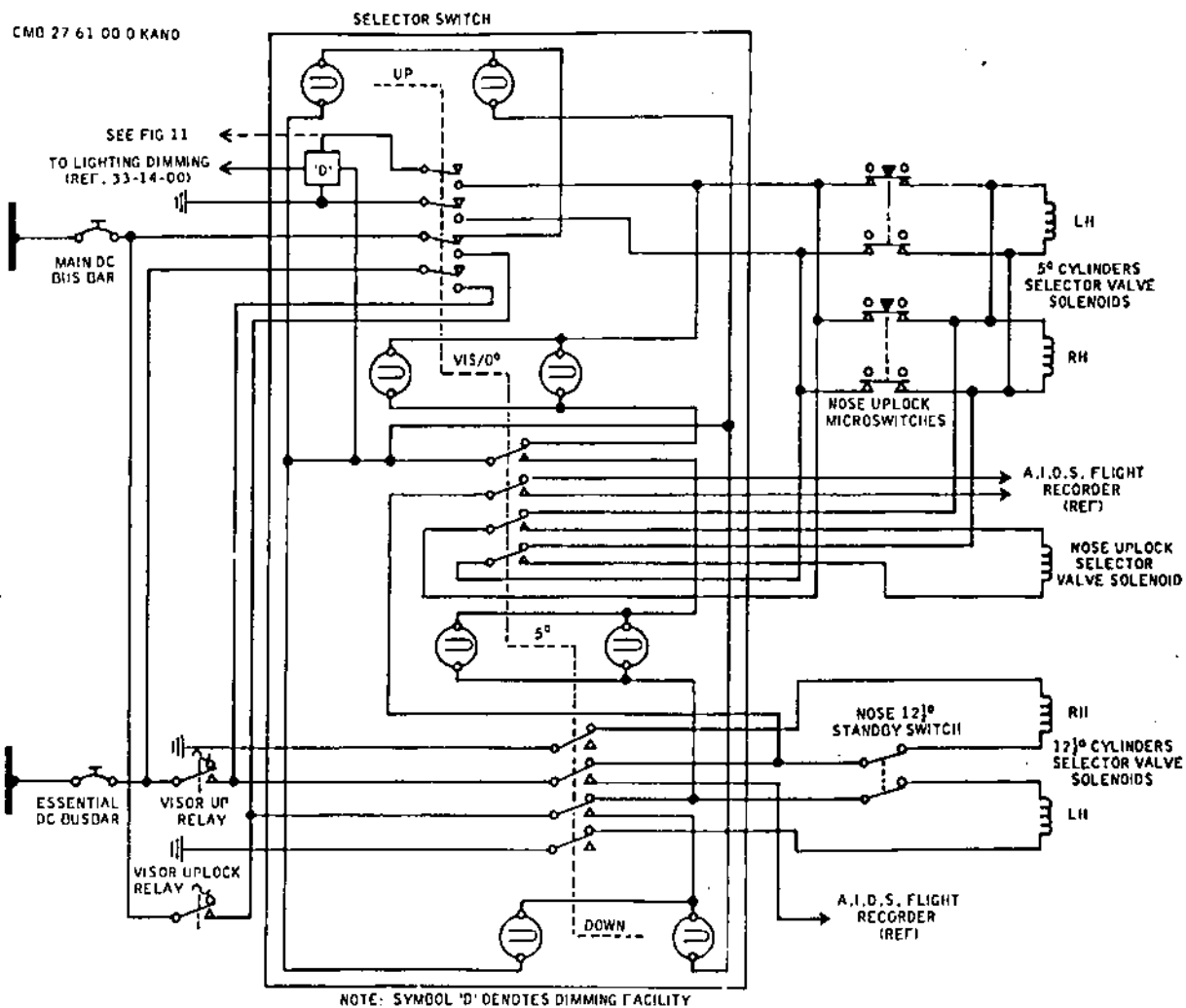
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Droop Nose Normal Control  
Schematic Diagram  
Figure 010

R

EFFECTIVITY: ALL

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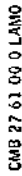
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Visor Normal Control - Schematic Diagram  
Figure 011

position. Indication will be as for the normal system.

C. Emergency Operation (Ref. Fig.009 and 012)

To operate the emergency release system, the release lever is first pulled outward by its pin-ring to hinge it clear of its stowed position and is then pulled upward. It is retained in this position automatically by a latch. This will operate the linkage to release the nose uplocks and will actuate the two microswitches to electrically isolate the normal and standby systems with the exception of one feed to the right hand nose jack 12 1/2 deg. selector to ensure that at least one collet lock is maintained. The nose will free fall to the 5 deg. position under its own weight and aerodynamic pressure and as it hinges downward a cam fitting on the fuselage bulkhead trips the visor emergency release system to release the visor uplock. The visor aided by the spring assist mechanism free falls to the down position.

EFFECTIVITY: ALL

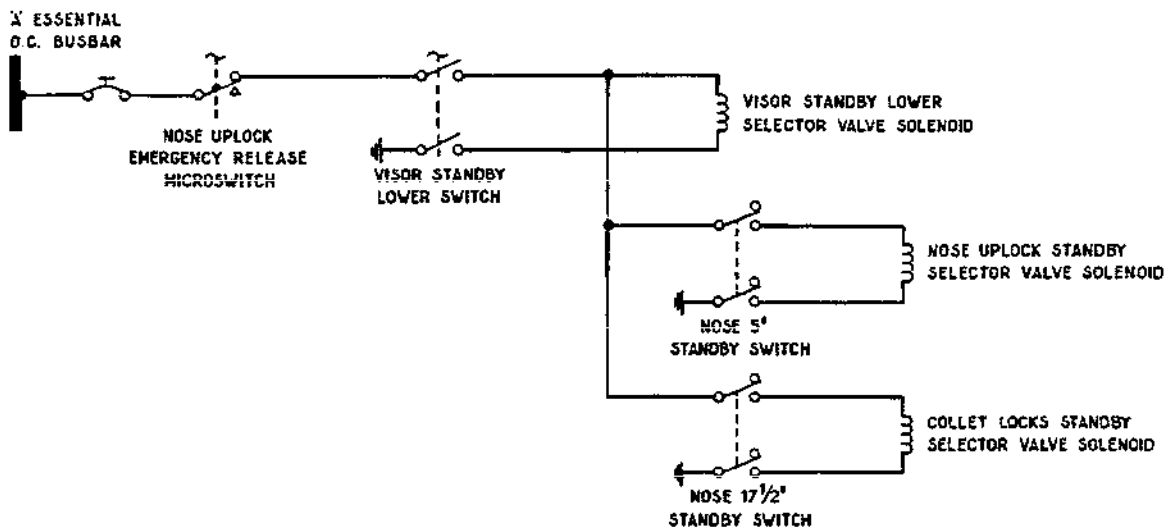
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CMB 27 61 00 0 MAMO

Visor and Droop Nose Standby/Emergency  
Control - Schematic Diagram  
Figure 012

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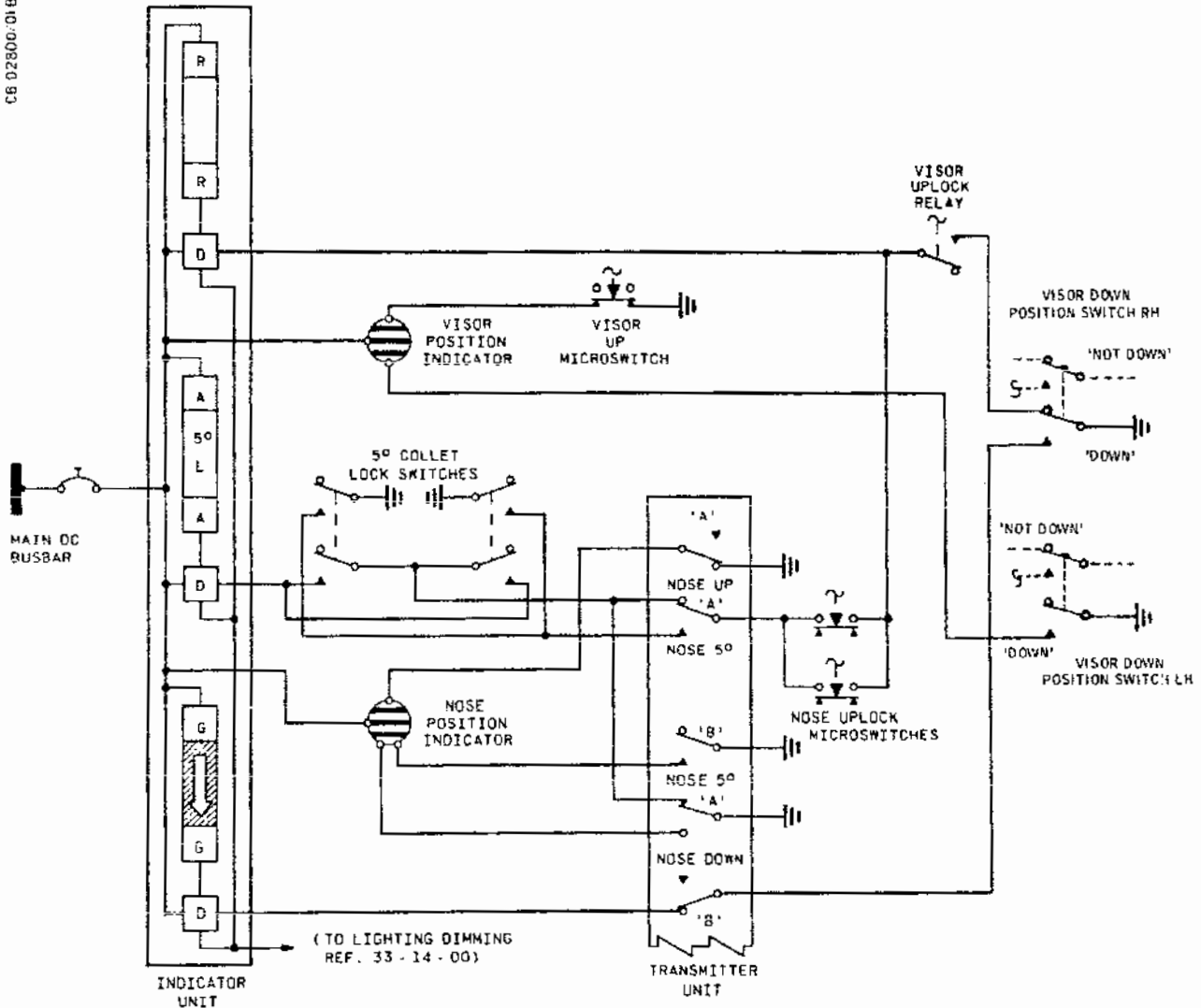
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CB 02800/01B



### NOTES:

1. THE DIAGRAM CONNECTIONS ARE DRAWN TO SHOW THE NOSE AND VISOR UP AND LOCKED.
2. IN THE TRANSMITTER UNIT, THE 'NOSE 50' MICROSWITCHES REMAIN CLOSED ONLY IN THE APPROPRIATE NOSE POSITION.
3. SYMBOL 'D' DENOTES DIMMING FACILITY.

CMB 27 61 00 0 NAME

Droop Nose/Visor Indication -  
Schematic Diagram  
Figure 013

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### VISOR AND DROOP NOSE SYSTEM - TROUBLE SHOOTING

NOTE: For fault isolation chart index, see para. 4.

#### 1. General

Faults are dealt with on a probability basis and identified as a result of testing. They can also develop on the ground or during flight.

The defect can be isolated with the aid of trouble shooting procedures (Ref. para. 3), and traced through IF OK and IF NOT OK paths to the appropriate charts or other specified rectification action as may be necessary. If a defect occurs, perform the appropriate rectification action, then repeat the operation at which the defect was encountered to ensure that the operation is OK.

Bracketed numbers in the procedures and charts indicate items on the component identification table (Ref. Table 101). The table provides information, including component location, required for rectification. Component location also indicates the possible necessity of repositioning certain items of ground service equipment. Each chart also specifies the ground equipment required for that particular task.

All procedures dealing with trouble shooting are based on the assumption that electrical wiring is serviceable and that electrical power is available unless otherwise stated. If the fault is not rectified, check the wiring in accordance with the Wiring Diagram Manual (Ref. Table 101).

The diagnostic charts are written for single faults and are not fully effective for double faults.

Where it is required to check that a solenoid is energized this can be done by touching the solenoid with a magnetic object such as a steel rule. This will cling to an energized solenoid.

#### 2. Preparation

WARNING: OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS 24-00-00. OBSERVE THE HYDRAULIC SAFETY PRECAUTIONS 29-00-00. BEFORE ENTERING THE DROOP NOSE FIT THE APPROPRIATE GROUND SAFETY LOCKS.

NOTE: If a new transmitter unit is fitted or if the unit is disconnected from the link rod, an inspection, followed by a duplicate inspection, is to be carried out to ensure that the unit input lever is spring-

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loaded to the 'up' (0 deg) position.

- (1) Before connecting ground electrical and hydraulic power check that the nose and visor controls agree with the nose and visor positions, and check that:
  - (a) Visor and nose STBY (standby) control switches on the pilots' centre console for VISOR/LOWER, NOSE 5, and NOSE DOWN, are all at OFF.
  - (b) EMERGENCY NOSE/VISOR UNLOCK RELEASE lever on the right hand side of the centre console, is in the stowed position and secured with the pip-pin.
- (2) Ensure that the visor and droop nose control and indication circuit breakers are set.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
Visor control	15-215	M11	F8
Visor/Nose indication	15-215	M15	F9
Nose control	1-213	M12	Q16
Visor/Nose standby	1-213	M13	Q17

- (3) Connect the hydraulic generation ground rig and pressurize the green and the yellow systems (Ref. 29-00-00).
- (4) Make available electrical ground power (Ref. 24-41-00).

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### 3. Trouble Shooting

#### A. \*\*\*\*\*

\*Prepare to trouble-shoot (Ref. para. 2). \*  
\*With the nose and visor in the UP \*  
\*position check that VISOR and NOSE \*  
\*magnetic indicators (1) (2) on dash \*  
\*panel display UP, with the three \*  
\*captions extinguished. \*

\*\*\*\*\*

OK

-NOT OK - - -

-----  
| Operate filament test facility |  
| (for visor/nose caption) to |  
| prove supply from C/B (19) - if |  
| supply OK, refer to - |  
Chart 101 - visor indication

#### B. \*\*\*\*\*

\*Set normal selector switch (4) from \*  
\*UP to VIS 0°. Check that visor lowers.\*  
\*\*\*\*\*

OK

-NOT OK - - -

-----  
| Visor fails to lower - |  
Chart 102

#### C. \*\*\*\*\*

\*Check that red caption (8) illuminates\*  
\*during visor transit to 0°. \*

\*\*\*\*\*

OK

-NOT OK - - -

-----  
| Red caption fails to illuminate |  
Chart 103.

#### D. \*\*\*\*\*

\*When visor has fully lowered check \*  
\*that red caption (8) extinguishes \*  
\*\*\*\*\*

OK

-NOT OK - - -

-----  
| Red caption fails to extinguish- |  
Chart 104

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E.\*\*\*\*\*  
\*Visor lowered, check magnetic \*  
\*indicator (1) displays DOWN \*  
\*\*\*\*\*

OK

-NOT OK - - -

Magnetic indicator fails to  
display DOWN -  
Chart 105

F.\*\*\*\*\*  
\*Set normal selector switch to 5°. \*  
\*Check that droop nose lowers to 5° \*  
\*position. \*  
\*\*\*\*\*

OK

-NOT OK - - -

Nose fails to lower -  
Chart 106.

G.\*\*\*\*\*  
\*When nose in transit to 5° position, \*  
\*check that red caption illuminates. \*  
\*\*\*\*\*

OK

-NOT OK - - -

Red caption fails to illuminate -  
Chart 107.

H.\*\*\*\*\*  
\*When nose in 5° position, check that \*  
\*red caption extinguishes and magnetic \*  
\*indicator displays 5°. \*  
\*\*\*\*\*

OK

-NOT OK - - -

Red caption fails to extinguish -  
Chart 113.  
Magnetic indicator fails to  
display 5° -  
Chart 108.

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J.\*\*\*\*\*  
\*Set normal selector switch to DOWN and\*  
\*check that droop nose lowers to fully \*  
\*down (12 1/2°) position. \*  
\*\*\*\*\*

OK

-NOT OK - - -|Nose fails to lower -  
|Chart 109

K.\*\*\*\*\*  
\*When nose is in transit to 12 1/2° \*  
\*position, check that red and 5°L \*  
\*captions illuminate \*  
\*\*\*\*\*

OK

-NOT OK - - -|Red caption fails to illuminate-  
|Chart 107.  
|5°L caption fails to illuminate-  
|if filament test proves OK-  
|renew nose position transmitter  
|unit (17).

L.\*\*\*\*\*  
\*When nose is fully lowered, check that\*  
\*magnetic indicator displays DOWN \*  
\*\*\*\*\*

OK

-NOT OK - - -|Magnetic indicator fails to  
|display DOWN -  
|Chart 110.

M.\*\*\*\*\*  
\*When nose is fully lowered, check that\*  
\*red and 5°L captions extinguish. \*  
\*\*\*\*\*

OK

-NOT OK - - -|Red caption fails to extinguish-  
|Renew nose position transmitter  
|unit (17).

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N.\*\*\*\*\*  
\*When nose is fully lowered, check that\*  
\*green caption illuminates\*  
\*\*\*\*\*

OK

-NOT OK - - -

Green caption fails to  
illuminate -  
Chart 111.

P.\*\*\*\*\*  
\*Set selector switch to 5°, check that\*  
\*nose raises to 5° position.\*  
\*\*\*\*\*

OK

-NOT OK - - -

Nose fails to raise -  
Chart 112

Q.\*\*\*\*\*  
\*When nose is in transit from DOWN to\*  
\*5°, check that red caption illuminates\*  
\*\*\*\*\*

OK

-NOT OK - - -

Red caption fails to illuminate -  
Chart 107.

R.\*\*\*\*\*  
\*When nose reaches 5° position and\*  
\*engages in collet locks, check that red\*  
\*and 5°L captions extinguish and that\*  
\*magnetic indicator displays 5°.\*  
\*\*\*\*\*

OK

-NOT OK - - -

Red and 5°L captions fail to  
extinguish -  
Chart 113.  
Magnetic indicator fails to  
display 5° -  
Chart 108.

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S.\*\*\*\*\*  
\*Set the normal visor selector switch \*  
\*to VIS 0°, check that nose raises to \*  
\*up position. \*  
\*\*\*\*\*

OK

-NOT OK - - -|Nose fails to raise -  
|Chart 114.

T.\*\*\*\*\*  
\*When nose is moving from 5° to 0° (UP)\*  
\*position, check that red caption \*  
\*illuminates. \*  
\*\*\*\*\*

OK

-NOT OK - - -|Red caption fails to illuminate-  
|Chart 107.

U.\*\*\*\*\*  
\*When nose is in 0° (UP) position, check\*  
\*that magnetic indicator displays UP \*  
\*and red caption extinguishes. \*  
\*\*\*\*\*

OK

-NOT OK - - -|Magnetic indicator fails to  
|display UP -  
|Chart 115.  
|Red caption fails to extinguish-  
|Chart 104.

V.\*\*\*\*\*  
\*Set normal control selector switch \*  
\*from VIS 0° to UP and check that visor\*  
\*raises to UP position. \*  
\*\*\*\*\*

OK

-NOT OK - - -|Visor fails to raise -  
|Chart 116.

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## MAINTENANCE MANUAL

W.\*\*\*\*\*  
\*When visor is in transit to up \*  
\*position, check that red caption \*  
\*illuminates. \*  
\*\*\*\*\*

OK

-NOT OK - - -

Red caption fails to illuminate-  
Chart 103.

X.\*\*\*\*\*  
\*When visor reaches up position, check \*  
\*that red caption extinguishes and \*  
\*visor magnetic indicator displays UP. \*  
\*\*\*\*\*

-NOT OK - - -

Red caption fails to extinguish  
Chart 117.  
Visor magnetic indicator fails  
to display UP.  
Chart 101

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## MAINTENANCE MANUAL

\*\*\*\*\*  
 \*MAGNETIC INDICATOR (1) FAILS \*  
 \*TO DISPLAY UP WHEN VISOR IS \*  
 \*IN UP POSITION \*  
 \*\*\*\*\*

### GROUND EQUIPMENT REQUIRED

DESCRIPTION	PART NO.
GROUND POWER SUPPLIES	-
ELECTRICAL/HYDRAULIC	=
MULTIMETER	-
CIRCUIT BREAKER CLIPS	-

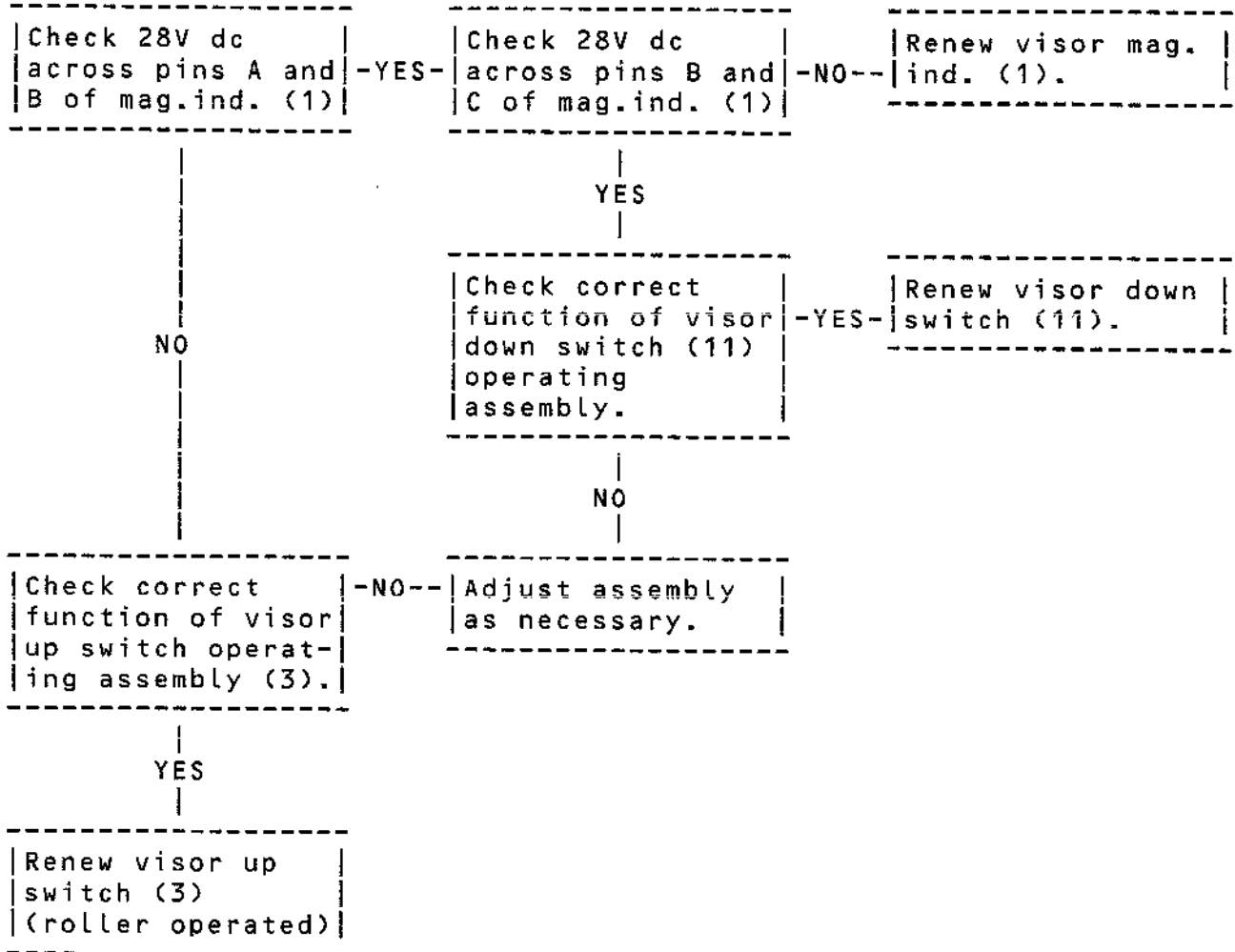


Chart 101

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## MAINTENANCE MANUAL

\*\*\*\*\*  
 \*Visor fails to lower when \*  
 \*normal selector switch (4) is\*  
 \*set to VIS 0°.\*  
 \*\*\*\*\*

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
GROUND POWER SUPPLIES:	
ELECTRICAL/HYDRAULIC	-
MULTIMETER	-
CIRCUIT BREAKER CLIPS	-
NOSE LOCKING PIN (2)	E925045031
VISOR LOCKING PIN (2)	E925045030

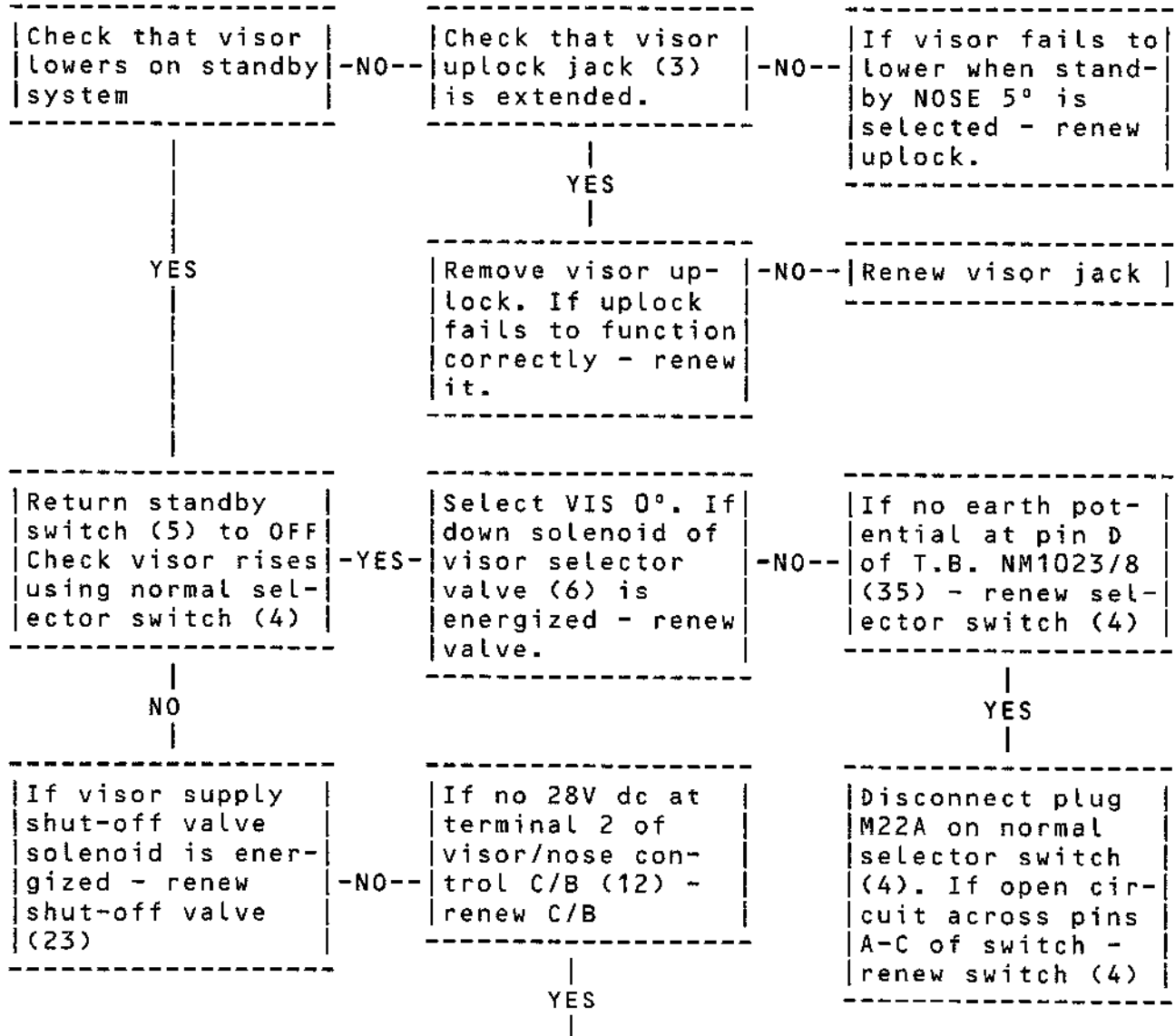


Chart 102 (Continued)

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|  
YES  
|

Disconnect plug  
M22A on normal  
selector switch  
(4). If open cir-  
cuit across pins  
D-F of switch -  
renew switch (4)

Chart 102 (Concluded)

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\*RED CAPTION (8) FAILS TO \*  
\*ILLUMINATE DURING VISOR TRAN-\*  
\*SIT UP OR DOWN \*  
\*\*\*\*\*

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
GROUND POWER SUPPLIES:	
ELECTRICAL/HYDRAULIC	-
MULTIMETER	-
CIRCUIT BREAKER CLIPS	-

Operate filament test to  
check for faulty filaments  
(8)

-YES- Renew filaments (8)

NO

Check earth potential at ter-  
minal 2 of visor uplock relay  
(10)

-NO--

Adjust or renew visor down  
switch RH (9)

YES

Check earth potential at ter-  
minal A of visor uplock relay  
(10)

-NO--

Adjust striker assembly or  
renew visor uplock switch (3)

YES

Renew indicator unit (8)

Chart 103

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## MAINTENANCE MANUAL

\*\*\*\*\*  
\*RED CAPTION (8) FAILS TO \*  
\*EXTINGUISH WHEN VISOR FULLY \*  
\*LOWERED (NOSE AT 0°) \*  
\*\*\*\*\*

### GROUND EQUIPMENT REQUIRED

DESCRIPTION	PART NO.
-------------	----------

### GROUND POWER SUPPLIES:

ELECTRICAL/HYDRAULIC	-
MULTIMETER	-
CIRCUIT BREAKER CLIPS	-

Check earth potential at pin T of fixed connector U1044 (36)

-YES-

Check for maladjusted nose up-lock switch operating assembly (14)

-YES-

Adjust assembly (14) as required

NO

Check visor down position switch (9) operating assembly for malfunction.

-NO--

Renew visor down switch (9)

Chart 104

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## MAINTENANCE MANUAL

\*\*\*\*\*  
 \*MAGNETIC INDICATOR (1) FAILS \*  
 \*TO DISPLAY DOWN WHEN VISOR \*  
 \*FULLY LOWERED \*  
 \*\*\*\*\*

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
GROUND POWER SUPPLIES:	
ELECTRICAL/HYDRAULIC	-
MULTIMETER	-
CIRCUIT BREAKER CLIPS	-

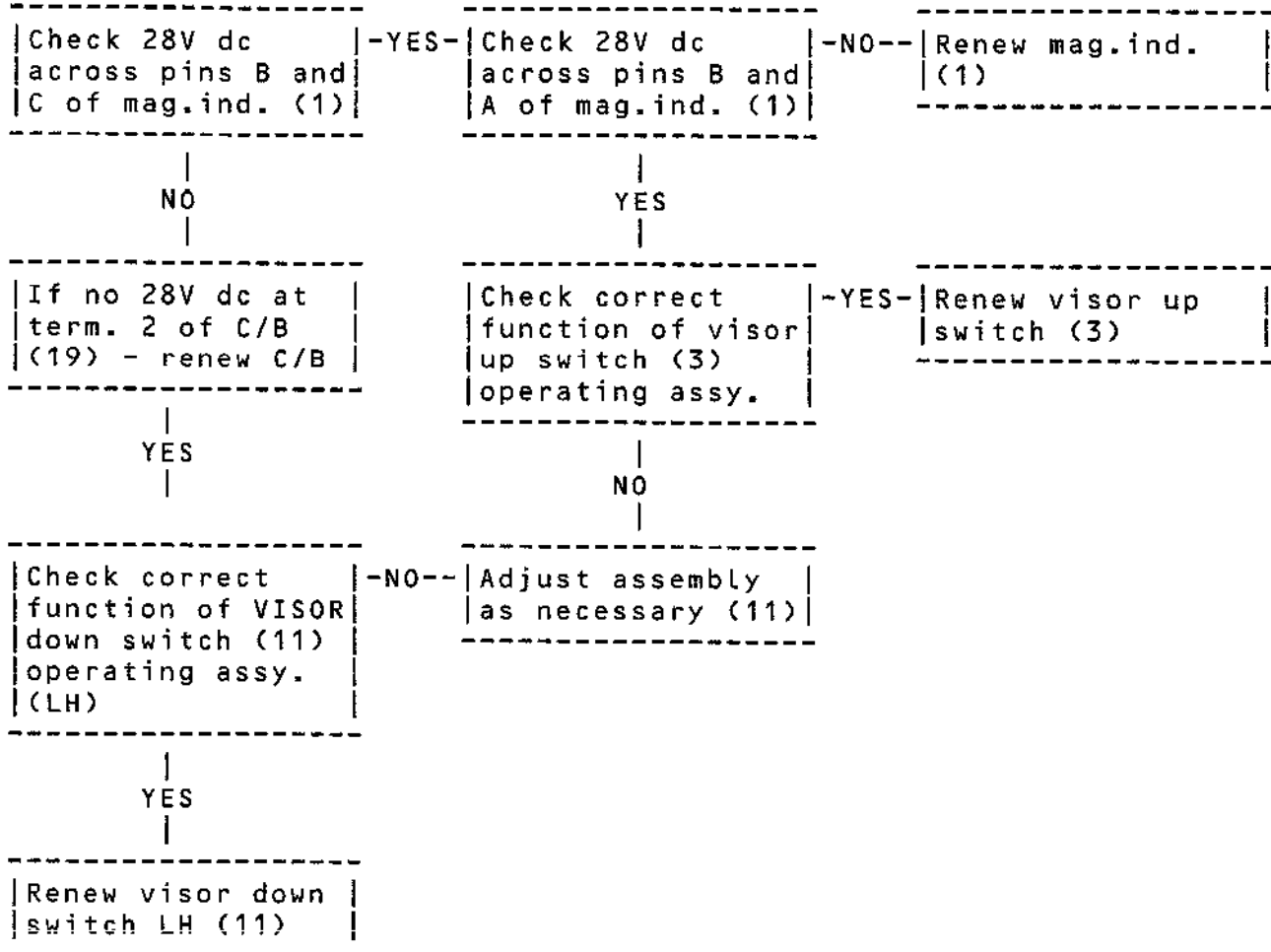


Chart 105

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## MAINTENANCE MANUAL

\*\*\*\*\*  
 \*NOSE FAILS TO LOWER WHEN \*  
 \*NORMAL SELECTOR SWITCH (4) IS\*  
 \*SET TO 5° \*  
 \*\*\*\*\*

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
GROUND POWER SUPPLIES:	
ELECTRICAL/HYDRAULIC	-
MULTIMETER	-
CIRCUIT BREAKER CLIPS	-
NOSE LOCKING PINS-	E925045031

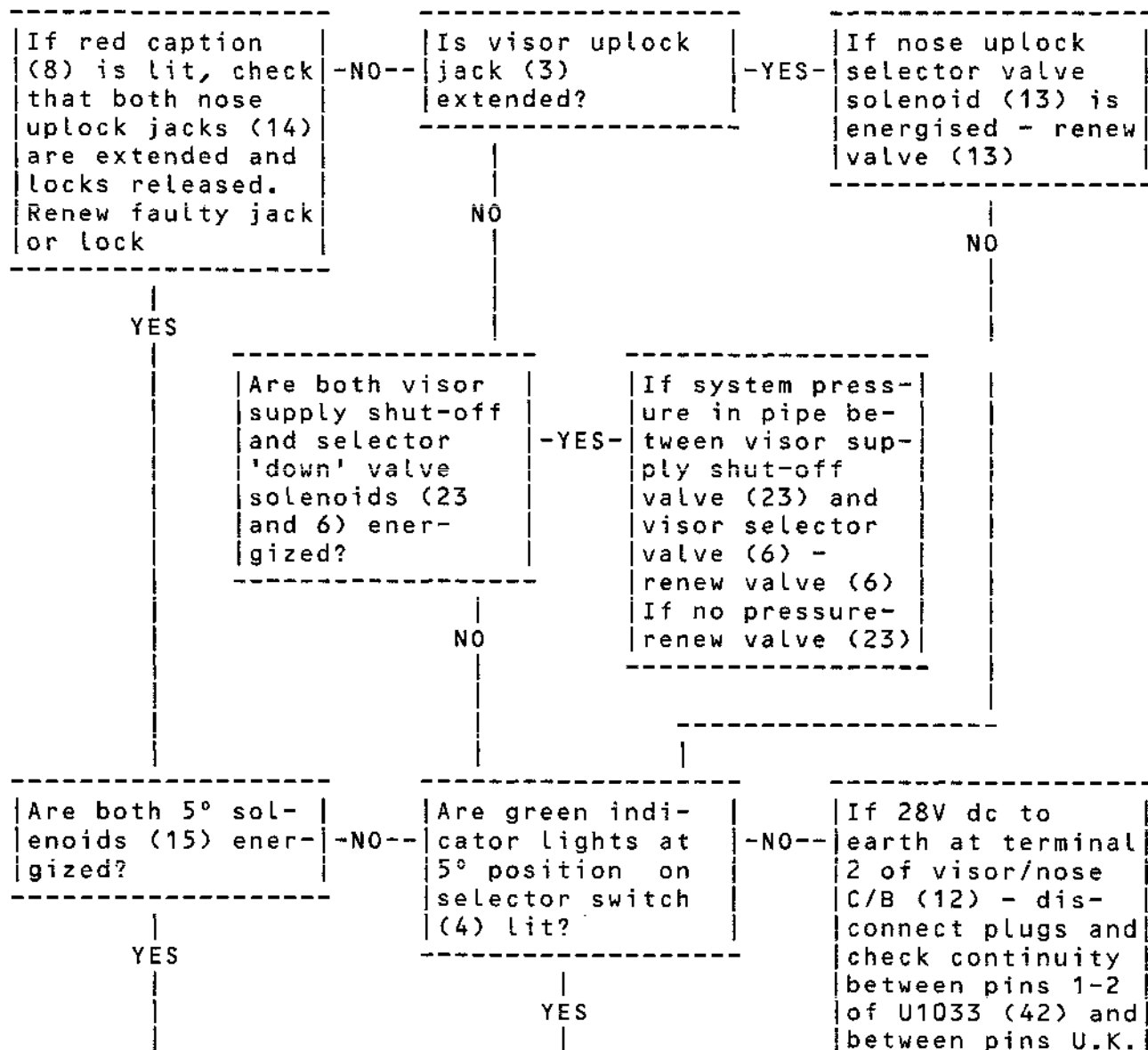


Chart 106 (Sheet 1 of 2)

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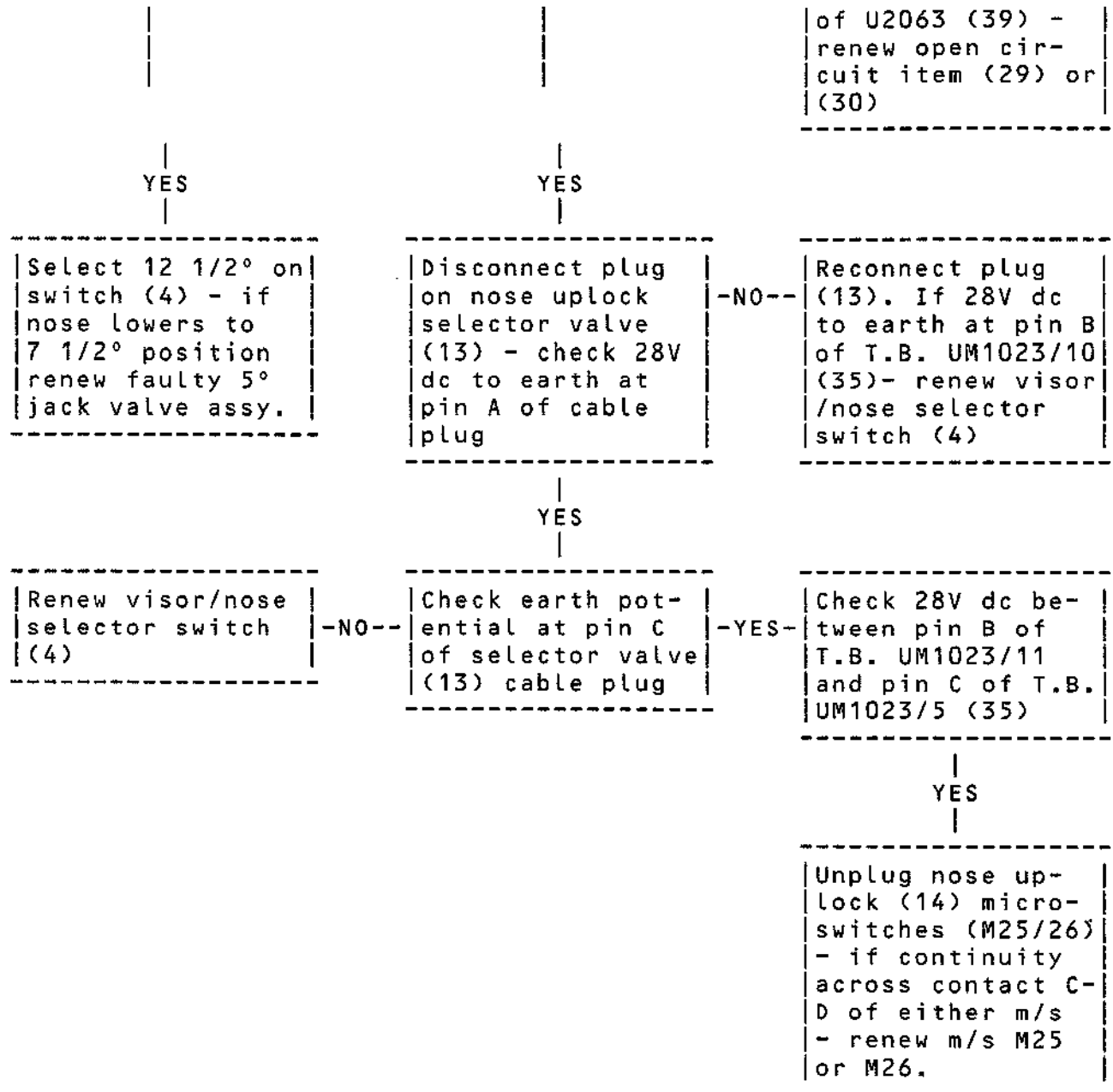


Chart 106 (Sheet 2 of 2)

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\*\*\*\*\*  
 \*RED CAPTION (8) FAILS TO \*  
 \*ILLUMINATE WHEN NOSE IN TRAN-\*  
 \*SIT BETWEEN 0° AND 5° AND 5° \*  
 \*AND 12 1/2° POSITIONS \*  
 \*\*\*\*\*

-----  
GROUND EQUIPMENT REQUIRED

-----  
DESCRIPTION PART NO.

-----  
 | GROUND POWER SUPPLIES:  
 | ELECTRICAL/HYDRAULIC -  
 | MULTIMETER -  
CIRCUIT BREAKER CLIPS -

-----  
 | Operate filament  
 | test to check for  
 | faulty filaments  
(8)

-NO--

-----  
 | Check earth pot-  
 | ential at pin B  
 | of T.B. UM1023/14  
(35)

-NO--

-----  
 | Renew nose posit-  
 | ion transmitter  
unit (17)

|  
 YES  
 |

-----  
 | Renew filaments  
(8)

|  
 YES  
 |

-----  
 | Check earth pot-  
 | ential at pin C  
 | of T.B. UM1023/3  
(35)

-NO--

-----  
 | Renew nose posit-  
 | ion transmitter  
unit (17)

Chart 107

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\*\*\*\*\*  
 \*MAGNETIC INDICATOR (1) FAILS \*  
 \*TO DISPLAY 5° WHEN NOSE AT 5°\*  
 \*\*\*\*\*

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
GROUND POWER SUPPLIES:	
ELECTRICAL/HYDRAULIC	-
MULTIMETER	-
CIRCUIT BREAKER CLIPS	-

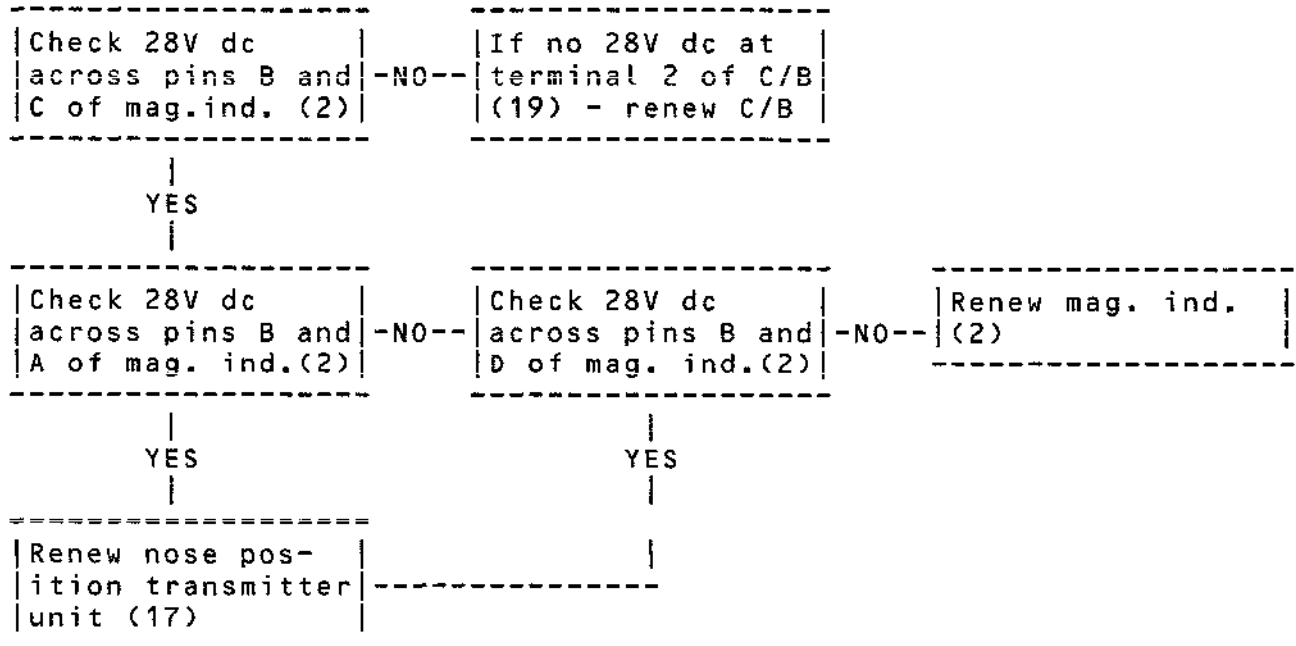


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## MAINTENANCE MANUAL

\*\*\*\*\*  
 \*NOSE FAILS TO LOWER FROM 5° \*  
 \*WHEN NORMAL SELECTOR SWITCH \*  
 \*(4) IS SET TO DOWN \*  
 \*\*\*\*\*

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
GROUND POWER SUPPLIES:	
ELECTRICAL/HYDRAULIC	-
MULTIMETER	-
CIRCUIT BREAKER CLIPS	-
NOSE LOCKING PIN(2)	E925045030

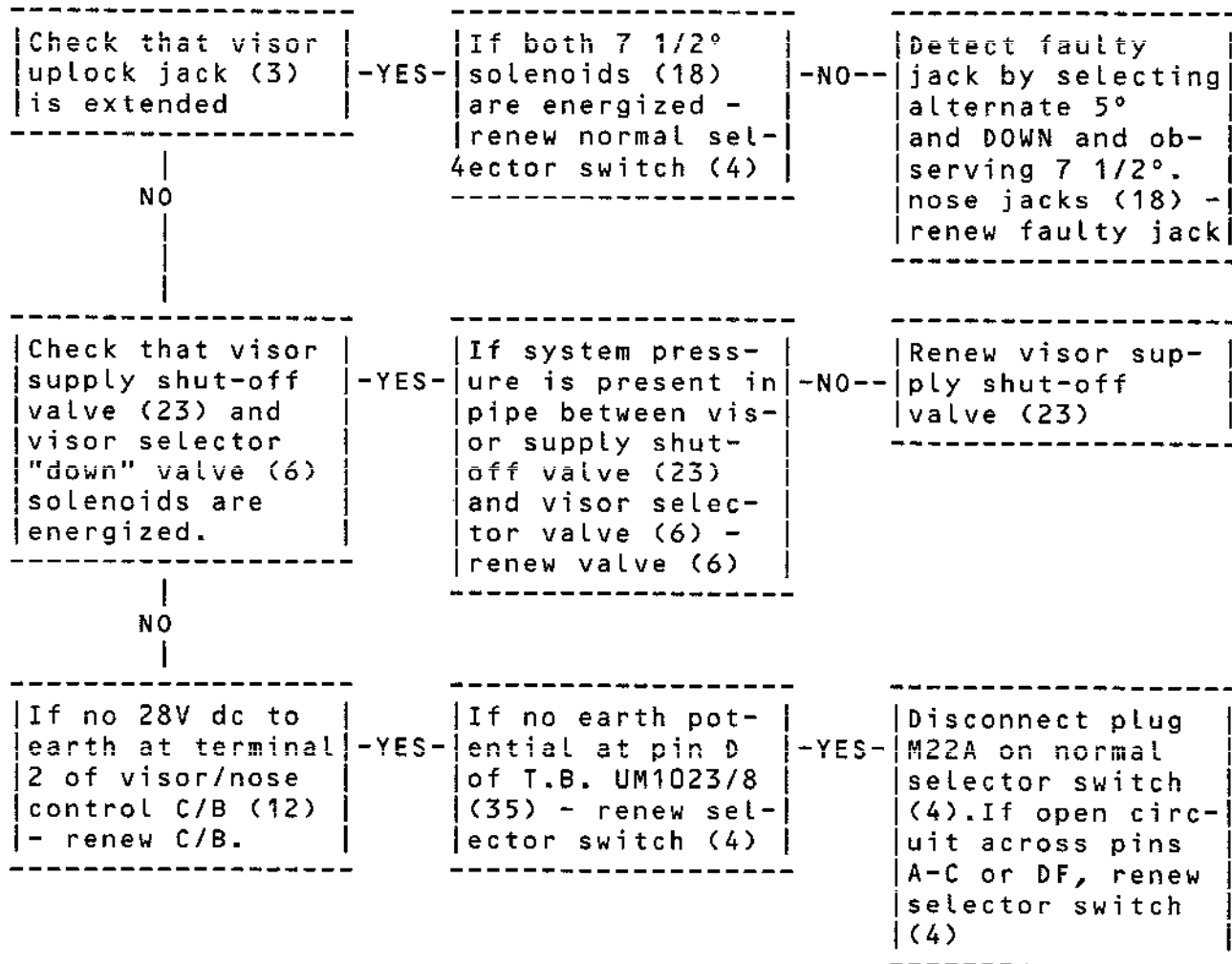


Chart 109

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

\*\*\*\*\*  
 \*MAGNETIC INDICATOR (2) FAILS \*  
 \*TO DISPLAY DOWN WHEN NOSE IN \*  
 \*12 1/2° (DOWN) POSITION \*  
 \*\*\*\*\*

### GROUND EQUIPMENT REQUIRED

DESCRIPTION	PART NO.
-------------	----------

#### GROUND SUPPLIES:

ELECTRICAL/HYDRAULIC	-
MULTIMETER	-
CIRCUIT BREAKER CLIPS	-

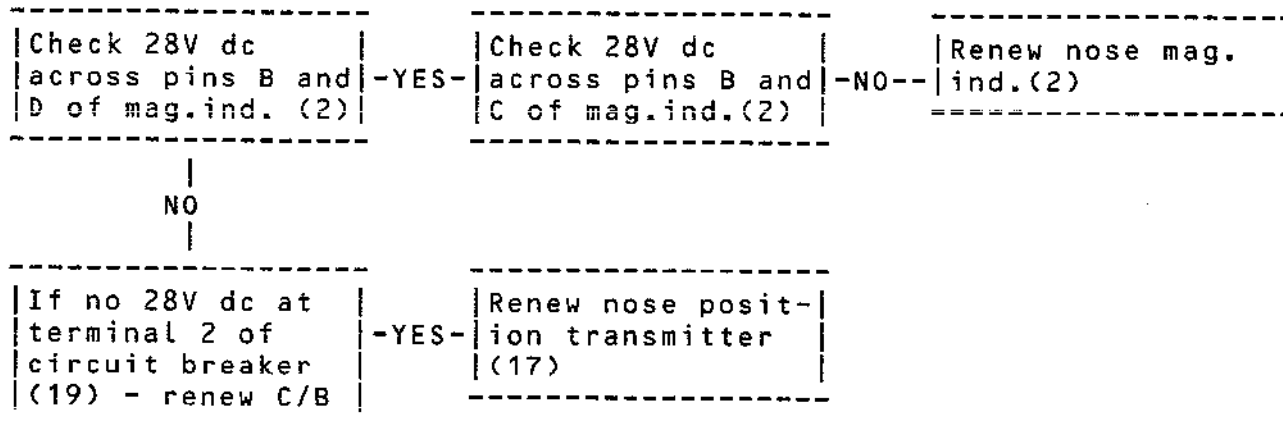


Chart 110

EFFECTIVITY: ALL

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R

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# Concorde

## MAINTENANCE MANUAL

\*\*\*\*\*  
 \*GREEN CAPTION (8) FAILS TO \*  
 \*ILLUMINATE WHEN NOSE FULLY \*  
 \*LOWERED \*  
 \*\*\*\*\*

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
GROUND SUPPLIES:	-
ELECTRICAL/HYDRAULIC	-
MULTIMETER	-
CIRCUIT BREAKER CLIPS	-

Operate filament test to  
 check for faulty caption fil-  
 aments (8)

-YES-

Renew caption filaments (8)

NO

Disconnect plug U1044 (36),  
 check earth potential at pin  
 T on fixed connector

-YES-

Renew nose position transmit-  
 ter unit (17)

NO

(Check for correct functioning  
 of visor down switch (9)  
 operating assembly

-YES-

Renew visor down switch (9)

NO

Adjust or renew switch (9)  
 operating assembly as necess-  
 sary

Chart 111

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

\*\*\*\*\*  
 \*NOSE FAILS TO RAISE FROM \*  
 \*DOWN to 5° POSITION \*  
 \*\*\*\*\*

### GROUND EQUIPMENT REQUIRED

DESCRIPTION	PART NO.
GROUND SUPPLIES:	
ELECTRICAL/HYDRAULIC	-
MULTIMETER	-
CIRCUIT BREAKER CLIPS	-
NOSE LOCKING PIN(2)	E925045031

R  
R  
R

Check that visor  
unlock jack (3)  
is extended

-NO--

Check both visor  
supply shut-off  
valve (23) and  
visor selector  
valve (6) opera-  
ting

-YES-

If system press-  
ure is present in  
pipe between vis-  
or supply shut-  
off valve (23) and  
visor selector  
valve (6) - renew  
valve (6).

YES

NO

NO

If both 7 1/2°  
nose jack select-  
or valve (18)  
solenoids are en-  
ergized - renew  
selector valve/s

If no 28V dc to  
earth at terminal  
2 of visor/nose  
control C/B (12)  
-renew C/B

Renew visor sup-  
ply shut-off  
valve (23)

NO

YES

FOR RH SELECTOR  
VALVE (18):  
check 28V dc to  
earth at pin A of  
7 1/2° selector  
valve solenoid  
(M49)

If no earth pot-  
ential at pin D  
of T.B. UM1023/8  
(35) - renew  
selector switch  
(4)

-YES-

Disconnect plug  
M22A from normal  
selector switch  
(4). If open-cir-  
cuit across pins  
A-C on switch (4)  
-renew switch.  
(Switch at VIS/0°  
for this test)

YES

NO

R

Chart 112 (Sheet 1 of 2)

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# Concorde

## MAINTENANCE MANUAL

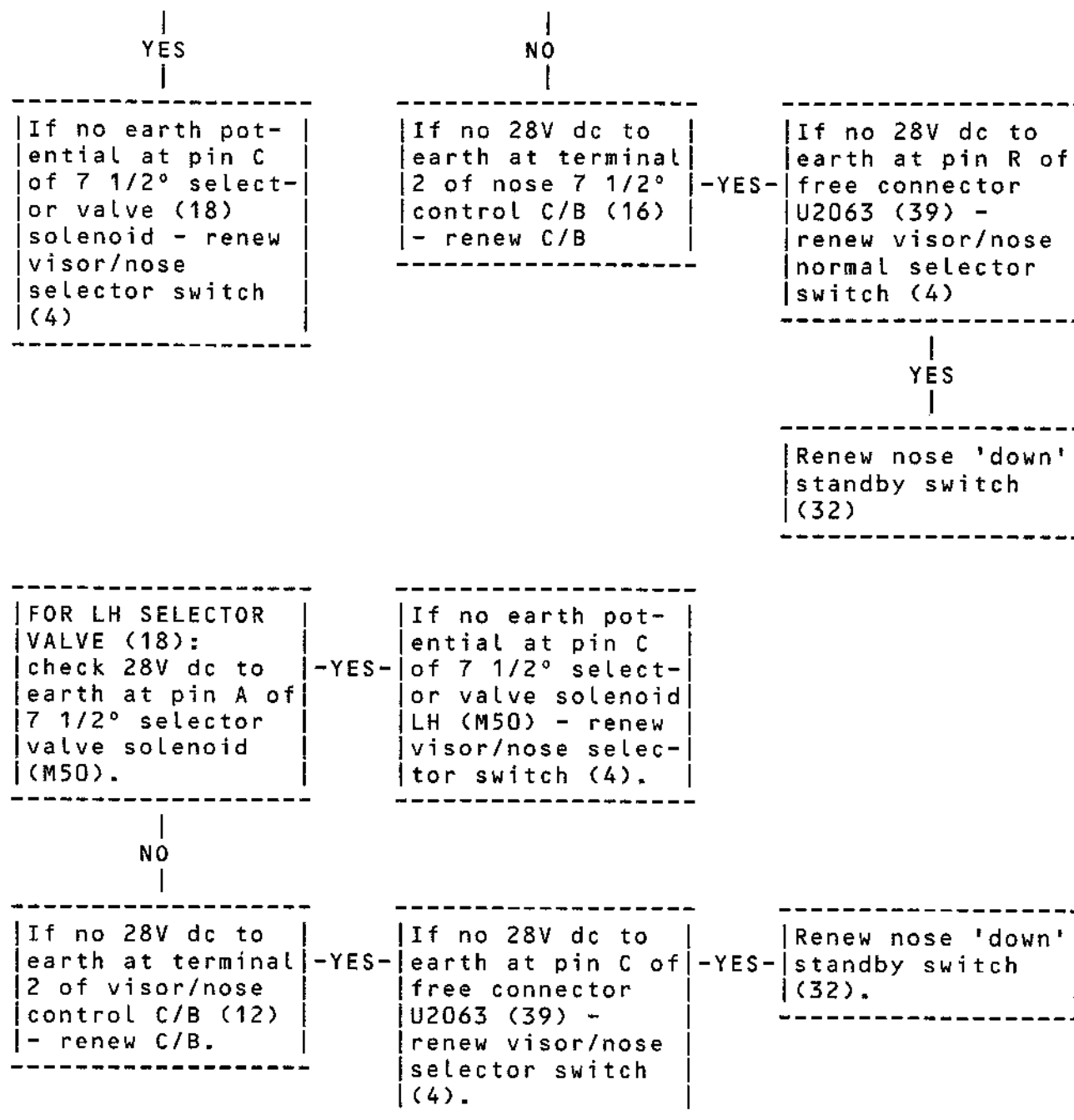


Chart 112 (Sheet 2 of 2)

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

\*\*\*\*\*  
\*RED AND 5°L CAPTIONS (8) FAIL\*  
\*TO EXTINGUISH AFTER NOSE \*  
\*RAISES TO 5° AND ENGAGES \*  
\*COLLET LOCKS (15). \*  
\*\*\*\*\*

### GROUND EQUIPMENT REQUIRED

DESCRIPTION	PART NO.
-------------	----------

### GROUND SUPPLIES:

ELECTRICAL/HYDRAULIC	-
MULTIMETER	-
CIRCUIT BREAKER CLIPS	-

Disconnect wire from pin 4A  
of T.B. UM1023 (35) - check  
wire for earth potential.

-YES-

Reconnect wire to pin 4A.  
Renew RH nose jack assembly.

NO

Reconnect wire to pin 4A.  
Disconnect wire from pin 4B  
of T.B. UM1023 (35) - check  
wire for earth potential.

-YES-

Reconnect wire to pin 4B.  
Renew LH nosejack assembly

Chart 113

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

\*\*\*\*\*  
 \*NOSE FAILS TO RAISE FROM 5° \*  
 \*TO VIS 0° POSITION \*  
 \*\*\*\*\*

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
GROUND SUPPLIES:	
ELECTRICAL/HYDRAULIC	-
MULTIMETER	-
CIRCUIT BREAKER CLIPS	-
NOSE LOCKING PIN(2)	E925045031

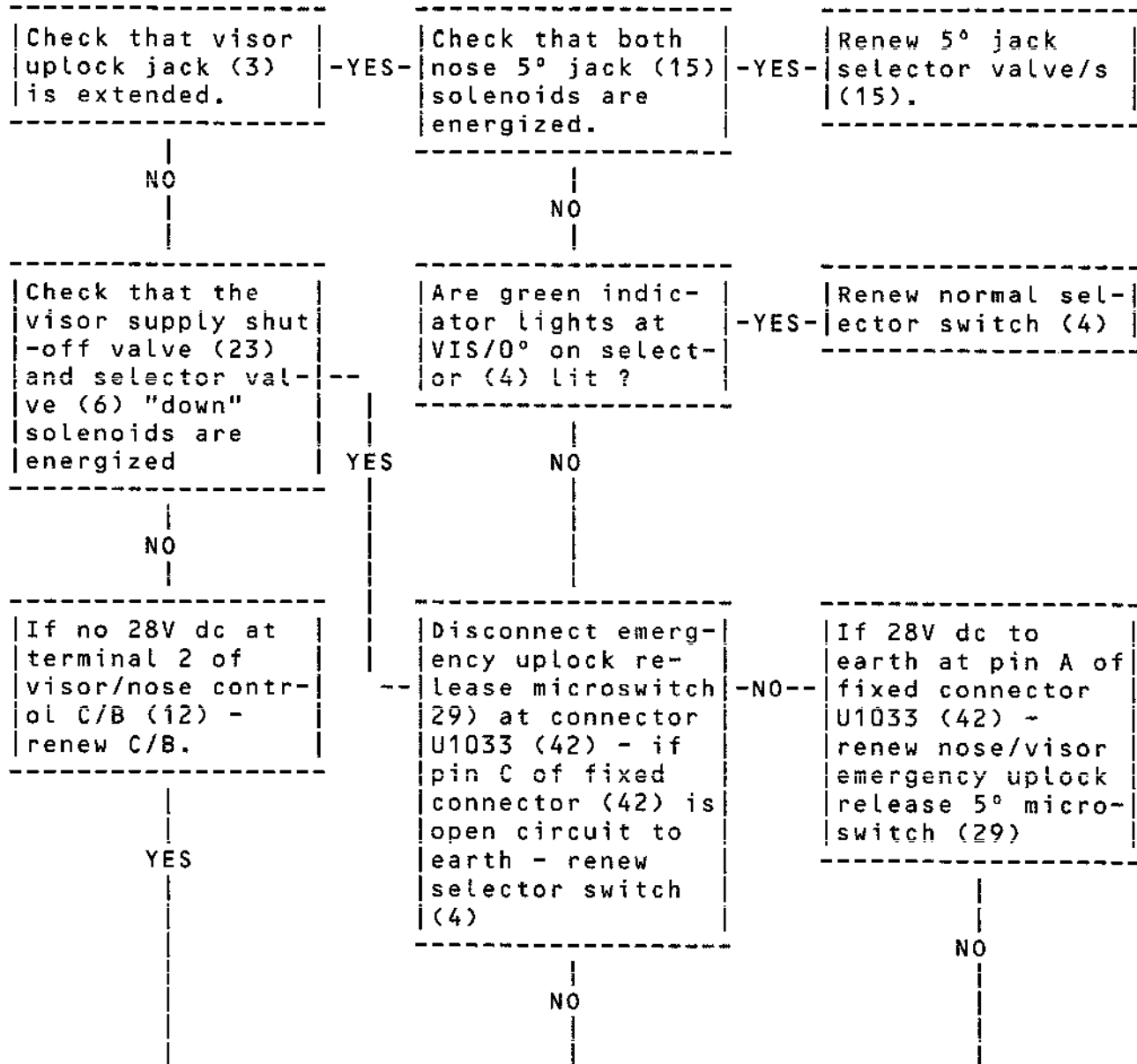


Chart 114 (Sheet 1 of 2)

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# Concorde

## MAINTENANCE MANUAL

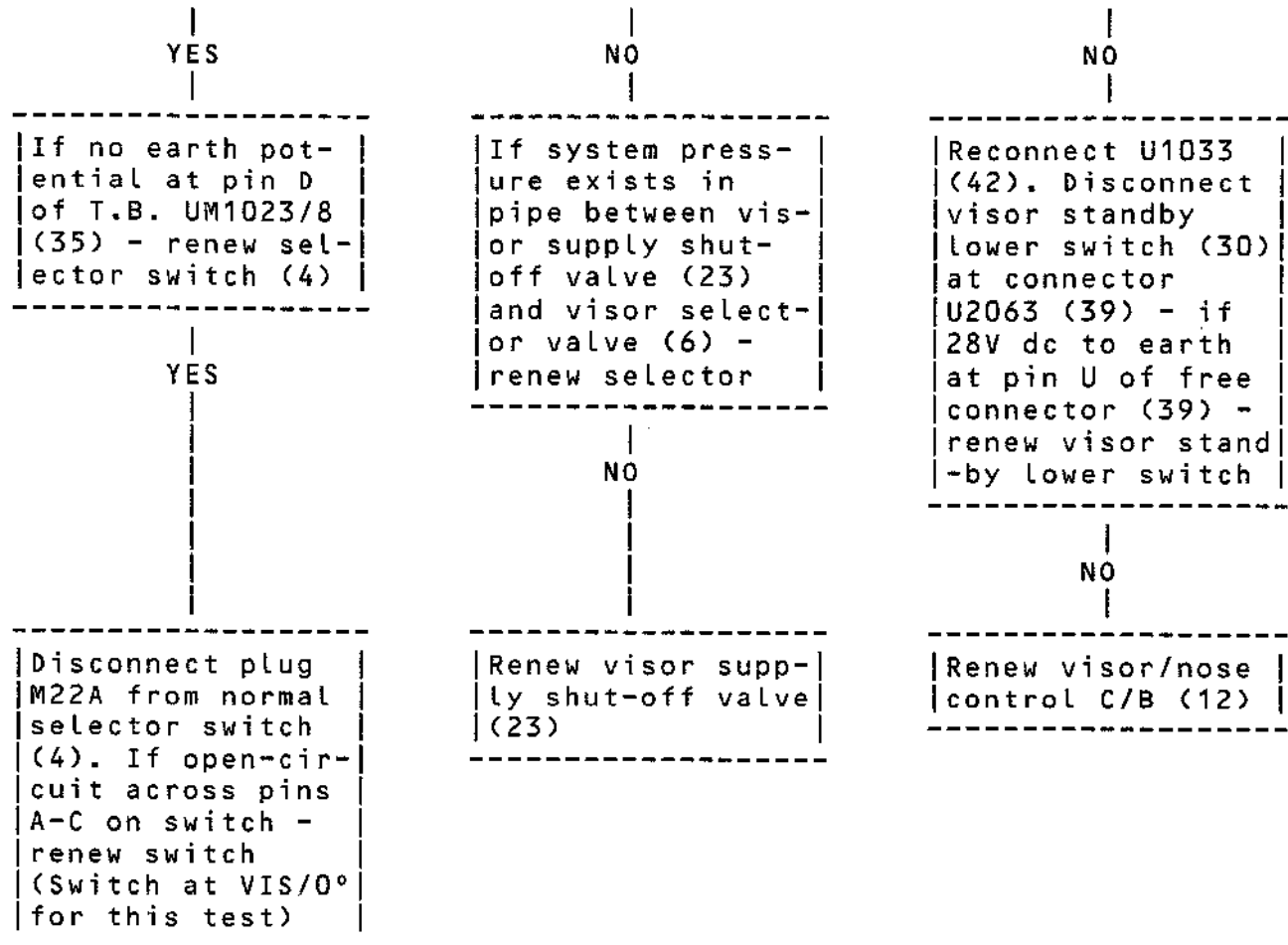


Chart 114 (Sheet 2 of 2)

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

\*\*\*\*\*  
 \*MAGNETIC INDICATOR (2) FAILS \*  
 \*TO DISPLAY UP WHEN NOSE AT \*  
 \*VIS/O° \*  
 \*\*\*\*\*

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
GROUND SUPPLIES:	
ELECTRICAL/HYDRAULIC	-
MULTIMETER	-
CIRCUIT BREAKER CLIPS	-

Check 28V dc across pins B-A of mag. ind. (2)
---

-YES-

Check 28V dc across pins B-C of mag. ind. (2)
---

-NO--

Renew nose mag. ind. (2)
-----------------------------

NO

YES

If no 28V dc at terminal 2 of C/B (19) - renew C/B
--

-YES-

Renew nose posit- ion transmitter unit (17)
---

Chart 115

EFFECTIVITY: ALL

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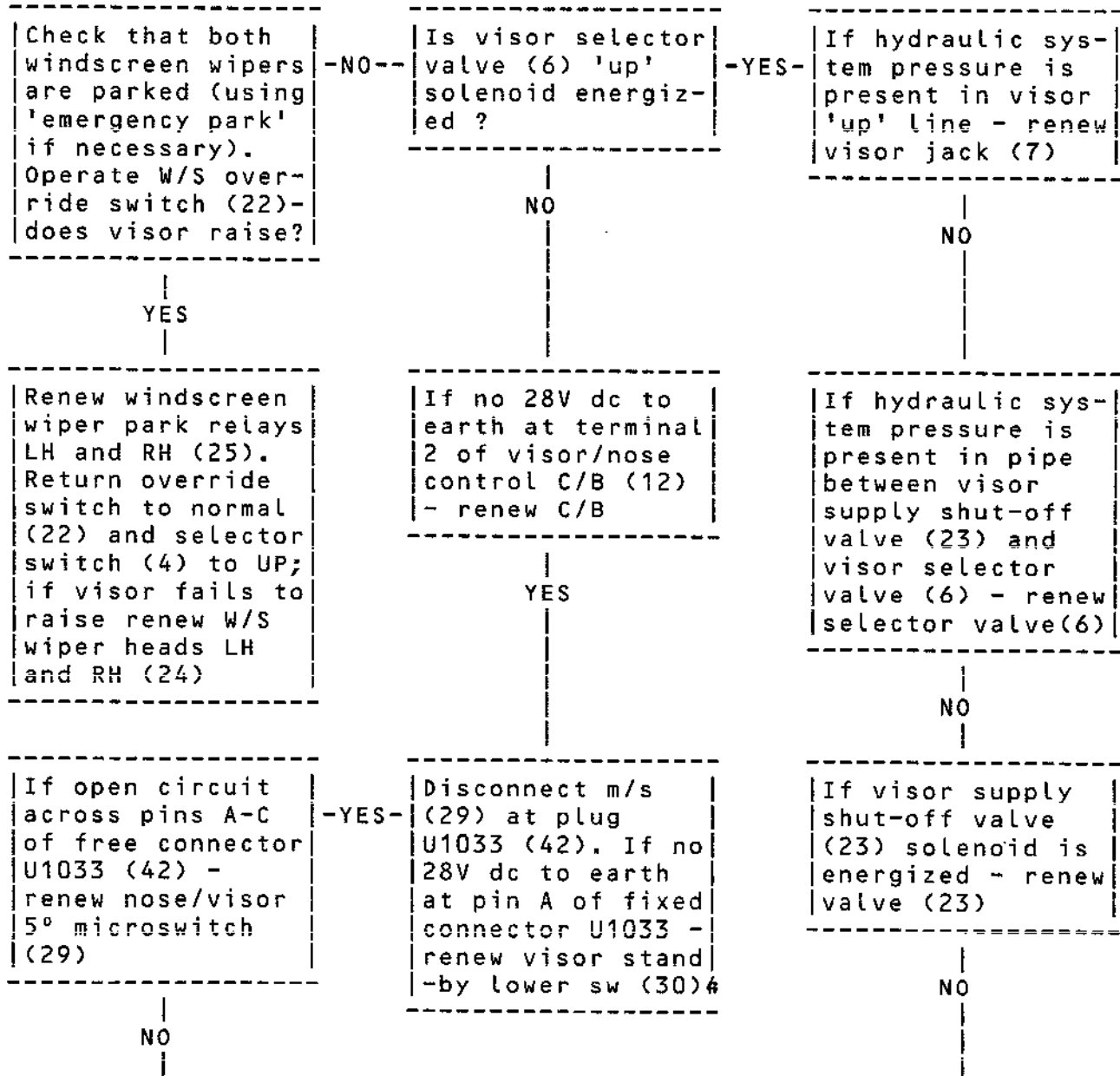
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# Concorde

## MAINTENANCE MANUAL

\*\*\*\*\*  
 \*VISOR FAILS TO RAISE. \*  
 \*\*\*\*\*

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
GROUND SUPPLIES:	
ELECTRICAL/HYDRAULIC	-
MULTIMETER	-
NOSE LOCKING PIN(2)	E925045031



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MAINTENANCE MANUAL

Chart 116 (Sheet 1 of 2)

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

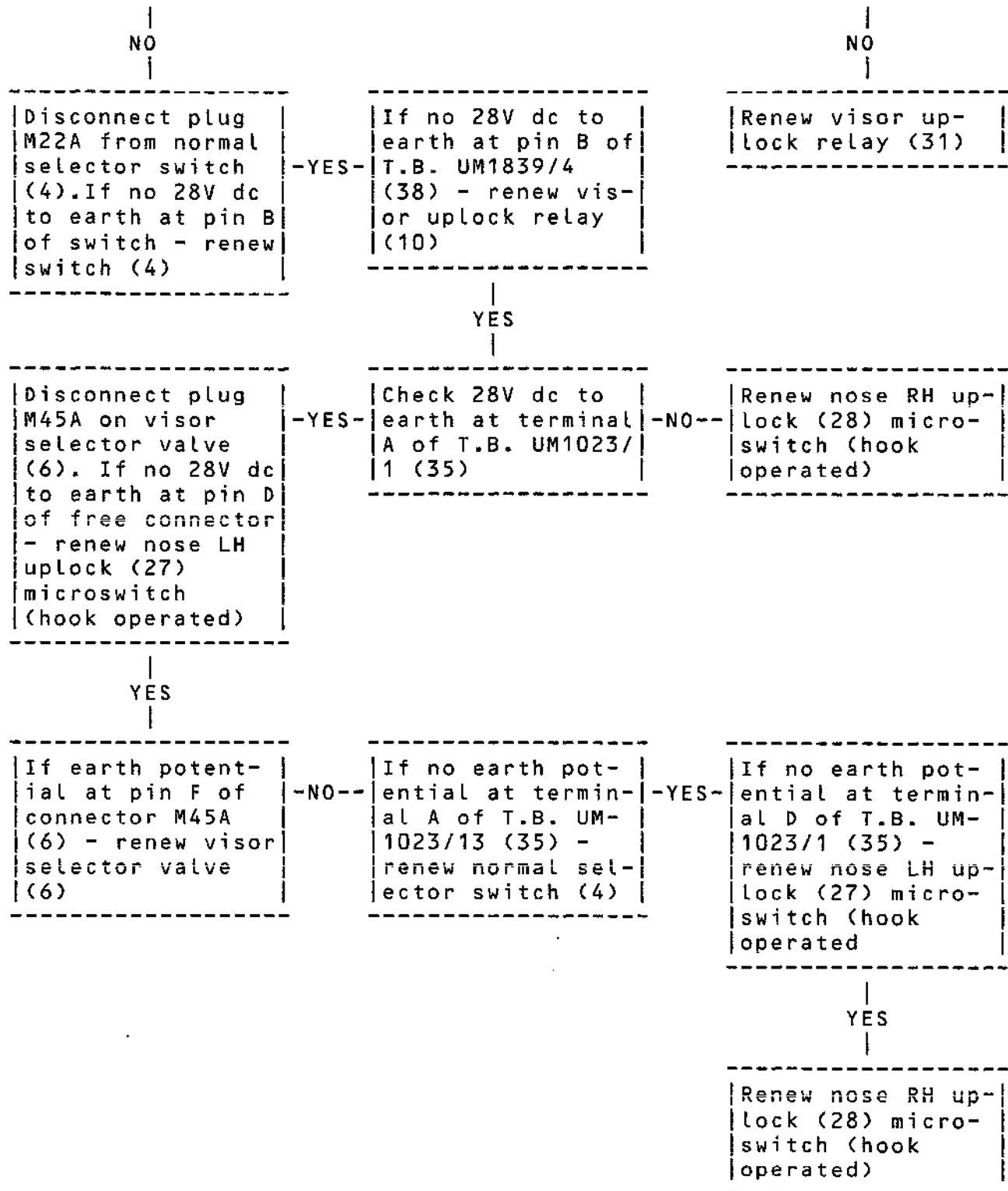


Chart 116 (Sheet 2 of 2)

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

\*\*\*\*\*  
\*RED CAPTION (8) FAILS TO \*  
\*EXTINGUISH WHEN VISOR FULLY \*  
\*UP \*  
\*\*\*\*\*

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
GROUND SUPPLIES:	
ELECTRICAL/HYDRAULIC	-
MULTIMETER	-
CIRCUIT BREAKER CLIPS	-

Check 28V dc to earth at pin C on Test Point UT1837/7 (37)

-NO--

If no 28V dc at terminal 2 of C/B (33) - renew C/B.

YES

Check earth potential at pin D on Test Point UT1837/7 (37)

-NO--

Renew visor uplock relay (10)

YES

Check visor uplock switch (3) striker assembly for correct function (Hook operated)

-NO--

Adjust as necessary

YES

Renew visor uplock switch (3)

Chart 117

EFFECTIVITY: ALL

R

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# Concorde

## MAINTENANCE MANUAL

ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
(1) Visor magnetic indicator	-	2-212	M38	RH Dash Panel	27-61-00	
(2) Nose magnetic indicator	-	2-212	M39	RH Dash Panel	27-61-00	
(3) Visor uplock roller switch	113BB	113/4		Visor	27-61-14	
Hook switch			M37 M32	Visor Visor	27-61-26	
(4) Visor/nose normal selector switch	-	2-212	M22	RH Dash Panel	27-61-53	
(5) Visor/nose standby selector switch	-	9-211	M28	RH Centre Console		
(6) Visor selector valve	113DB/ 121AB	122	M45 -	U/F Equip Bay, RH.	27-62-11	
(7) Visor jack	113AB	114	-	Droop Nose	27-62-13	
(8) Caption module		2-212	M59	RH Dash	27-61-00	
(9) Visor down (RH) micro-switch	113BB	114	M34	Droop Nose	27-61-26 R/I	
(10) Visor uplock relay	-	2-123	M18	U/F Equip Bay, LH		
(11) Visor down (LH) micro-switch	113BB/	113	M60	Droop Nose	27-61-26 R/I	
(12) Circuit breaker, 28V d.c.	-	15-215	M11	F8 (3 CM Racking)	24-50-00 R/I	
(13) Nose uplock normal selector	113DB/ 121AB	121	M48	U/F Equip Bay, LH	27-62-21 R/I	

EFFECTIVITY: ALL

BA

# 27-61-00

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# Concorde

## MAINTENANCE MANUAL

ITEM NO. AND DESCRIPTION	ACCESS PANEL/ PANEL ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
				MAINT. TOPIC	WIRING DIAGRAM
valve					
(14)Nose uplocks,	113/114		Droop Nose	27-61-37	
switch, LH	113	M25	Droop Nose	27-61-26	
switch, RH	114	M26	Droop Nose	27-61-26	
(15)5 deg collet					
locks	113CB	113	Droop Nose		
switch, LH		113	M35	Droop Nose	
switch, RH		114	M36	Droop Nose	
selector valve					
solenoid, LH		113	M46	Droop Nose	
RH		114	M47	Droop Nose	
(16) Circuit	-	1-213	M12	N16, (3 CM	24-50-00
breaker, 28V d.c.				station	R/I
(17) Transmitter	113DB/	121	M58	-	27-61-51
unit	121AB				R/I
(18) Nose 7 1/2	113CB	113/114		Droop Nose	
deg jacks,					
selector valves	RH	114	M49	Droop Nose	
	LH	113	M50	Droop Nose	
(19) Circuit	-	15-215	M15	F9 (3 CM	24-50-00
breaker, 28V d.c.				Racking)	R/I
(20) Normal	113DB/	121	-	U/F Equip	27-62-19
system NRV	121AB			Bay	R/I
(21) Visor	113DB/	121	M51	U/F Equip	27-62-12
standby selec-	121AB			Bay	R/I
tor valve					
(22) Windshield -		2-212	M57	RH Dash	
wipers override				Panel	
switch					
(23) Visor supply		122	M63	U/F Equip	
shut-off valve				Bay. RH	
(24) Windshield					
wiper heads LH		211	1H76)	Flight	
RH		212	2H76)	Compt. Fwd	

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

ITEM NO. AND DESCRIPTION	ACCESS PANEL PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
(25) Windshield wiper relays LH RH		2-123 2-123	M30) M31)	U/F Equip Bays		
(26) Visor UP relay		3-123	M20)			
(27) Nose uplock microswitch (hook operated) LH		113	M23	Droop Nose LH	27-61-26 R/I	
(28) Nose uplock microswitch (hook operated) RH		114	M24	Droop Nose RH	27-61-26 R/I	
(29) Nose/Visor emergency uplock release m/sw.5 deg.		114	M21	Droop Nose	27-61-26 R/I	
(30) Visor stand- by lower switch		9-211-3	M29	Centre Con- sole, RH		
(31) Visor uplock relay		2-123	M19	HYD Relay Box, LH		
(32) Nose down standby switch		9-211-3	M27	Centre Con- sole, RH		
(33) Circuit breaker, 28V d.c.		1-213	M14	Q18(3 CM station)	24-50-00 R/I	
(34) Circuit breaker, 28V d.c.		15-216	M16	D18.(3 CM Racking,RH)	24-50-00 R/I	
(35) Terminal block		122	UM1023	Equip.Bay		
(36) Electrical connector		113	U1044	Droop Nose LH		
(37) Test point		2-123	UT1837)	HYD Relay )Box, LH		
(38) Terminal block		2-123	UM1839)			
(39) Electrical connector		9-211	U2063	Centre console		

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

ITEM NO. AND DESCRIPTION	ACCESS PANEL/ PANEL ZONE	EQUIP. POSITION IDENT.	MANUAL REF.	
			MAINT. TOPIC	WIRING DIAGRAM
(40)Terminal block	10-211	UG2014)Centre )Console )(fwd)		
(41)Terminal block	10-211	UG2021)		
(42)Electrical connector	114	U1033 Droop Nose RH		

Component Identification  
Table 101

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## MAINTENANCE MANUAL

### 4. Fault Isolation Chart Index

TYPE OF FAULT	CHART NO.
INDICATION FAULTS	
Magnetic indicator fails to display UP when visor is in up position	101
Magnetic indicator fails to display DOWN when visor fully lowered	105
Magnetic indicator fails to display 5 deg when nose is at 5 deg	108
Magnetic indicator fails to display DOWN when nose is in 12 1/2 deg (down) position	110
Magnetic indicator fails to display UP when nose is up (VIS 0 deg)	115
Red caption fails to illuminate during visor transit up or down	103
Red caption fails to extinguish when visor fully lowered (Nose at 0 deg)	104
Red caption fails to illuminate when nose is in transit between 0 deg, 5 deg and 12 1/2 deg positions	107
Red caption fails to extinguish when visor is fully up	117
Red and 5 deg L captions fail to extinguish after nose raises to 5 deg and engages collet locks	113
Green caption fails to illuminate when nose fully lowered	111
SYSTEM FAULTS	
Visor fails to lower when normal selector switch is set to VIS 0 deg	102

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

TYPE OF FAULT	CHART NO.
Visor fails to raise	116
Nose fails to lower when normal selector switch is set to 5 deg	106
Nose fails to lower from 5 deg when normal selector switch is set to DOWN	109
Nose fails to raise from down to 5 deg position	112
Nose fails to raise from 5 deg to up (VIS 0 deg) position	114

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

### VISOR AND DROOP NOSE SYSTEM - SERVICING

#### 1. General

There are two zones into which entry is made to carry out work on the visor and droop nose and its associated systems - the nose fairing itself (zone 113) and the forward equipment bay (zone 121). The following gives the precautions and procedure for entering and leaving these zones.

#### 2. Nose Fairing and Forward Equipment Bay - Entry and Close-up

WARNING: DO NOT ENTER THE DROOP NOSE FAIRING UNTIL THE APPROPRIATE GROUND SAFETY LOCKS HAVE BEEN FITTED.

##### A. Equipment and Materials.

DESCRIPTION	PART NO.
Locking pin (2), visor-up	E925045030
Locking pin (2), nose-up	E925045031
Locking sleeves, nose	E925091000
Locking link, visor-'down'	D925468030
Safety clips, circuit breakers	-
Torque spanner, range 0-50lbf in (0-0.55 mdaN)	-

##### B. Entry

NOTE: The configuration of the nose and visor at the time of entry dictates which ground locks are fitted. There is no ground lock for the nose when in the 5 deg position.

- (1) If the nose is at the 5 deg position either raise it (0 deg) or fully lower it (12 1/2 deg).
- (2) Electrically isolate the visor and nose control systems by tripping the associated circuit breakers; fit safety clips.

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## MAINTENANCE MANUAL

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
VISOR & NOSE CONT	15-215	M11	F 8
NOSE 7 1/2° CONT	1-213	M12	Q16
NOSE/VISOR STBY LOWER SUP	1-213	M13	Q17

- (3) Fit the appropriate ground safety locking device (Ref. Fig. 301 ):
- (a) If the visor and nose are raised, fit the visor and nose locking pins.
  - (b) If the nose is lowered: Placard the visor and droop nose controls in the flight compartment warning that they must not be operated, remove panel 113DB and fit the locking sleeves to the nose actuator jacks.
  - (c) If the nose is up and the visor down: Placard the visor and droop nose controls in the flight compartment, warning that they must not be operated, fit the nose-'up' locking pins; remove panel 113BB and fit the visor locking link.
- (4) Remove panels (if not already removed) as necessary to gain access to the required area of the nose interior.
- (5) Illuminate the service lights, if required, as follows:
- (a) Make available ground electrical power (Ref. 24-41-00).
  - (b) Set the GRD LIGHTING CONTROL switch on the oxygen panel in the flight compartment, to "ON".

### C. Close-up.

- (1) Ensure the electrical safety precautions still comply.

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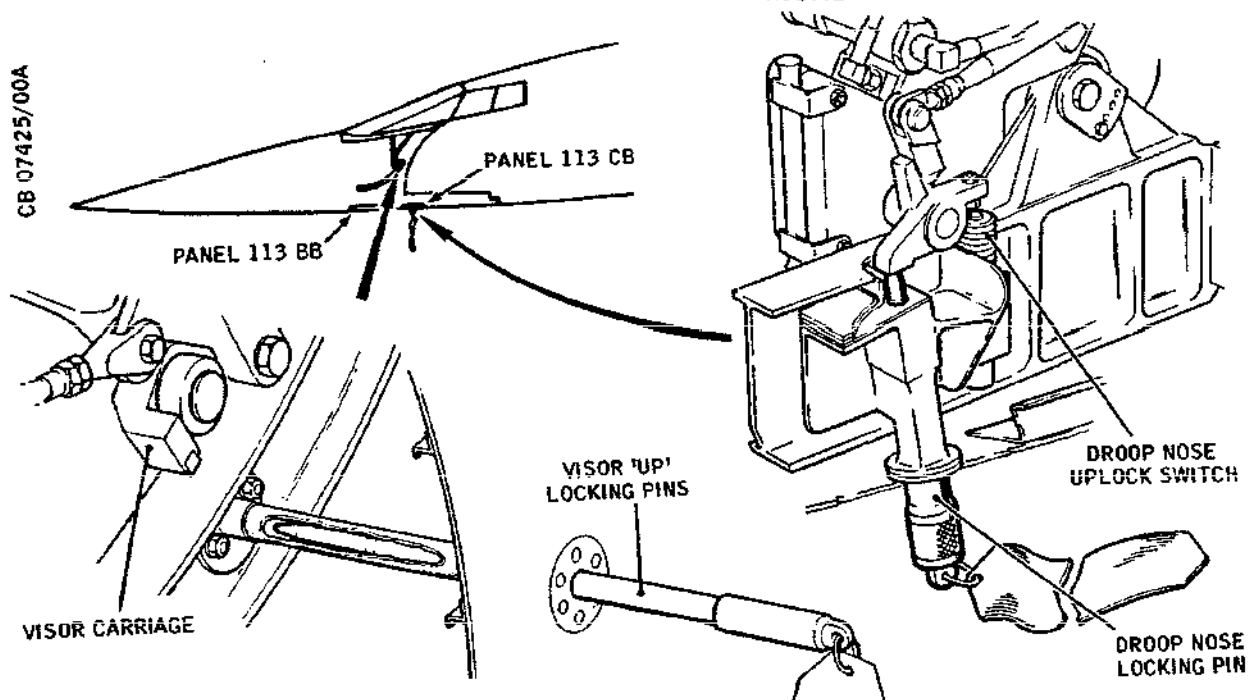
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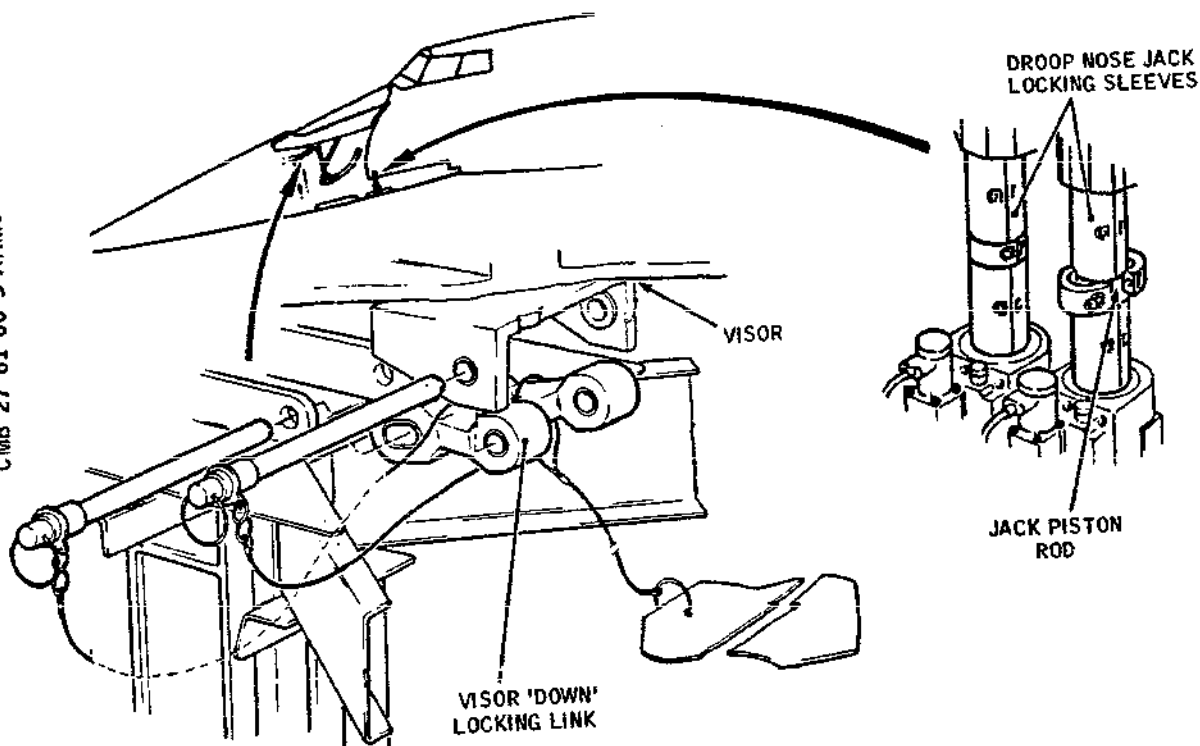
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## MAINTENANCE MANUAL

CB 07425/00A



CMB 27 61 00 3 AAM0



Ground Safety Locks  
Figure 301

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## MAINTENANCE MANUAL

- (2) Check that all tools and ground equipment have been removed from the interior of the nose fairing including the nose jack locking sleeves and the visor locking link, if fitted.
- (3) Refit the access panels and torque tighten their attachment screws to between 40 and 45 lbf in (0.45 and 0.50 mdaN).
- (4) Switch off the servicing lights and disconnect ground electrical power.
- (5) Check that the VISOR/NOSE NORMAL CONTROL selector switch on the co-pilot's (RH) dash panel is set to agree with the configuration of the visor and nose; that the standby lowering switches on the centre console are at "OFF" and the EMERGENCY NOSE/VISOR UPLOCK RELEASE lever on the centre console is stowed in its normal unused position.
- (6) Remove ground safety locking pins.
- (7) Remove the safety clips and reset the circuit breakers previously tripped.
- (8) Remove warning placards, if used, from the pilot's controls.

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# *Concorde*

## MAINTENANCE MANUAL

### VISOR AND DROOP NOSE SYSTEM - REMOVAL/INSTALLATION

WARNING: OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DETAILED IN 24-00-00.

CAUTION: ELECTROLUMINESCENT PANELS ARE FRAGILE. HANDLE THEM WITH CARE.

#### 1. General

R This topic contains general instructions for the removal  
R and installation of minor electrical components, e.g.  
R switches and relays, fitted to panels and equipment racks.  
R Detailed instructions for the removal and installation of  
R major components are given separately under individual  
R subject numbers.

R The panels included in this topic are as follows:  
R RH Dash Panel, Sub-panel (2-212-6)  
R Aft Centre Console, Sub-panel (9-211-3)  
R Forward Underfloor Equipment Bay Racking Panels (2-123  
R and 3-123).

R For some components it is necessary to remove the associated  
R electroluminescent panel (Ref. Chapter 33). The panels are  
R electrically connected by flying leads or terminal connec-  
R tions at the back of the panel.

R Special tools may be required such as thin walled tubular  
R hexagon or peg spanners for switches, cruciform (straight  
R and offset) screwdrivers for magnetic indicators and cable  
R insertion extraction tools for various cable sizes on  
R components fitted with 'pin' type connectors.

R The relays are mounted in boxes on racks in the forward  
R underfloor equipment compartment (zone 123). Sufficient  
R cable is provided to allow each box to be withdrawn from  
R its rack for the removal of individual components without  
R electrically disconnecting the box, thus subsequent test  
R procedures are confined to only the associated circuit.

R Unlocked bolts are to be assembled using Loctite Grade H,  
R together with Locquic 'N' activator, (Ref. 20-25-11).

#### R 2. RH Dash Panel Sub-Panel 2-212-6 Components (Ref. Fig. 401 )

##### A. Equipment and Materials

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## MAINTENANCE MANUAL

---

### DESCRIPTION

### PART NO.

---

Circuit breaker safety clips

-

R

R

B. Prepare to Remove Components.

R

(1) Electrically isolate the sub-panel by tripping the following circuit breakers. Fit circuit breaker safety clips.

---

### SERVICE

### PANEL

### CIRCUIT BREAKER

### MAP REF

---

R

VISOR & NOSE CONT

15-215

M11

F 8

VISOR & NOSE IND

15-215

M15

F 9

PLTS LT TEST SUP

15-215

L1001

E14

RH DASH INST LTS SUP

13-216

L371

E 9

DASH & G/SHIELD PNL LTG SUP

13-215

L85

A11

R

(2) Remove the four bolts securing panel sub-assembly 2-212-6. Electrically disconnect and remove the electroluminescent panel in accordance with 33-16-00. Withdraw the sub-panel from the dash panel as far as the loom cables will permit.

R

R

R

R

R

C. Remove 3-Caption Indicator Unit (Electrical code M59)

R

(1) Using a suitable extraction tool, disconnect the eight electrical cables from the rear of the unit.

R

(2) Remove the attachment screws and remove the unit from the front of the dash panel.

R

D. Install 3-Caption Indicator Unit (Electrical code M59)

(1) Comply with the electrical safety precautions and use care in handling electroluminescent panels.

EFFECTIVITY: ALL

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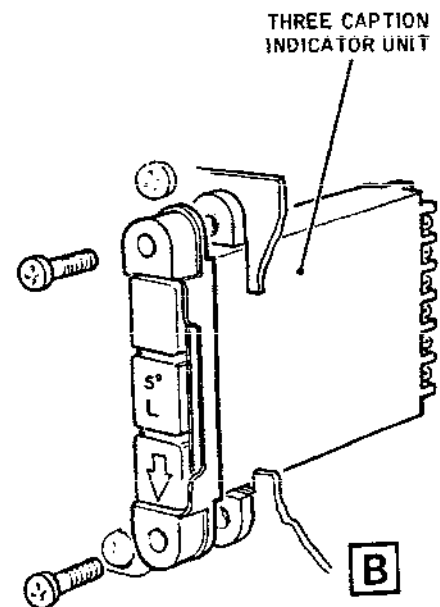
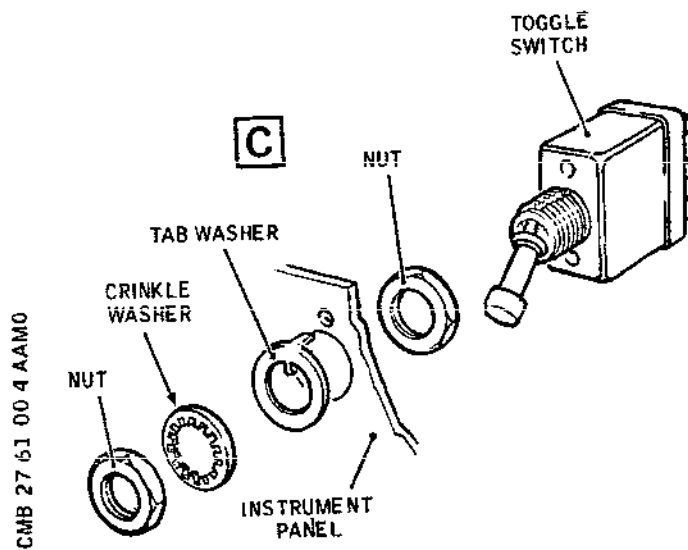
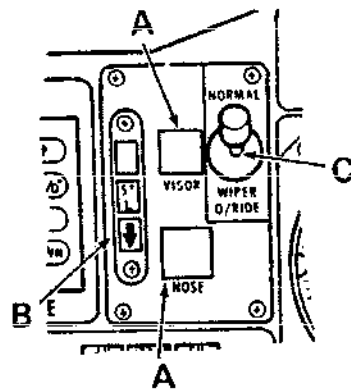
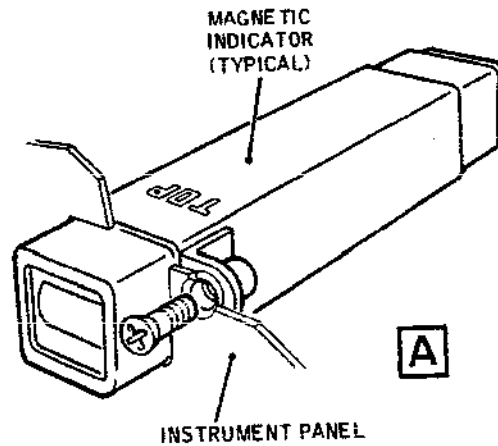
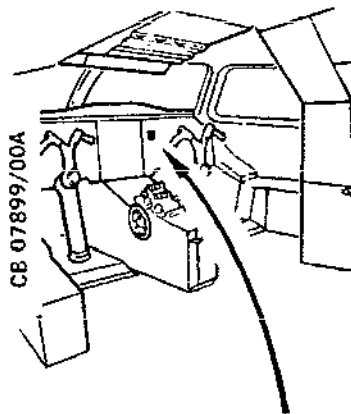
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# Concorde

## MAINTENANCE MANUAL



Sub-panel 2-212-6, Components - Installation  
Figure 401

R

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## MAINTENANCE MANUAL

- (2) If the unit is new, fit filler plugs in the four sockets which have no electrical cables inserted in them as indicated in the wiring diagram manual.
- (3) Attach the unit to the dash panel and secure it with two screws, ensuring that the hinge line of the caption screens corresponds with the white line on the rear face of the dash panel.
- R (4) Using a suitable insertion tool, insert the eight electric cables in the sockets in the rear of the unit ensuring that the connections are made in accordance with the cable identification and the applicable wiring diagram.

### E. Remove Visor Magnetic Indicator (Electrical code M38)

- R (1) Remove two attachment screws and withdraw the indicator from the back of the sub-panel.
- R (2) Using a suitable extraction tool, remove the five electrical cables from the rear of the indicator.

### F. Install Visor Magnetic Indicator (Electrical code M38)

- R (1) Comply with the electrical safety precautions.
- R (2) Using a suitable insertion tool, insert the five electrical cables in the sockets in the rear of the indicator ensuring that the connections are made in accordance with the cable identification and the applicable wiring diagram.
- R (3) Attach the indicator to the back of the sub-panel with two screws, ensuring that the word TOP on the indicator corresponds with the white line on the back of the sub-panel.

### G. Remove Nose Magnetic Indicator (Electrical code M39)

- R (1) Remove four attachment screws and withdraw the indicator from the back of the sub-panel.
- R (2) Using a suitable extractor tool, remove the six electrical cables from the rear of the indicator. Withdraw the indicator.

### H. Install Nose Magnetic Indicator (Electrical code M39)

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## MAINTENANCE MANUAL

- (1) Comply with the electrical safety precautions.
- (2) Using a suitable insertion tool, insert the six electrical cables in the indicator, cutting the cables to suitable length if necessary, fitting contacts and ensuring that the connections are made in accordance with the cable identification and the applicable wiring diagram.
- (3) Attach the indicator to the back of the sub-panel with four screws, ensuring that the word TOP in the indicator corresponds with the white line on the rear face of the front plate of the dash panel.

J. Remove Windshield Wiper Override Switch (Electrical Code M57).

- (1) Disconnect the electrical cables from the switch terminals using a suitable extraction tool.
- (2) Remove the nut, lock washer and locating tab washer and remove the switch from the back of the panel.

K. Install Windshield Wiper Override Switch (Electrical Code M57).

- (1) Comply with the electrical safety precautions.
- (2) Insert the switch from the rear of the panel and secure it with the locating tab washer, washer and nut.

NOTE: Switches are supplied with two nuts; if a new switch is being fitted discard the second nut.

- (3) Connect the electrical cables to the terminal sockets using a suitable insertion tool and ensuring that the connections are made in accordance with the cable identifications and the applicable wiring diagram.

L. Conclude Installation

- (1) Comply with the electrical safety precautions.
- (2) Refit the sub-panel together with its electro-luminescent panel to the dash panel with four bolts and electrically connecting and testing the luminescent panel in accordance with the instructions in 33-16-00.

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## MAINTENANCE MANUAL

R (3) Cancel the electrical safety precautions and  
R function test the visor and droop nose system  
R (Ref. 27-61-00, Adjustment/Test).

R 3. Aft Centre Console, Sub-panel 9-211-3, Components  
R (Ref. Fig. 403 )

R A. Equipment and Materials

R

DESCRIPTION	PART NO.
-------------	----------

R

Circuit breaker safety clips	-
------------------------------	---

Screwdriver torque limiting range:	-
0-79 lbf in. (0-0.89 mdaN).	-

Corrosion resistant steel wire	-
0.028 in. (0.71 mm) dia.	-

Locking pin (droop nose)	E925045031
--------------------------	------------

Loctite grade H (Ref.	-
20-30-00, No. 113).	-

Locquic N activator to DTD	-
900/4588 (Ref. 20-30-00, No.120)	-

R B. Prepare to Remove Components.

R (1) Electrically isolate the sub-panel by tripping the  
R associated circuit breakers, fit safety clips.

R

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
---------	-------	--------------------	------------

R

NOSE/VISOR STBY LOWER SUP	1-213	M13	Q17
LH RAIN REPEL CONT	15-215	1H63	A11
RH RAIN REPEL CONT	15-216	2H63	A16
LH W/SCREEN WIPER SUP	2-213	1H71	E23
RH W/SCREEN WIPER SUP	14-216	2H71	D15
LH W/SCREEN WIPER CONT	1-213	1H72	J 8
RH W/SCREEN WIPER CONT	15-216	2H72	A15
CTR CONSOLE PNL LTG SUP	13-215	L82	B12
VISOR & NOSE CONT	15-215	M11	F 8
NOSE 7 1/2 deg CONT	1-213	M12	Q16

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# Concorde

## MAINTENANCE MANUAL

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
CHART STOWAGE LTS SUP	15-216	L237	D12
ENG. 1			
MAIN THROT CONT.	3-213	1K3	A 1
ALT. THROT CONT.	15-216	1K4	E 8
REV THRUST CONT.	3-213	1K331	D 1
REV THRUST ASOV CONT.	3-213	1K334	G 3
REHEAT CONT.	15-216	1K1542	E 9
PP MTG LTS SUP.	5-213	1E461	D 1
ENG. 2			
MAIN THROT CONT.	1-213	2K3	A 3
ALT THROT CONT.	15-215	2K4	F15
REV THRUST CONT.	1-213	2K331	B 5
REV THRUST ASOV CONT.	1-213	2K334	D 7
REHEAT CONT.	15-215	2K1542	D15
PP MTG LTS SUP.	1-213	2E461	E 3
ENG. 3			
MAIN THROT CONT.	1-213	3K3	A 4
ALT THROT CONT.	15-215	3K4	F16
REV THRUST CONT.	1-213	3K331	B 6
REV THRUST ASOV CONT.	1-213	3K334	D 8
REHEAT CONT.	15-215	3K1542	D16
PP MTG LTS SUP	1-213	3E461	E 4
ENG. 4			
MAIN THROT CONT.	3-213	4K3	A 2
ALT THROT CONT.	15-216	4K4	F 9
REV THRUST CONT.	3-213	4K331	D 2
REV THRUST ASOV CONT.	3-213	4K334	G 4
REHEAT CONT.	15-216	4K1542	E10
PP MTG LTS SUP.	5-213	4E461	D 2

NOTE: To improve access to the centre console it may be necessary to remove the co-pilots' seat (Ref. 25-11-21, Removal/Installation).

(2) Remove the centre console aft left-hand side panel:

(a) Release the screws securing the panel.

(b) Disconnect the electrical plug for the pilots' floor illumination at the receptacle identified

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U2026 on the panel.

(c) Remove the panel.

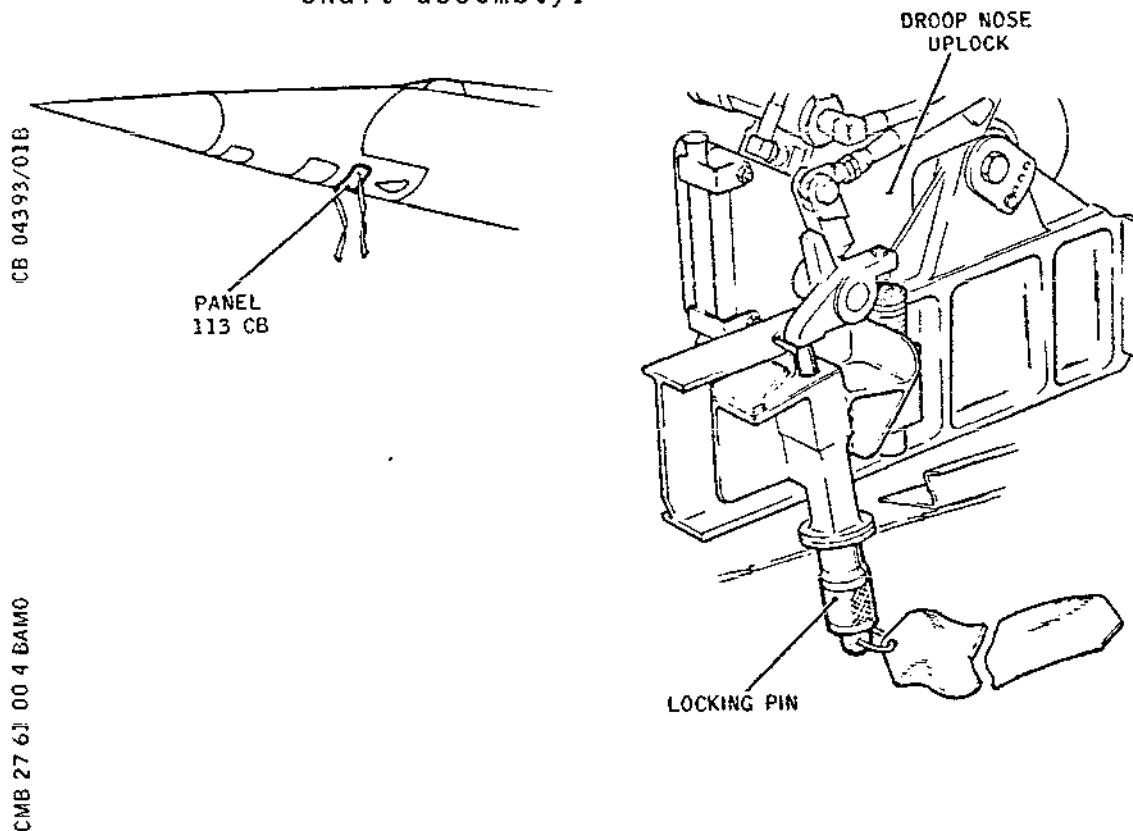
(3) Remove the droop nose emergency lever.

**NOTE:** This can be done with the nose either up or down.

(a) If the nose is up, fit locking pins (2) to the droop nose uplocks (Ref. Fig. 402 ).

(b) Using the ring pull the handle outwards at the aft end of the droop nose emergency lever.

(c) Reach through the centre console from the left-hand side and depress the spring-loaded pin on the cross shaft of the droop nose emergency lever; remove the lever and cross shaft assembly.



Droop nose Locking Pins.  
Figure 402

(4) Remove the centre console aft right-hand side panel

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## MAINTENANCE MANUAL

R in a manner similar to that described for the  
R left-hand; the electrical plug identification is  
R U2025.

R (5) Remove the protective cover from beneath sub-panel  
R 9-211-3 (Ref. Fig. 403 ):

R (a) Disconnect the baulk override lever by removing  
R the bolt assembly.

R (b) Remove the three screws securing the cover to  
R the underside of the panel and lower the cover.

R (c) Disconnect the electrical plug from the cover  
R and remove the cover.

R C. Remove Toggle Switches (Electrical code M27,M28,M29)

R (1) Remove the nose and visor standby switch plate and  
R guard by removing the nuts and bolts securing the  
R switch plate forward and aft brackets.

R (2) Using a suitable extraction tool, disconnect the  
R electrical cables from the switch sockets.

R (3) Remove the nut, washer and locating tab washer and  
R withdraw the switch from the rear of the panel.

R D. Install Toggle Switch (Electrical code M27,M28,M29).

R (1) Comply with the electrical safety precautions.

R (2) Insert the switch from the rear of the panel and  
R secure it with the locating tab washer, washer and  
R nut.

R NOTE: Switches are supplied with two nuts; if a  
R new switch is being fitted discard the second  
R nut.

R (3) Connect the electrical cables to the terminal sockets  
R using a suitable insertion tool, and ensuring that  
R the connections are made in accordance with the  
R cable identifications and the applicable wiring  
R diagram.

R (4) Fit the nose and visor standby switch plate and  
R guard assembly to the sub-panel, securing the top  
R and bottom brackets with the bolts and nuts. Ensure  
R that the switch dollys are correctly positioned to  
R engage the switch plate.

EFFECTIVITY: ALL

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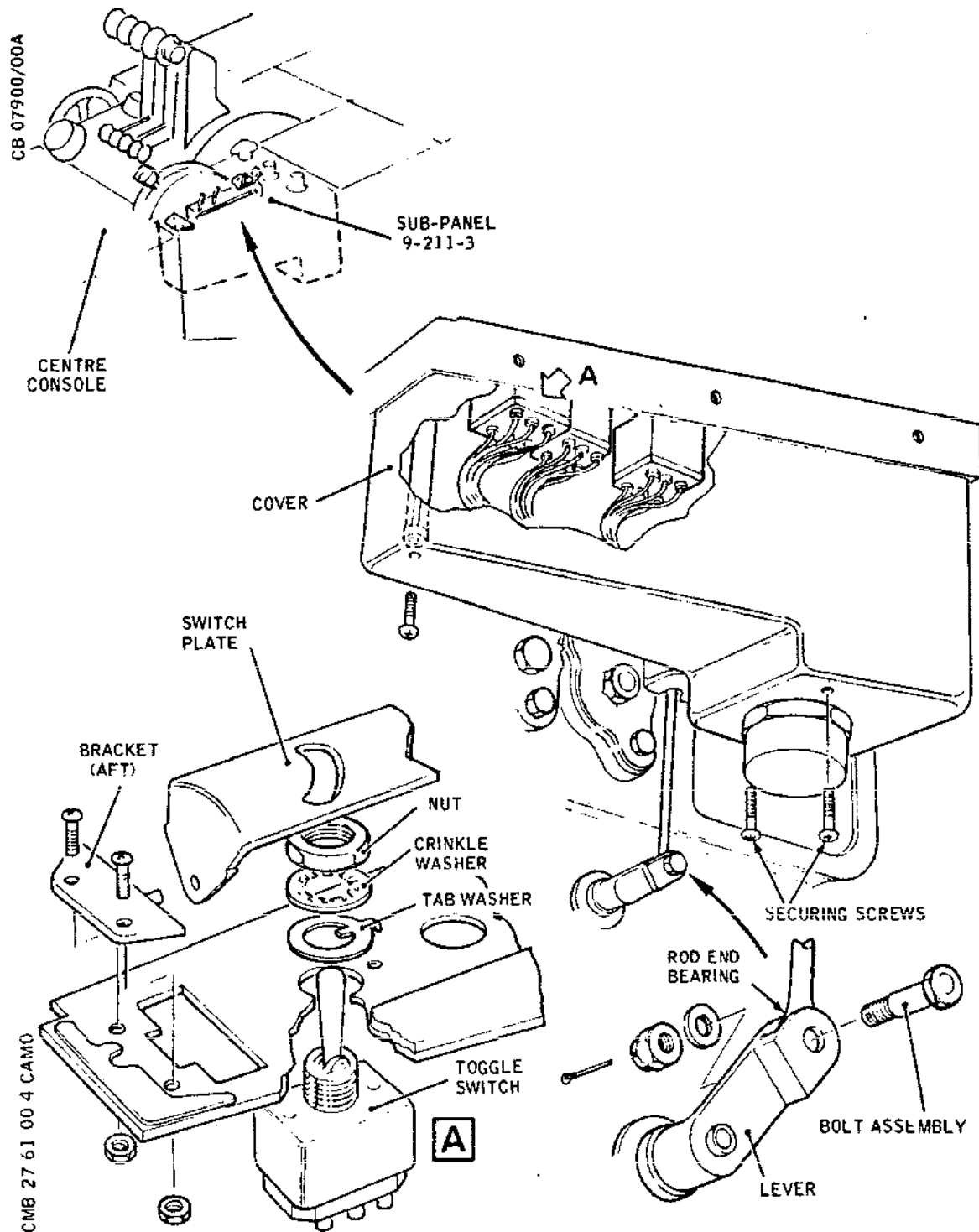
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# Concorde

## MAINTENANCE MANUAL



Centre Console, Sub-panel 9-211-3, Toggle  
Toggle Switch Installation  
Figure 403

R

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## MAINTENANCE MANUAL

### E. Conclude Installation

- (1) Refit the protective cover beneath sub-panel 9-211-3 (Ref. Fig. 403 ):
  - (a) Connect the electrical plug to the cover.
  - (b) Fit the cover to the underside of the panel and secure it with the three screws. Lock the screws with Loctite (Ref. 20-25-11).
  - (c) Connect the baulk override lever using the bolt assembly, and carry out the setting-up procedure given in 76-11-24.
- (2) Replace the centre console aft right-hand side panel:
  - (a) Check the panel seals for damage and security.
  - (b) Loosely engage the panel.
  - (c) Connect the pilots' floor illuminations at the receptacle identified U2025 on the panel.
  - (d) Torque tighten the panel screws to between 40 and 45 lbf in (0.44 and 0.51 mdaN).
- (3) Fit the droop nose emergency release on the right-hand side of the centre console, reaching through from the left-hand side of the console depress the spring loaded quick release pin on cross-shaft and push lever pivot from right-hand side until it bottoms. Release pressure from pin and check that there is no sideways movement of cross shaft i.e. it is locked.
- (4) Secure the centre console aft left-hand side panel in a manner similar to that described for the right-hand panel; the electrical plug is identified U2026.
- (5) If necessary, replace the co-pilots' seat (Ref.25-12-21, Removal/Installation).
- (6) Remove the locking pins (2) from the droop nose.
- (7) Remove the safety clips and reset the circuit breakers previously tripped.
- (8) Carry out operational tests on the services from sub-panel 3:
  - (a) Visor and droop nose standby system (Ref.27-61-00).
  - (b) Windscreen wipers (Ref. 30-42-00).

RB  
RB  
RB  
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## MAINTENANCE MANUAL

(c) Rain repellant systems (Ref. 30-42-00).

### 4. Underfloor Rack Panel (2-123,3-123) Components.

#### A. Prepare to Remove Components.

- (1) Isolate the electrical generation and external power in accordance with 24-00-00, Servicing.
- (2) Open access panel 123 AB (Ref. 52-41-11) to gain access in the forward underfloor service compartment to panel 2-123 or 3-123.
- (3) Release the hold-down fasteners securing the panel box. Withdraw the box sufficiently for access to the quick-release cable clamps on top of the box and release the cables from the clamps.
- (4) Withdraw the box from the rack and place it on a suitable support.

#### B. Remove Relay (Electrical code M18,M19,M20,M30,M31,M64). (Ref. Fig. 404 )

- (1) Remove the nuts and washers or the spring clamp, as applicable, that secures the relay to its socket base and withdraw the relay from the socket.

#### C. Install Relay (Electrical Code M18,M19,M20,M30,M31,M64)

- (1) Comply with the electrical safety precautions.
- (2) Check that the relay pins are clean and undamaged.
- (3) Plug the relay into its socket and secure it with the nuts and washers or the spring clamp, as applicable.

NOTE: A location pin on the relay ensures correct fitment to the socket.

#### D. Conclude Installation

- (1) Place the panel box on the rack support rails and secure the cables in the quick release clamps.
- (2) Slide the box into place and secure it with the hold-down fasteners.
- (3) Check that the panel box is bonded in accordance with 20-27-11.

EFFECTIVITY: ALL

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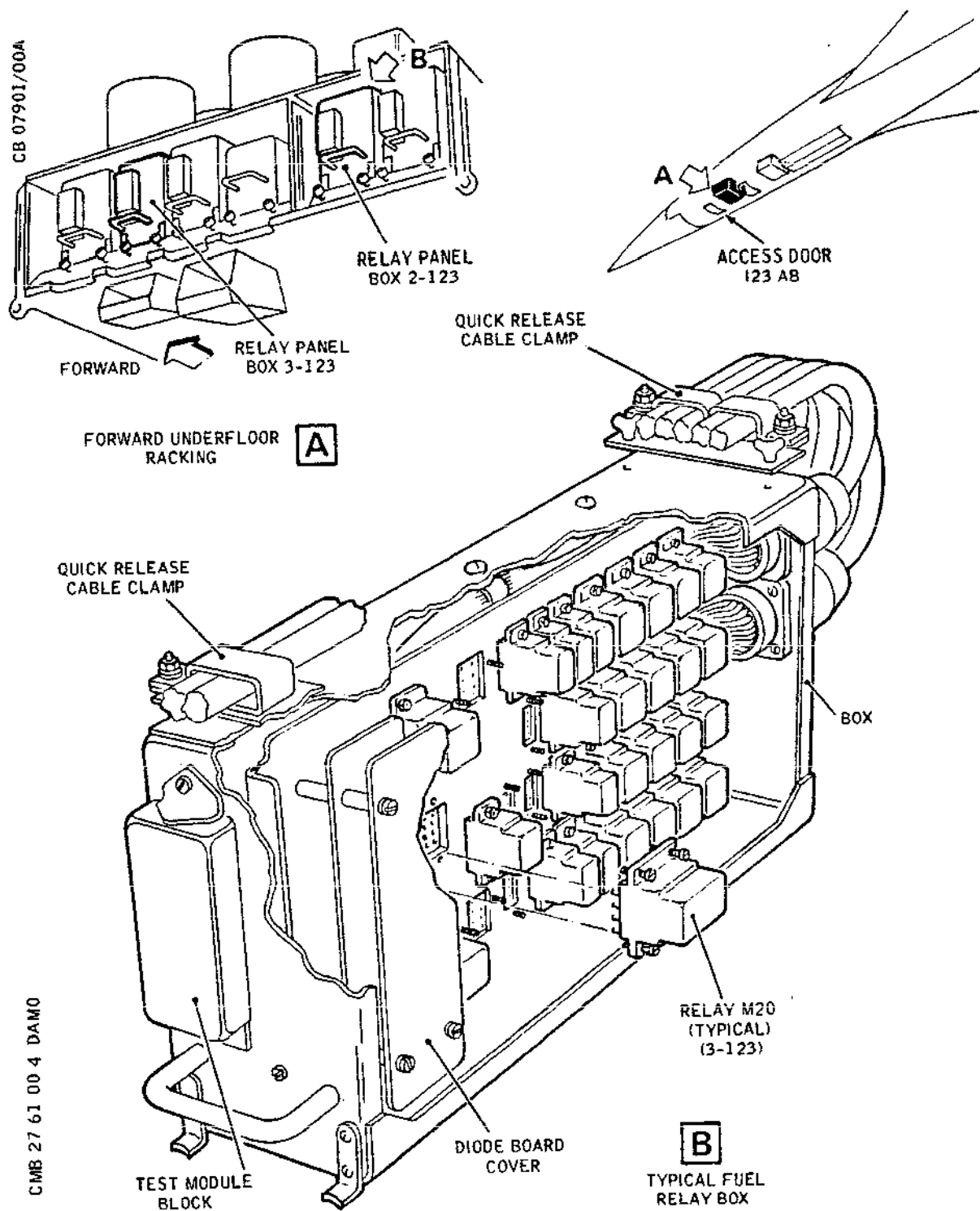
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Rack Box Panels 2-123 and 3-123 Relays -  
Installation  
Figure 404

R

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- (4) Cancel the electrical safety precautions and check the operation of the relay by function testing the visor and droop nose system (Ref. 27-62-00, Adjustment/Test).

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### VISOR AND DROOP NOSE SYSTEM - ADJUSTMENT/TEST

WARNING: OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DETAILED IN 24-00-00.

#### 1. General

Adjustments include those for the nose uplock unit pins, visor emergency release control rods and stop bolts, and for the nose transmitter unit link rod.

The visor and droop nose normal, standby and emergency controls and indicators are located on the right hand dash panel and the centre console (Ref. Fig. 508 ).

For normal lowering and raising of the visor and nose the gated switch on the right-hand dash panel is used. The standby switches are used for lowering only and are set in a pivoted guard that prevents inadvertent operation and ensures sequential use. Operation of the emergency release lever mechanically releases the visor and nose uplocks to permit the visor and nose to free-fall to the visor down/nose 5 deg position. The lever is prevented from returning to its original position after use by a latch integral with the lever shaft. When resetting the lever a plunger in the end of the shaft must be depressed to release the latch. An electrical interlock in the visor/windshield wipers 'parked' circuits prevents the visor being raised unless the wipers are parked. In the event of an interlock failure preventing the visor from raising when the wipers are parked the interlock can be by-passed by the wipers override switch.

#### 2. Nose Uplock Pins - Adjustment

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Checking sling, droop nose	D935085000
Bracket, sling	D935063000
Spring balance, (2 ton)	-
Visor screwjack	D925156001
Locking pin (2), droop nose	E925045031
Locking pin (2), visor	E925045030

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## MAINTENANCE MANUAL

---

### DESCRIPTION

### PART NO.

---

Safety clips, circuit breaker	-
Torque spanner, 0 to 235 lbf in (0 to 2.6 mdaN) range	-
Non-corrodible steel locking wire 0.028 in (0.7 mm) dia	-

---

### B. Prepare to Adjust

- (1) Electrically isolate the visor and droop nose controls by tripping the associated circuit breakers:

---

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
VISOR & NOSE CONT	15-215	M11	F 8
NOSE 7 1/2 DEG CONT	1-213	M12	Q16
NOSE/VISOR STBY LOWER SUP	1-213	M13	Q17

---

- (2) If the visor and droop nose are raised fit the visor locking pins and the droop nose locking pins (Ref. Fig. 501 ).
- (3) Install the visor screwjack:
- (a) Disconnect the electrical plugs from the normal and standby selector valves (M45 and M51) in the equipment bay (zone 121).
- (b) Fit the screwjack (Ref. Fig. 502 ).
- (4) Fit the checking sling to the droop nose (Ref. Fig. 501 ).
- (a) Remove the screwed plugs from the sling attachment bracket point and fit the bracket.

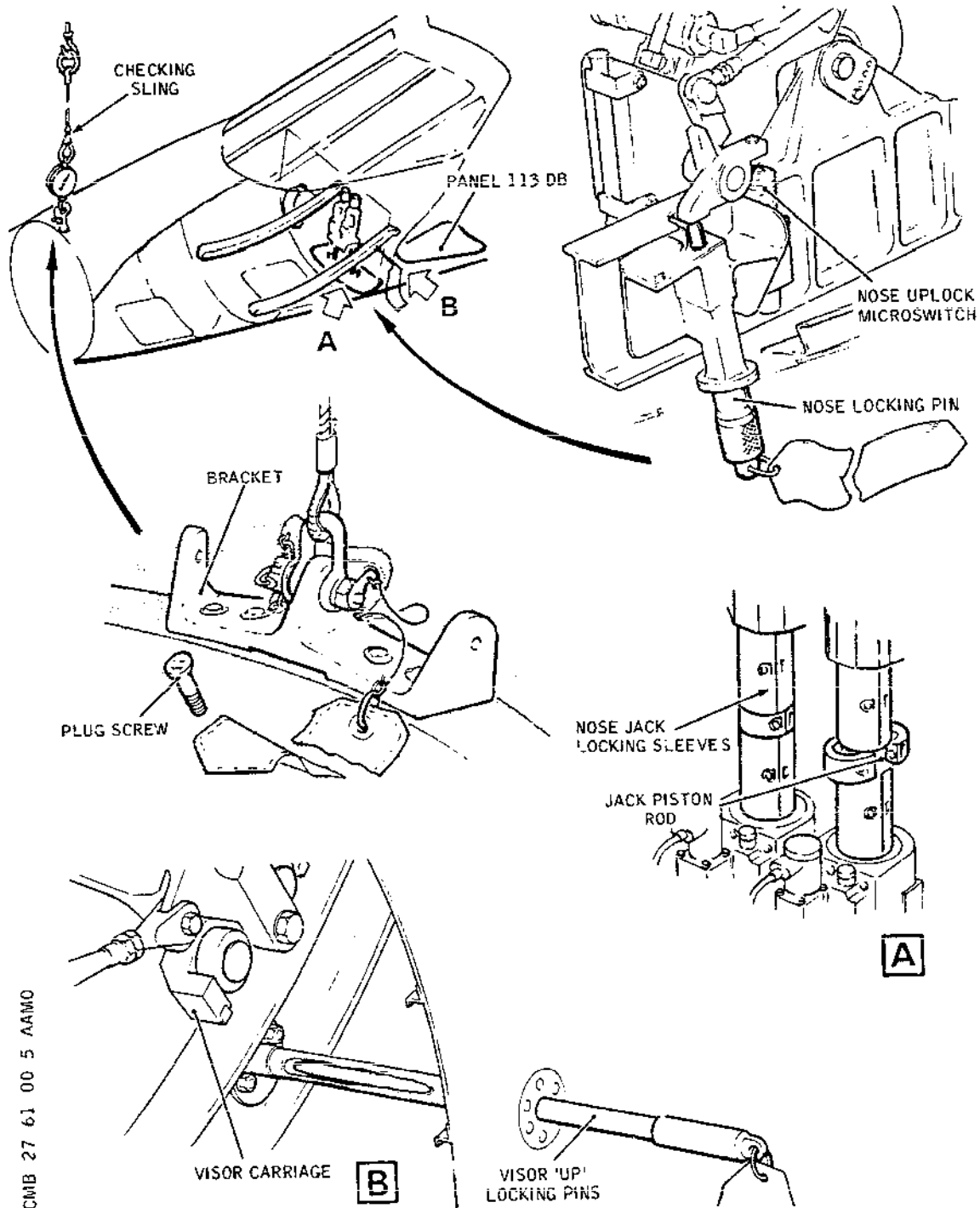
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## MAINTENANCE MANUAL



CMB 27 61 00 5 AAMO

Ground Safety Equipment  
Figure 501

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- (b) Suspend the checking sling from suitable lifting equipment and secure the sling complete with spring-balance to the bracket.

NOTE: The weight on the checking sling must not exceed 1500 lb (680 kg).

- (5) Remove the visor and the droop nose locking pins if fitted.
- (6) If the nose is engaged in its uplocks, lower it to the 5 deg position by releasing the uplocks using the EMERGENCY NOSE/VISOR UPLOCK RELEASE lever on the centre console and lowering the nose with the checking sling. Reset the lever.

### C. Adjust Nose Uplock Pins (Ref. Fig. 503 )

- (1) Remove the split-pin and slacken the nut securing each eccentric pin.
- (2) Remove the side locking plate from each pin.
- (3) Set each uplock pin so that the highest point of the eccentric is at the bottom.
- (4) Raise the nose fairing to the up position and raise the visor to the up and locked position. Check that the nose fairing datum is in alignment with the fuselage datum as proved by the metal to metal clearance gap between the visor/nose and the fuselage being within the required limits.
- (5) Rotate each eccentric pin anti-clockwise, viewed from the left-hand side, until the roller contacts the uplock hook. Continue turning the pin slowly until it trips the hook into the fully engaged position and the uplock hook retention mechanism locks it.

NOTE: The locking action of the spring-loaded retention mechanism is audible.

- (6) Check that the clearance between the rearmost point of the roller and the uplock hook does not exceed 0.44 in (11.2 mm).
- (7) Lock the eccentric pins in this position with their side plates. Torque load each side plate retaining bolt to between 45 and 55 lbf in (0.50 to 0.60 mdaN) and lock the bolt head to the pin head with wire.

EFFECTIVITY: ALL

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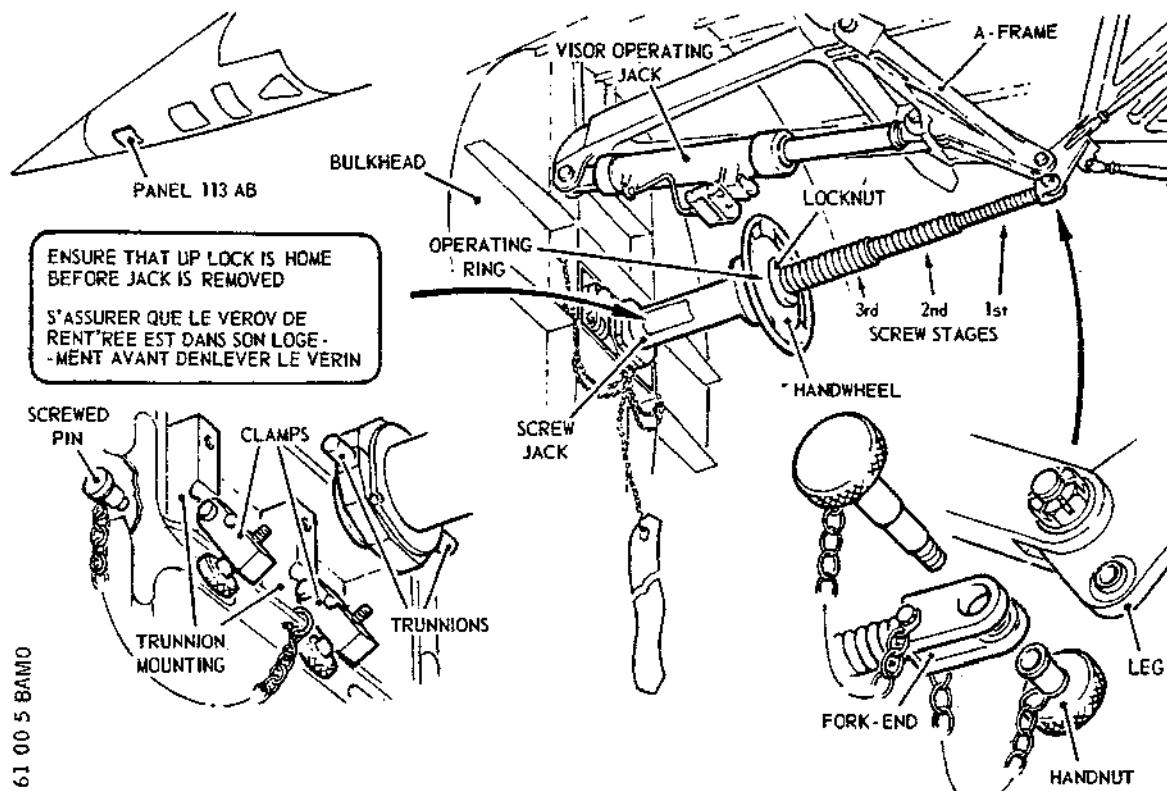
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**WARNING:** BEFORE INSTALLING THE SCREWJACK, THE VISOR ACTUATING JACK MUST BE ISOLATED FROM ITS ELECTRICAL AND HYDRAULIC SUPPLIES.

### INSTALLATION

1. Secure trunnions to bulkhead with screwed pins. Open clamps.
2. Position screwjack and secure trunnions with clamps.
3. Operate screwjack to engage fork-end with leg; secure with captive bolt and nut.

### OPERATION

#### Extension

1. Lock 3rd stage screw in closed position with locknut.
2. Operate screwjack handwheel to extend 1st and 2nd stage screws.
3. Release locknut and extend 3rd stage screw.

#### Retraction

1. Lock 3rd stage screw in extended position.
2. Operate screwjack until 1st and 2nd stage screws are retracted.
3. Release locknut and retract 3rd stage screw.

Visor Screwjack Installation  
Figure 502

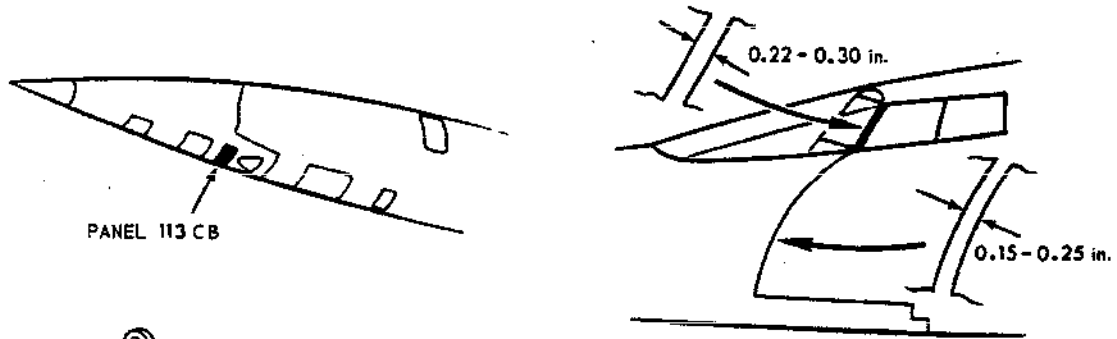
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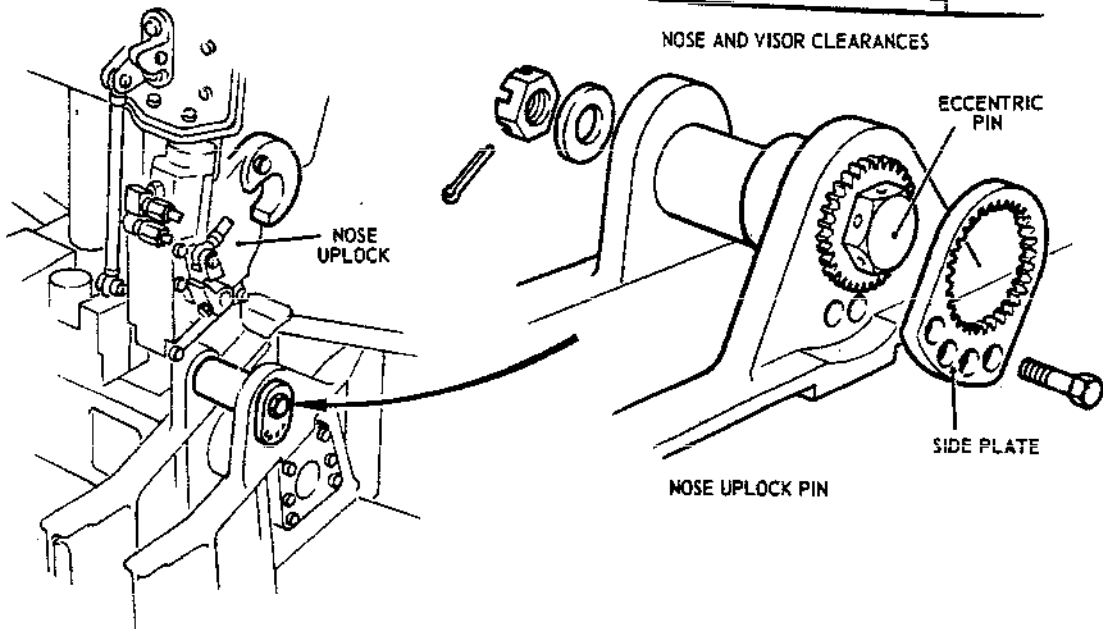
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## MAINTENANCE MANUAL



PANEL 113 CB

NOSE AND VISOR CLEARANCES

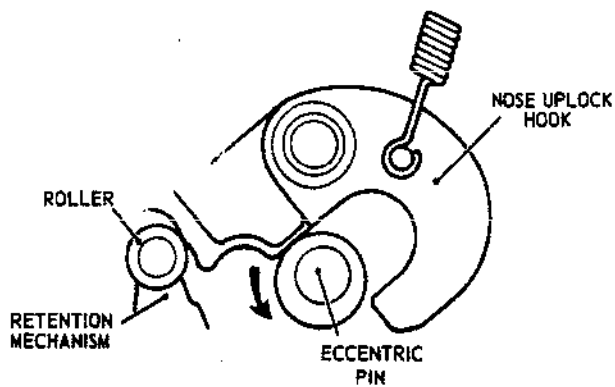


NOSE UPLOCK

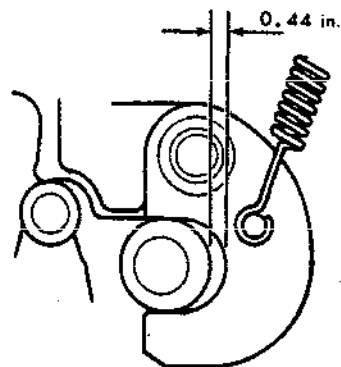
ECCENTRIC PIN

SIDE PLATE

NOSE UPLOCK PIN



BEFORE ADJUSTMENT



AFTER ADJUSTMENT  
(HOOK AND ROLLER  
ENGAGED)

Nose Uplock Pins - Adjustment  
Figure 503

EFFECTIVITY: ALL

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- (8) Torque load the nuts securing the eccentric pins to between 210 and 235 lbf in (2.3 to 2.6 mdaN) and secure each with a split pin.
- (9) With the visor held in its uplock, manually release the nose fairing and lower it to approximately 2 deg droop using the sling. Reset the lever, raise the nose and check that both uplocks close with a simultaneous snap action. Repeat several times to ensure that the uplocks perform satisfactorily.
- (10) With the nose up and locked, recheck the metal to metal gap between the visor/nose and the fuselage.
- (11) Remove the checking sling and bracket from the nose and refit the screwed plugs in the bracket attachment holes in the fuselage.
- (12) Remove the visor screwjack (Ref. Fig. 502 ).
- (13) Reconnect the electrical plugs to the normal and the standby selector valves (M45 and M51) in the equipment bay (zone 121).
- (14) Reset the visor and nose control circuit breakers.
- (15) Reinstall the emergency nose/visor uplocks release system as detailed in para.9.
- (16) Carry out the visor and droop nose operational test as detailed in para.6.

### 3. Visor Emergency Release Mechanism - Adjustment

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Checking sling	D935085000
Bracket, sling	D935063000
Spring balance (2 ton)	-
Visor screwjack	D925156001
Locking pin (2), droop nose	E925045031
Locking pin (2), visor	E925045030

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## MAINTENANCE MANUAL

---

### DESCRIPTION

### PART NO.

---

Safety clips, circuit breaker	-
Torque spanner, 0 to 35 lbf in (0 to 0.4 mdaN)	-
Non-corrodible steel locking wire 0.028 in (0.7 mm) dia	-

---

#### B. Prepare to Adjust

- (1) Carry out operations (1) to (6) in para.2B.
- (2) Ensure that the mechanism is fully assembled less the long strut and distance washer, and that the stop bolt (1) is screwed down sufficiently to clamp the tab washer against the face of the lever (Ref. Fig. 504 ).

#### C. Adjust Visor Emergency Release Mechanism (Ref. Fig. 504 )

- (1) With the nose in the 5 deg lowered position press the rear roller into contact with the cam on the pressure bulkhead and measure the gap between the faces of the stop bolts (1) and (2).
- (2) Grind the unchamfered face of the distance washer to the thickness of the measured gap, less 0.013 to 0.015 in (0.3 to 0.39 mm). Fit the washer beneath the head of the stop bolt (1) with its chamfered face against the tab washer.
- (3) With the stop bolts (1) and (2) contacting, check that the clearance 'X', between the rear roller and the face of the cam, is between 0.050 and 0.060 in (1.2 to 1.5 mm).
- (4) Lock the stop bolt (1) by folding the tab washer against the chamfered end of the ground distance washer. Secure the nut with a split pin.
- (5) Raise the droop nose to the up position.
- (6) With the aft roller located in the hook on the pressure bulkhead, check that the clearance between the stop and the stop arm (dimension 'Z') is from

EFFECTIVITY: ALL

**27-61-00**

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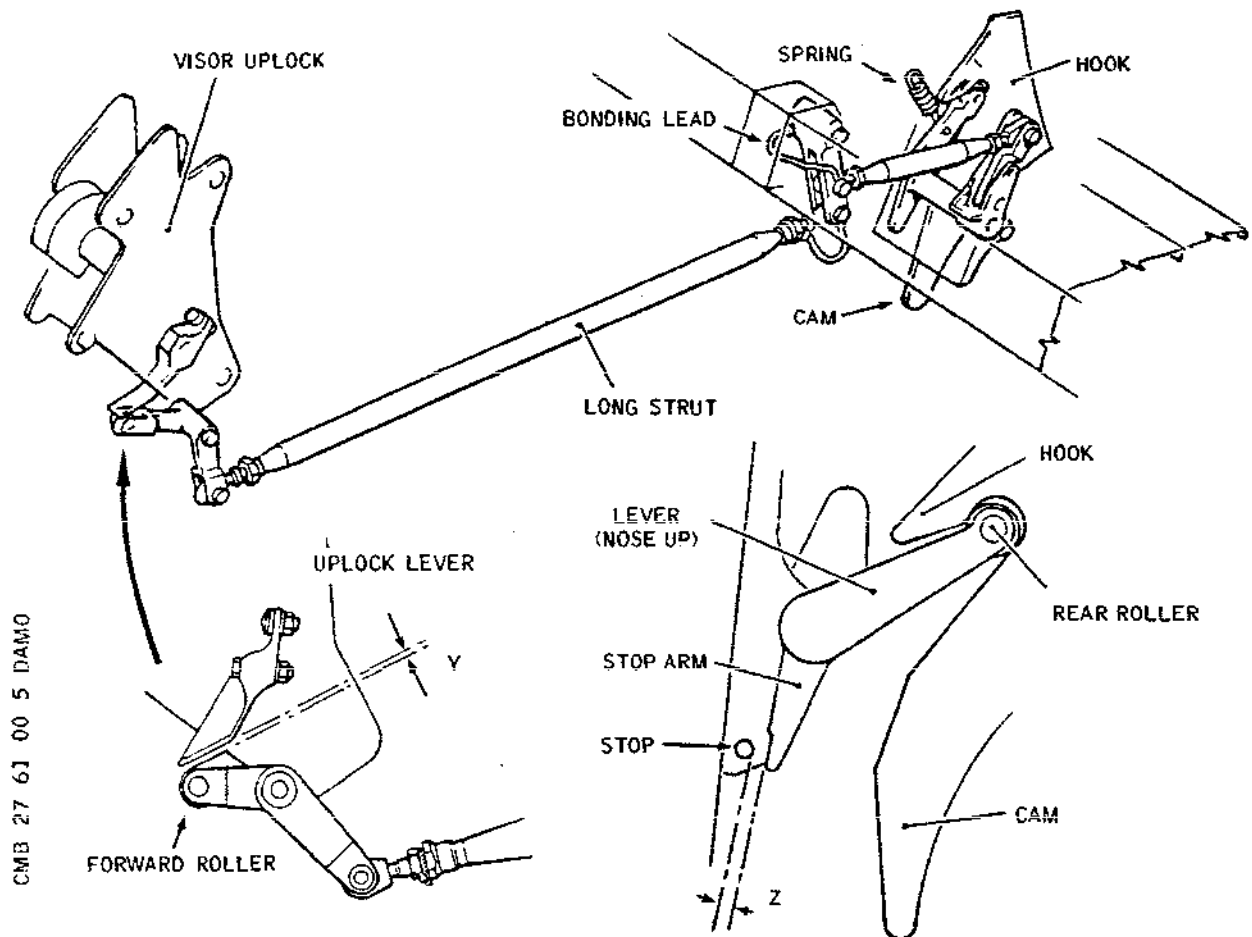
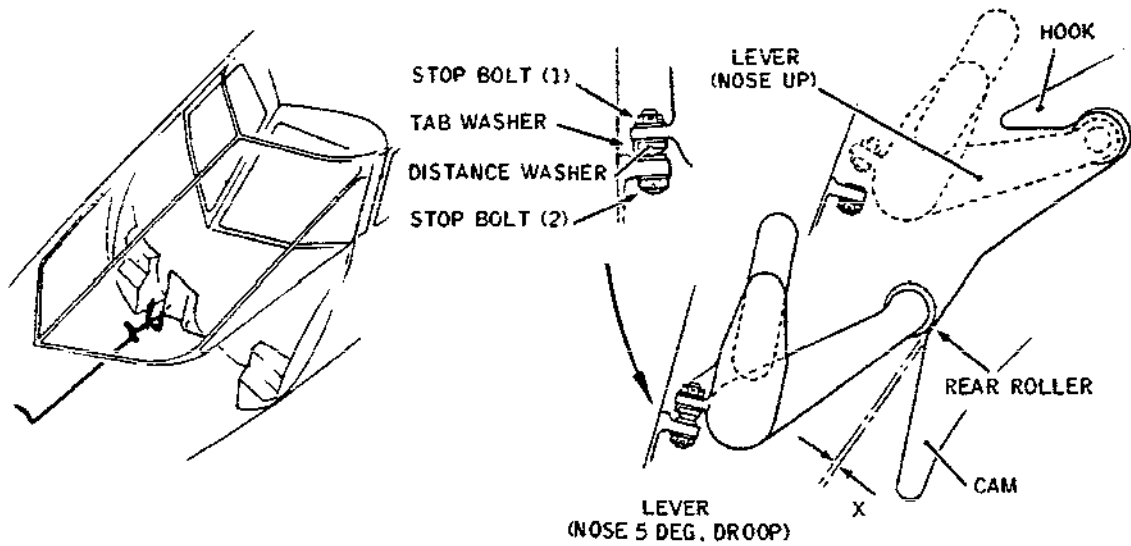
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## MAINTENANCE MANUAL

CB 00600/00C



CMB 27 61 00 5 DAMO

Visor Emergency Release -  
Adjustments  
Figure 504

R

EFFECTIVITY: ALL

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0.03 to 0.12 in (0.76 to 3.04 mm).

- (7) With the aft roller locating in the hook on the pressure bulkhead, fit the long strut to give a clearance 'Y' between the forward roller and the visor uplock lever face of between 0.065 and 0.075 in (1.65 to 1.90 mm). Adjust the strut ends as necessary, ensuring that they remain in safety.
- (8) Carry out a duplicate inspection (Ref.5-55-11) to ensure the accuracy of gap 'Y' achieved in operation (7).
- (9) Torque tighten the locknuts on the shaft to between 30 and 35 lbf in (0.34 to 0.40 mdaN) and secure them with wire.
- (10) Check visor uplock emergency release operation.
  - (a) Lower the nose to the 5 deg position by operating the EMERGENCY NOSE/VISOR UPLOCK RELEASE lever on the centre console and lowering the nose on the checking sling.

**NOTE:** The visor will remain in the raised position held by its screwjack. In the absence of electrical ground power there will be no caption indication that the visor uplock has released.
  - (b) Using the visor screwjack, carefully commence lowering the visor and check that the visor uplock hooks begin to open as soon as the rollers begin to move. Continue lowering the visor until the rollers are clear of the hooks.
  - (c) Reset the emergency release lever and return the nose to the up (0 deg) position.
  - (d) Raise the visor to the up position and ensure that the visor uplock is locked by checking that the gap Y is as required in operation (6).
- (11) Remove the checking sling and bracket from the nose and refit the screwed plugs in the bracket attachment holes in the fuselage.
- (12) Remove the visor screwjack (Ref. Fig. 502 ).
- (13) Reconnect the electrical plugs to the normal and the standby selector valves (M45 and M51) in the

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equipment bay (zone 121).

(14) Reset the visor and nose control circuit breakers.

(15) Reinstall the emergency visor/nose release system as detailed in para 9.

(16) Complete the visor and droop nose operational test as detailed in para.8.

#### 4. Nose Emergency Release Mechanism Adjustment

##### A. General

This rigging procedure is used when installing the droop nose emergency release system. Since during this procedure it is necessary to operate the uplocks manually, the nose must be lowered.

##### B. Equipment and Materials

DESCRIPTION	PART NO.
Locking sleeves, nose jacks	E92509100
Rigging pin, nose uplocks	D925188001
Safety clips, circuit breakers	-
Steel wire, non-corrodible 0.028 in (0.7 mm) dia	-

##### C. Prepare

(1) Ensure the nose is at either the 5 deg. or the fully down position. If fully down, fit the nose jack locking sleeves (Ref. Fig. 501 ).

(2) Electrically isolate the visor and droop nose control system by tripping the circuit breakers; fit safety clips.

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## MAINTENANCE MANUAL

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
VISOR & NOSE CONT	15-215	M11	F 8
NOSE 7 1/2 DEG CONT	1-213	M12	Q16
NOSE/VISOR STBY LOWER SUP	1-213	M13	Q17

- (3) Remove access panels 113 DB to gain access to the droop nose uplocks, and panel 121 AB to gain access into the forward equipment bay.

### D. Adjust (Ref. Fig. 505 )

- (1) Rod 1. Adjust the length between the rod eye-end centres to between 19.56 in and 19.6 in (495.5 and 497.8 mm) prior to installation into the aircraft. Check that the eye-ends are within the safety limits of 0.453 in (11.5 mm) (dimension 'Y'). Torque tighten the locknuts to between 30 and 35 lbf in (0.33 and 0.39 mdaN) and lock with wire. When securing the rod to the levers, torque tighten the nuts to between 25 and 30 lbf in (0.28 and 0.33 mdaN) and secure with split pins.
- (2) Rod 3. With rods 1 2 and 3 connected to their levers, fit the rigging pin to the LH uplock lever assembly and set the system release lever right down on its stop with a 0.030 in (0.75 mm) feeler interposed between lever and stop. Adjust the rod until bolt 'X' can be inserted without force. Secure the rod eye-end locking nuts as detailed in para (1).
- (3) With the system lever in the normal (unoperated) position, secure the gaiter to rod 3 ensuring that dimension 'Z' is 2.1 in (53.34 mm).
- (4) Nose uplocks.
- (a) With the nose lowered, raise the operating lever until the upper latch is engaged and continue lifting until stopped by the end of the slot in the console side panel. Retain in this position.
- (b) Close the uplocks by hand and adjust the rods 4

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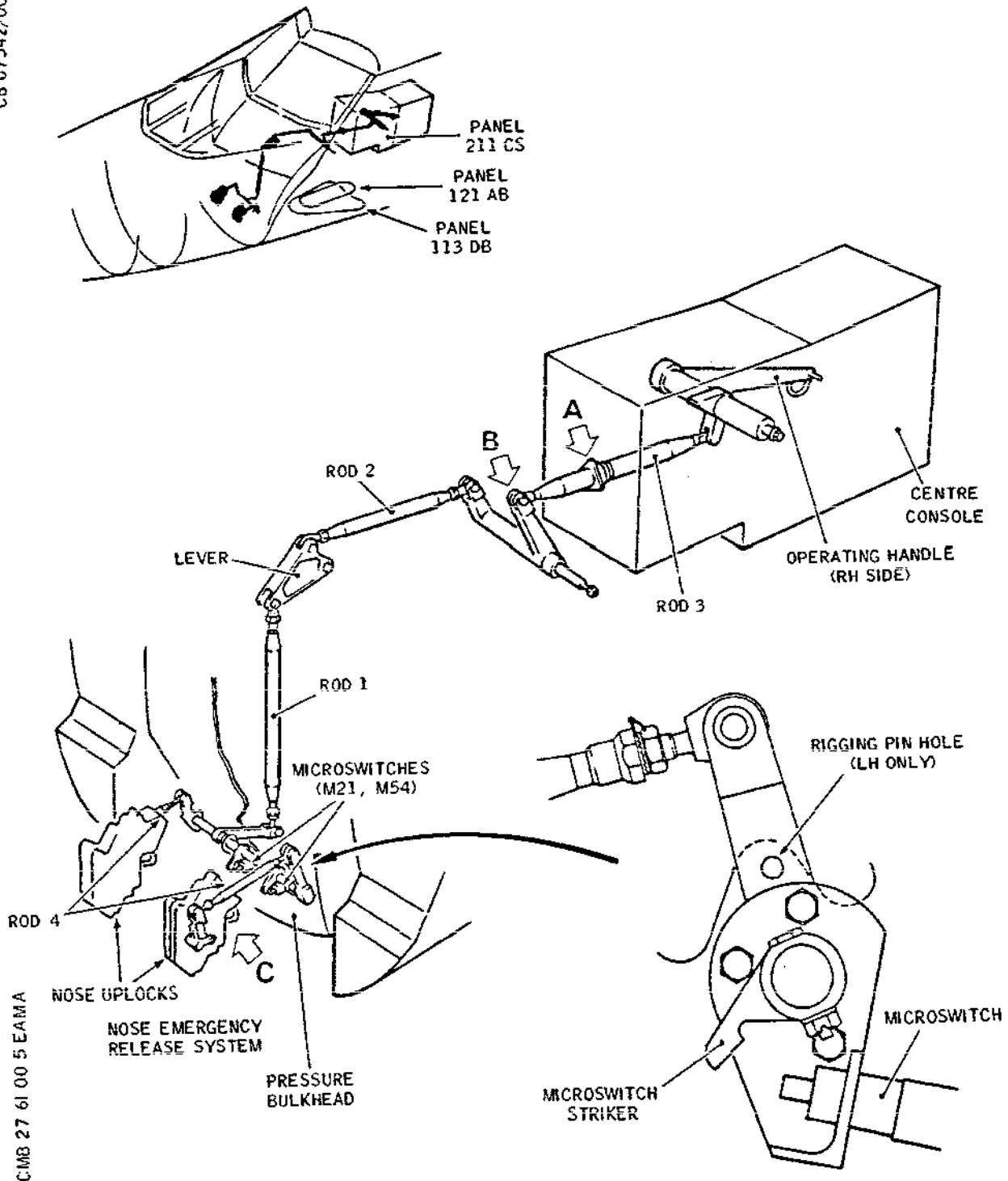
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## MAINTENANCE MANUAL

CB 07542/00B



CMB 27 61 00 5 EAMA

Droop Nose Emergency Release System - Adjustments  
(Sheet 1 of 2)  
Figure 505

EFFECTIVITY: ALL

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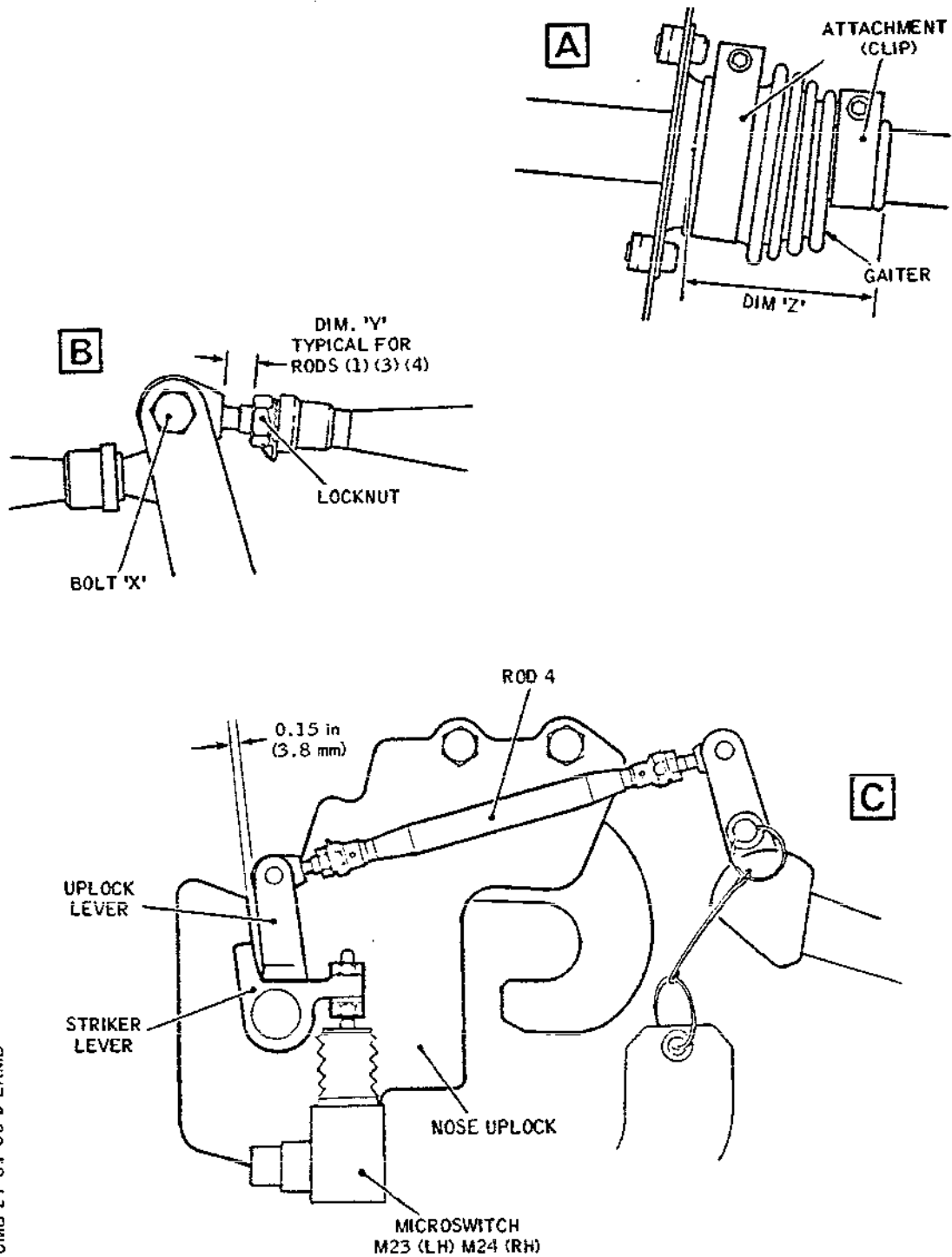
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## MAINTENANCE MANUAL

CB08423/00A



CMB 27 61 00 5 EAMB

Droop Nose Emergency Release System - Adjustments  
(Sheet 2 of 2)  
Figure 505

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until both uplock hooks just snap open simultaneously.

- (c) With the uplock closed and the emergency release handle stowed in the normal (unused) position, check that a gap of 0.15 in (3.81 mm) exists between the uplock lever and the striker lever, on both nose uplocks. If necessary, adjust rods 4 to achieve this gap.
  - (d) Carry out a duplicate inspection (Ref.5-55-11) to ensure the accuracy of the 0.15 in (3.81 mm) gap achieved in operation (c).
  - (e) Secure the rod eye-end locking nuts as detailed in para (1).
- (5) If microswitches M21 (LH) and M54 (RH) (which are operated by the release mechanism) require adjustment engage the operating lever in the upper latch (operated position) and set the switches forward to contact the strikers so that the switches just operate. Adjust the switches forward a further amount equivalent to two complete turns of the locknut; tighten the locknuts to between 10 and 15 lbf in (0.11 and 0.16 mdaN) and lock with wire.
- (6) Operate the mechanism several times, resetting the hooks by hand, to prove the satisfactory operation of the mechanism and microswitches.

### E. Conclusion.

- (1) Return the emergency release handle to the normal (unoperated) position.
- (2) Remove the locking sleeves from the nose actuator jacks.
- (3) Reset the circuit breakers previously tripped.
- (4) Make available ground electrical power (Ref.24-41-00).
- (5) Pressurize the green and the yellow hydraulic systems using the aircraft ground hydraulic checkout system (Ref.29-00-00, Servicing).
- (6) Raise the droop nose and visor.
- (7) Carry out an operational test of the visor and

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## MAINTENANCE MANUAL

droop nose emergency release system (Ref. para 8).

(8) Set the ground hydraulic checkout switches to "OFF" (Ref.29-00-00, Servicing).

(9) Disconnect ground electrical power (Ref.24-41-00),

(10) Refit the access panels.

### 5. Nose Position Transmitter Unit Link Rod - Adjustment

#### A. General

The nose position transmitter unit contains two identical independent signalling channels each comprising an ADC potentiometer, a weather radar synchro and a microswitch pack, all controlled by a common link arm lever. To obtain the correct link arm setting relative to the nose position the weather radar synchro signals are used in conjunction with a standard synchro transmitter/receiver. The microswitches serve the following items:

Droop nose position indication	(Ref.27-61-00)
Ground proximity warning	(Ref.34-51-00)
Undercarriage down audio warning	(Ref.32-61-00)
Flight data recorder (AIDS)	(Ref.31-31-00)
ADC overspeed warning	(Ref.34-11-40)

R B Para 5E is an alternative method of obtaining the correct  
R B link arm setting using the ADC potentiometers.

#### B. Equipment and Materials

DESCRIPTION	PART NO.
Test set, droop nose position transmitter	TE5041000
Locking sleeves, nose actuator jacks	E925091000
Ground electrical supply, 115V 400 Hz ac	-
Safety clips, circuit breakers	-
Torque spanner, 0 to 50 lbf in (0 to 0.56 mdaN) range	-

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DESCRIPTION		PART NO.	
	Non-corrodible steel locking wire, 0.028 in (0.7 mm) dia	-	
R	B		
R	B	Digital voltmeter	Fluke type 8000A
R	B		
R	B	Crouzet mini tester	-
R	B	Pitot/Static tester	-

### C. Prepare to Adjust

- (1) Make available electrical ground power (Ref. 24-41-00).
- (2) Pressurize the green and the yellow hydraulic systems using the aircraft ground hydraulic checkout system (Ref.29-00-00, Servicing).
- (3) If the nose is not in the up position, raise it using the normal control lever.
- (4) Ensure that the nose datum is in correct alignment with the fuselage datum by checking that the metal to metal gap between the visor/nose and the fuselage is within the required limits (Ref. Fig. 503 ).  
  
NOTE: If adjustment is necessary refer to para.2.
- (5) Electrically isolate the visor and nose normal and standby controls by tripping the circuit breakers M11 on panel 15-215 ref. F8, and M12 and M13 on panel 1-213 ref. Q16 and Q17; fit safety clips.
- (6) Remove access panels 113DB and 121AB in the droop nose trough and the floor of the equipment bay respectively and disconnect electrical plugs A and B from the transmitter unit.
- (7) Connect the test set looms A (TE5041.203) and B (TE5041.204) to plugs A and B respectively on the transmitter unit and the test set (Ref. Fig. 506 ).
- (8) Ensure that the test set power control switch is at 'off'.

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- (9) Connect the test set loom TE5041.201 to the 115V supply plug on the test set and the other end to a 115V, 400 Hz a.c. supply either from the aircraft or a ground supply truck:
- (a) Aircraft supply: connect the lead to auxiliary supply plug M245 on rack supply panel 18-216 on the flight compartment (Wiring Diagram Manual, Ref. 91-15-58).
  - (b) Ground supply: Adjoin adapter loom TE 5041.202 to loom TE.5041.201 and connect it to the ground electrical supply.
- (10) Reset the circuit breakers tripped in operation (5).
- (11) Set the test set supply control switch to "ON" and check that the 26V indication lamp illuminates.

### D. Adjust (Ref. Fig. 506 )

- (1) With the nose in the fully up position and the W/ RADAR SYNCHROS switch set to SYSTEM 1 on the test set, check that the synchro transmitter/receiver angle indication is zero.
- (2) If the reading is not correct:
  - (a) Lower the nose to 12 1/2°.
  - (b) Fit the safety locking sleeves to each of the nose actuator jack rods (Ref. Fig. 501 ).
  - (c) Open the hinged side of the fail-safe box around the end of the link rod, by cutting the locking wire and removing the two bolts that secure the side.
  - (d) Slacken the turnbuckle locknuts on the link rod. Adjust the turnbuckle as necessary and retighten the locknuts.

NOTE: One revolution of the turnbuckle will adjust the indication by 1° 22 min.

- (e) Remove the safety locking sleeves, raise the nose to the up position and recheck the indication on the test set. If necessary, continue adjusting the turnbuckle until a zero reading is obtained on the synchro transmitter/receiver.
- (3) Check the inspection holes to ensure that the eye-end

EFFECTIVITY: ALL

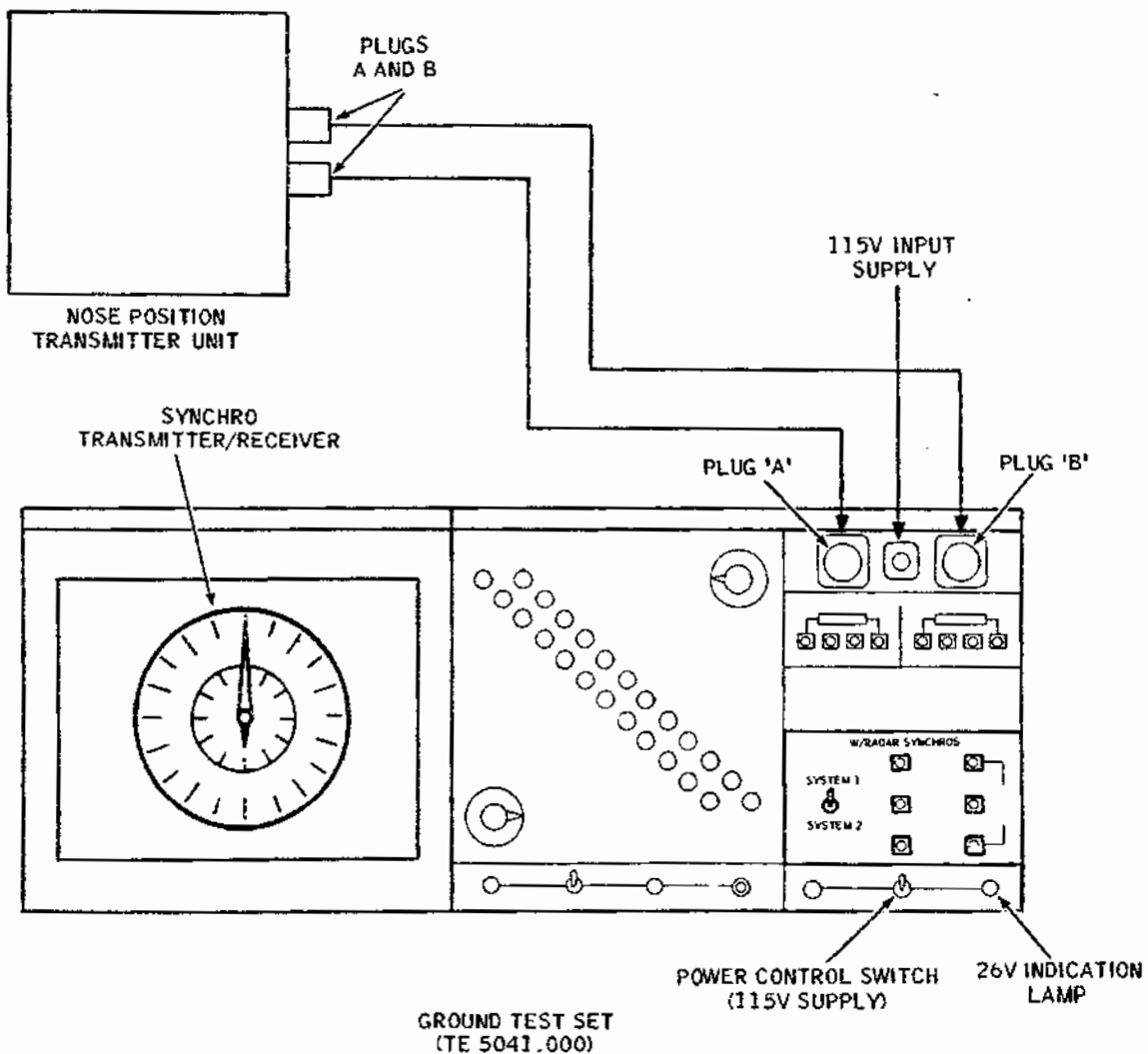
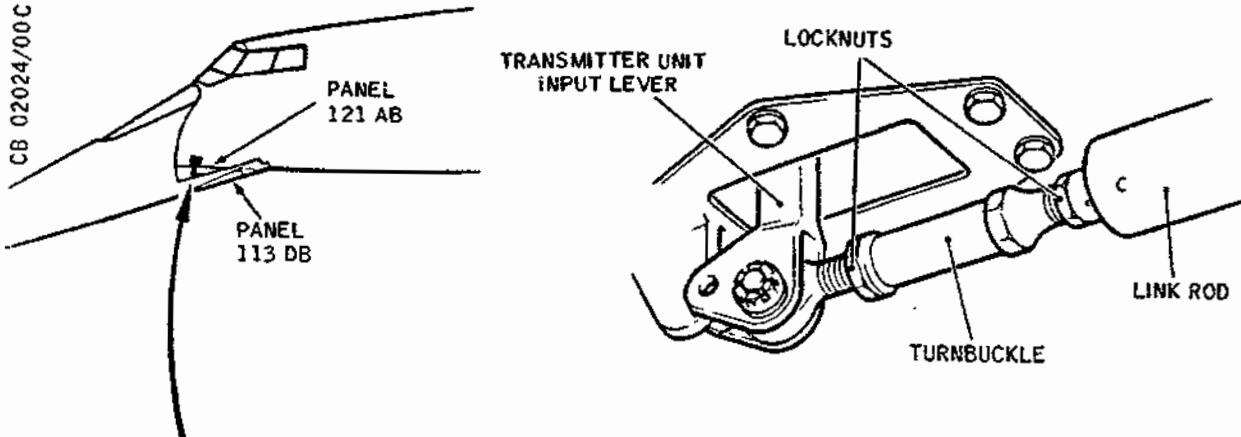
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CB 02024/00C



CMB 27 61 00 5 FAN0

Nose Position Transmitter Unit Link Rod -  
Adjustment  
Figure 506

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and turnbuckle are in-safety, then torque tighten the locknuts to between 45 and 50 lbf in (0.5 to 0.56 mdaN). Lock both locknuts with wire.

- (4) Recheck the synchro transmitter/receiver angle indication on the test set is zero to ensure that the tightening and locking of the locknuts has not disturbed the link rod setting.
- (5) Close the side of the fail-safe box and secure it with the two bolts. Torque-tighten the bolts to between 40 and 45 lbf in and lock with wire.
- (6) Set the W/RADAR SYNCHROS switch from SYSTEM 1 to SYSTEM 2 and with the nose in the up position check that the synchro transmitter/receiver angle indication is zero  $\pm$  6 min.
- (7) Electrically isolate the visor and droop nose normal and standby controls by tripping the associated circuit breakers M11 on panel 15-215 Ref.F8, and M12 and M13 on panel 1-213, Ref.Q16 and Q17; fit safety clips.
- (8) Disconnect and remove the test set together with the looms.
- (9) Reconnect the aircraft electrical plugs A and B to the transmitter unit ensuring that the plug and receptacle mating surfaces are clean and undamaged.
- (10) Reset the circuit breakers tripped in operation (7).
- (11) To ensure the reinstatement of the transmitter unit, carry out the tests given in 27-61-51, Adjustment/Test.
- (12) Refit all access panels.
- (13) Set the ground hydraulic checkout switches to "OFF". (Ref.29-00-00, Servicing).
- (14) Disconnect ground electrical power.

After SB 27-029

For A/C 001-007,

### A. General

The nose position transmitter unit contains two identical

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independent signalling channels each comprising an ADC potentiometer, a weather radar synchro and a microswitch pack, all controlled by a common link arm lever. The correct link arm setting, relative to the nose position, can be obtained by using the ADC potentiometer signals in conjunction with a standard ohmmeter. The microswitches serve the following items:

Droop nose position indication (Ref.27-61-00)  
Ground proximity warning (Ref.34-51-00)  
Undercarriage down audio warning (Ref.32-61-00)  
Flight data recorder (AIDS) (Ref.31-31-00)  
ADC overspeed warning (Ref.34-11-40)

### B. Equipment and Materials

DESCRIPTION	PART NO.
Ohmmeter	Fluke 8000A or equivalent.
Locking sleeves, nose actuator jacks	E925091000
Ground electrical supply, 115V 400 Hz ac	-
Safety clips, circuit breakers	-
Torque spanner, 0 to 50 lbf in (0 to 0.56 mdaN) range	-
Corrosion resistant steel locking wire, 0.028 in (0.7 mm) dia	-

### C. Prepare to Adjust

- (1) Make available electrical ground power (Ref. 24-41-00).
- (2) Pressurize the green and the yellow hydraulic systems using the aircraft ground hydraulic checkout system (Ref.29-00-00, Servicing).
- (3) If the nose is not in the up position, raise it using the normal control lever.
- (4) Ensure that the nose datum is in correct alignment

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R with the fuselage datum by checking that the metal to  
R metal gap between the visor/nose and the fuselage is  
R within the required limits (Ref. Fig. 503 ).

R NOTE: If adjustment is necessary refer to para.2.

R (5) Electrically isolate the visor and nose normal and  
R standby controls by tripping the circuit breakers M11  
R on panel 15-215 ref. F8, and M12 and M13 on panel  
R 1-213 ref. Q16 and Q17; fit safety clips.

R (6) Remove access panels 113DB and 121AB in the droop nose  
R trough and the floor of the equipment bay respectively  
R and disconnect electrical plugs A and B from the  
R transmitter unit.

R (7) Connect the test cables to plugs A and B respectively  
R on the transmitter unit and to the ohmmeter  
R (Ref. Fig. 507 ).

R (8) Reset the circuit breakers tripped in operation (5).

R D. Adjust (Ref. Fig. 507 )

R (1) With the nose in the fully up position, measure the  
R ADC potentiometer resistance between pins s and g on  
R plugs A and B. The readings on both potentiometers  
R are to be within 4 and 75 ohms, after making allowance  
R for the resistance of the test leads used.

R (2) If the readings are incorrect:

R (a) Lower the nose to 12 1/2°.

R (b) Fit the safety locking sleeves to each of the  
R nose actuator jack rods (Ref. Fig. 501 ).

R (c) Open the hinged side of the fail-safe box  
R around the end of the link rod, by cutting  
R the locking wire and removing the two bolts  
R that secure the side.

R (d) Slacken the turnbuckle locknuts on the link rod.  
R Adjust the turnbuckle as necessary and retighten  
R the locknuts.

R NOTE: One revolution of the turnbuckle will  
R adjust the resistance approximately 730  
R ohms. The resistance value will increase  
R for input lever movement in the nose down  
R direction.

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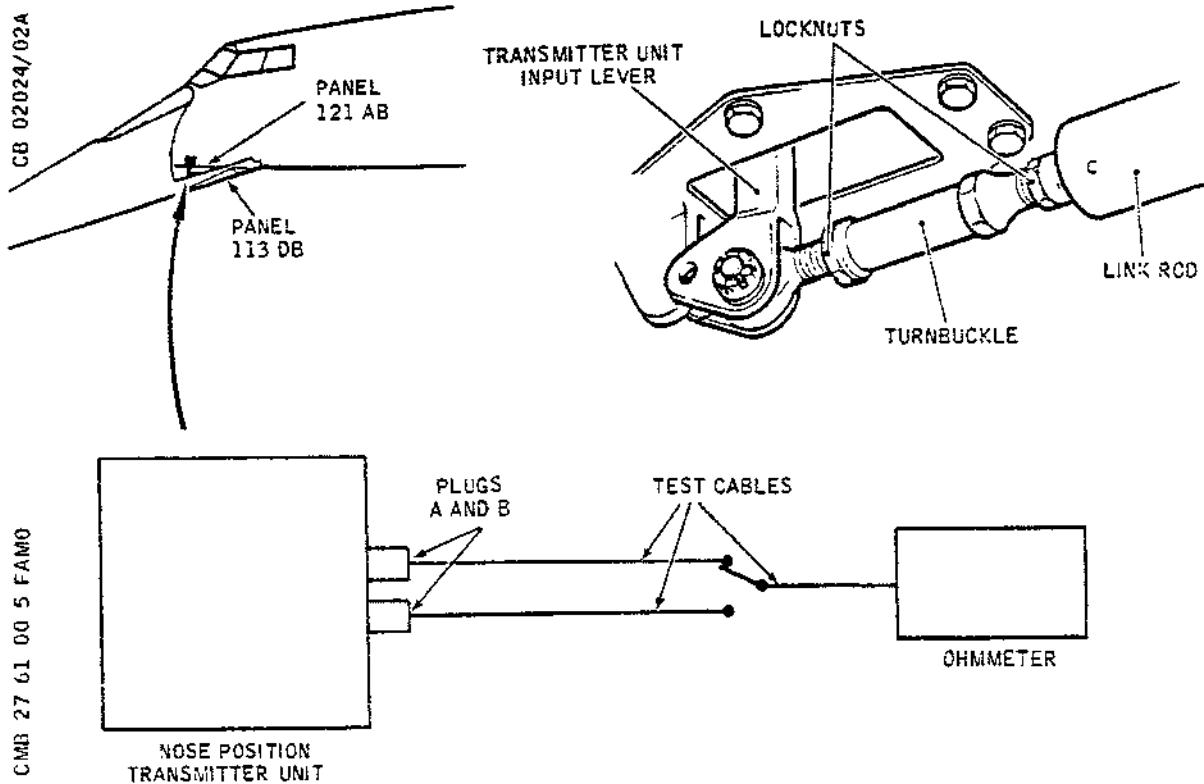
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Nose Position Transmitter Unit Link  
Rod - Adjustment  
Figure 507

R

R (e) Remove the safety locking sleeves, raise the nose  
R to the up position and recheck the resistance  
R reading on the ohmmeter. If necessary, continue  
R adjusting the turnbuckle until the required  
R resistance readings are obtained on the ohmmeter.

R (3) Check the inspection holes to ensure that the eye-end  
R and turnbuckle are in-safety, then torque tighten the  
R locknuts to between 45 and 50 lbf in (0.5 to 0.56  
R mdaN). Lock both locknuts with wire.

R (4) Recheck that the ADC potentiometer readings on the  
R ohmmeter are within 4 to 75 ohms, to ensure that the  
R tightening and locking of the locknuts has not  
R disturbed the link rod setting.

R (5) Close the side of the fail-safe box and secure it  
R with the two bolts. Torque-tighten the bolts to  
R between 40 and 45 lbf in and lock with wire.

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- R (6) Electrically isolate the visor and droop nose normal  
R and standby controls by tripping the associated  
R circuit breakers M11 on panel 15-215 Ref.F8, and M12  
R and M13 on panel 1-213, Ref.Q16 and Q17; fit safety  
R clips.
- R (7) Disconnect and remove the test cables.
- R (8) Reconnect the aircraft electrical plugs A and B to the  
R transmitter unit ensuring that the plug and receptacle  
R mating surfaces are clean and undamaged.
- R (9) Reset the circuit breakers tripped in operation (6).
- R (10) Carry out the tests given in 27-61-51, Adjustment/  
R Test, to ensure the reinstatement of the transmitter  
R unit.
- R (11) Refit all access panels.
- R (12) Set the ground hydraulic checkout switches to "OFF"  
R (Ref.29-00-00, Servicing).
- R (13) Disconnect ground electrical power.

### R B E. Adjust (Alternative Method)

- R B (1) Connect test loom to connector A on transmitter with  
R B terminal block to permit resistance checks between  
R B pins S and g, S and r, S and T.
- R B (2) Raise nose to 0° and check resistance values are  
R B within limits (See Table). If OK check 5° and 12.5°  
R B positions. If not OK adjust link rod to give a  
R B resistance of 0 to 50 ohms between pins S and g at 0°  
R B then check rest of table. If within limits setting  
R B is OK.

R B

NOSE POSITIONS	PINS		
	S and <u>g</u>	S and <u>r</u>	S and T
0°	0-50	9.46K to 10.49K	2.67K to 3.03K
5°	2.7K to 3.06K	-	200 MAX

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## MAINTENANCE MANUAL

R B

R B

R B

R B

R B

NOSE POSITIONS	PINS		
	S and g	S and r	S and T
12.5°	6.69K to 7.5K	2.76K to 3.06K	-

R B

R B

R B

Pin Resistances (in Ohms)  
Table 1

R B

R B

R B

(3) Recheck with test loom on connector B.

R B

R B

(4) Restore airplane to normal and function check visor and droop nose and weather radar.

R B

R B

R B

(5) With droop nose at 12.5° operate Test 1 on ADC 1 and ADC 2 in turn. The overspeed warning should sound.

R B

R B

R B

(6) With droop nose at 0° operate Test 1 on ADC 1 and ADC 2 in turn. The overspeed warning should not sound.

R B

R B

R B

(7) With aircraft on ground angle of attack is simulated at 1°. In order to indicate local angle of attack either:

R B

R B

R B

(a) Pull RH u/c weight SW CB G294 on 3-213 ref B9 for ADC 1 and LH u/c weight SW CB G292 on 1-213 ref M17 for ADC 2.

R B

OR

R B

R B

(b) Using pitot/static tester apply 100 knots to ADC 1 and ADC 2 in turn.

R B

OR

R B

R B

(c) Using mini tester electrically drive ADC 1 and ADC 2 in turn to above 95 knots.

R B

R B

R B

Note indicator readings and check droop nose movement causes a corresponding change in angle of attack indications.

### 6. Visor and Droop Nose Operational Test - Normal System

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## MAINTENANCE MANUAL

### A. General

This test is for the operation and indication of the visor and droop nose normal system using a ground hydraulic check out system and ground electrical power.

### B. Equipment and Materials

---

DESCRIPTION	PART NO.
Safety clips, circuit breakers	-

---

### C. Prepare to test

CAUTION: THESE TESTS COMMENCE WITH THE VISOR AND DROOP NOSE IN THE RAISED (UP) POSITIONS (NORMAL GROUND STATE). AN EXCEPTION TO THIS IS WHEN THE VISOR AND/OR NOSE HAVE BEEN OPERATED BY THE GROUND EQUIPMENT SCREWJACKS, AFTER WHICH BOTH THE VISOR AND NOSE MUST BE LEFT IN THE DOWN POSITION. IF LEFT IN THE UP POSITION THE HYDRAULIC JACKS MAY NOT BE FILLED WITH FLUID AND IF OPERATED FROM THIS POSITION THE VISOR AND NOSE WOULD FREE-FALL WITH INSUFFICIENT DAMPING ACTION FROM THE JACKS. IN THIS CASE OPERATIONAL TESTING OF THE NOSE AND VISOR MUST COMMENCE FROM THE LOWERED POSITION.

- (1) Ensure that all tools, loose articles and ground equipment are removed from the droop nose and that there is no equipment in the vicinity of the droop nose to obstruct its movement.
- (2) Before connecting ground electrical power check that the nose and visor controls agree with the nose and visor positions.
  - (a) VISOR/NOSE selector switch for normal operation on the co-pilot's dash panel, at UP.
  - (b) Visor and nose STBY (standby) control switches on the pilots' centre console for VISOR/LOWER, NOSE 5 deg., and NOSE DOWN, all at OFF.
  - (c) EMERGENCY NOSE/VISOR UNLOCK RELEASE lever on the right hand side of the centre console, in the

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stowed position and secured with pip-pin.

- (3) Make available electrical ground power (Ref. 24-41-00).
- (4) Pressurize the green and the yellow hydraulic systems using the aircraft ground hydraulic checkout system (Ref. 29-00-00, Servicing).

### D. Test Normal System (Ref. Fig.508 and 509)

NOTE: To move the normal selector switch the cup beneath the switch lever knob must first be lifted upward before making the initial sideways movement. At the 5 deg. position the cup must be released and relifted before the switch lever can be moved to DOWN.

- (1) Check that the normal selector switch panel, and the green lamps at either side of the switch lever position are illuminated.
- (2) With the nose and the visor in the 'up' position, check that the NOSE and the VISOR position magnetic indicators on the dash panel show UP.
- (3) Set the VISOR/NOSE selector switch for normal operation to "VIS/0 deg" (visor down; nose up): Check that:
  - (a) As the visor disengages from its uplock the unlocked indication illuminates (red) and the VISOR magnetic indicator shows cross-hatched.
  - (b) As the visor reaches the down position the red light extinguishes and the VISOR magnetic indicator presents DOWN.
  - (c) The time taken for the visor to lower is between 4 and 8 seconds.
- (4) Set the VISOR/NOSE control lever to "5 deg." (visor down, nose 5 deg droop). Check that:

R B  
R B

R B

R B

R B

EFFECTIVITY: ALL

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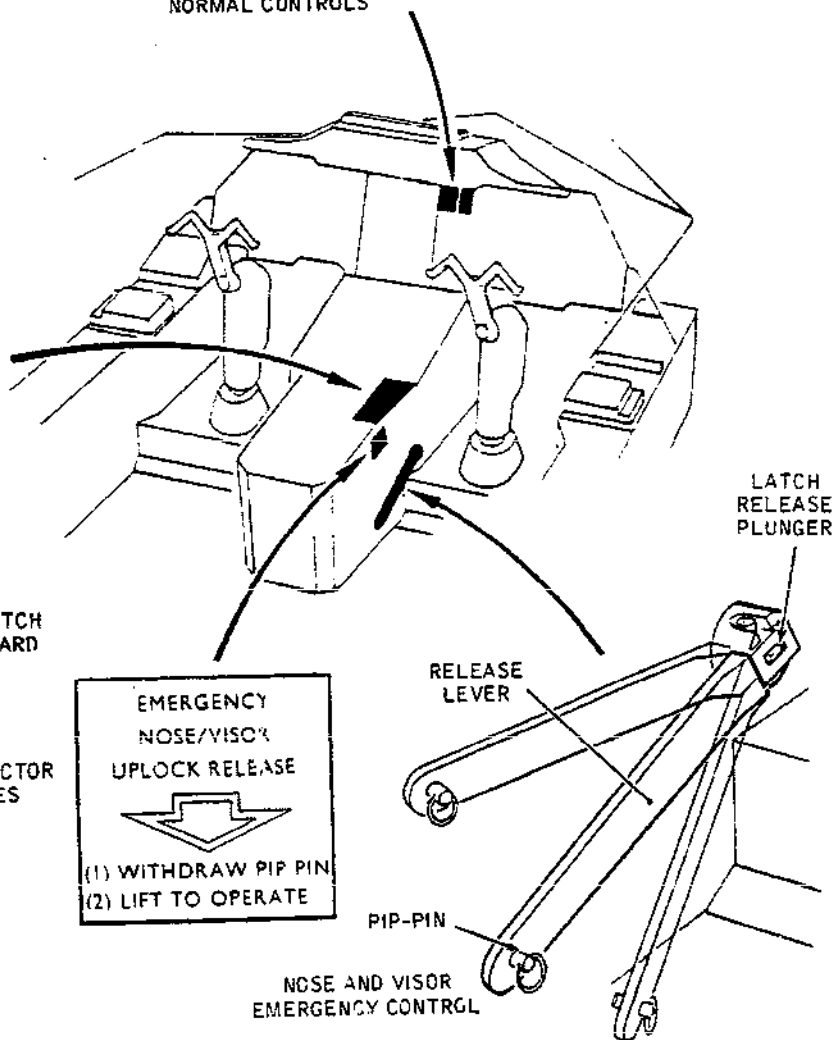
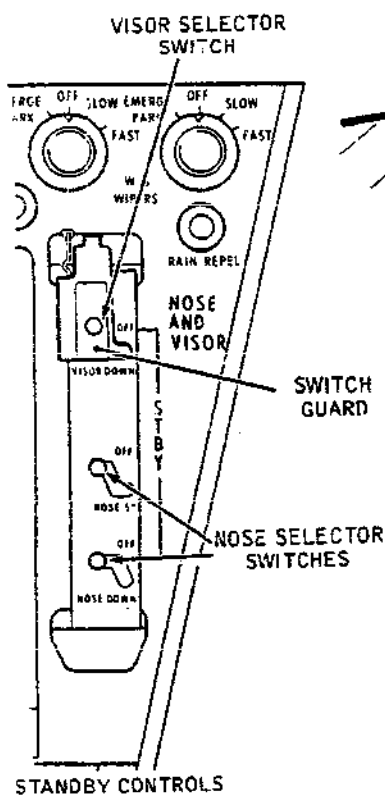
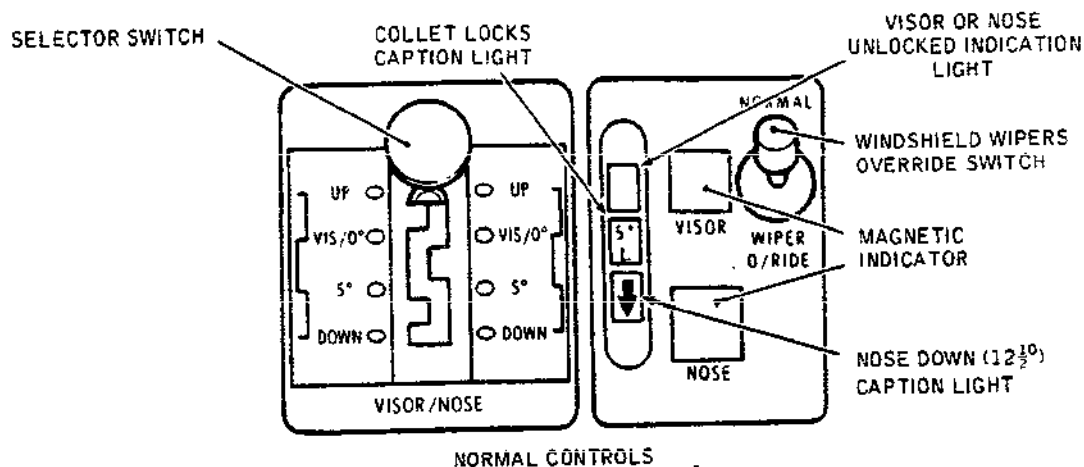
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CB 01995/01D



Visor and Droop Nose Controls and Indicators  
Figure 508

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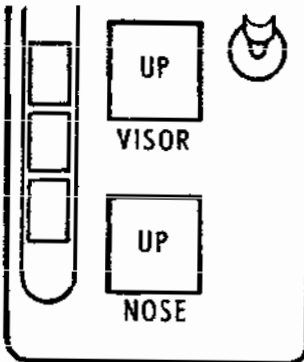
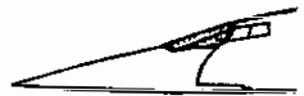
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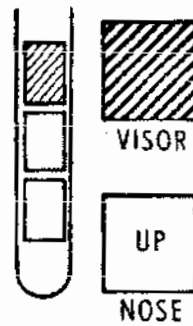
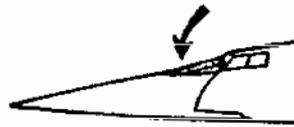
## MAINTENANCE MANUAL

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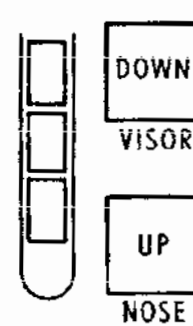
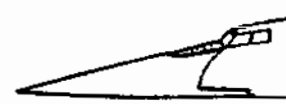
NOSE UP - VISOR UP



VISOR IN-TRANSIT

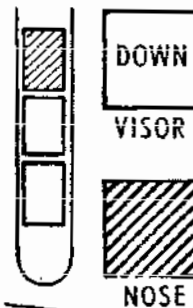


VISOR DOWN

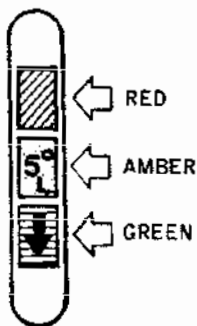
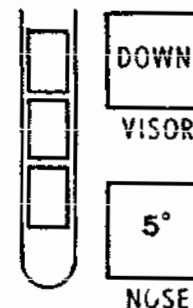


VISOR MOVEMENT

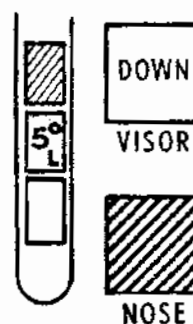
NOSE IN-TRANSIT (0°-5°)



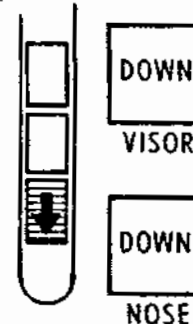
NOSE DOWN 5°



NOSE IN-TRANSIT (5°-12½°)



NOSE DOWN 12½°



NOSE FAIRING  
MOVEMENT

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Visor and Droop Nose Indication Diagram  
Figure 509

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- R B (a) As the nose uplocks open the red unlocked indication illuminates and, as the nose begins to lower, the NOSE magnetic indicator shows cross-hatch.
- R B (b) As the nose approaches the 5 deg droop position the red light extinguishes and the NOSE magnetic indicator shows 5 deg.
- R B (c) The time taken to lower is between 2 and 5 seconds.
- (5) Set the VISOR/NOSE control lever to "DOWN" (visor down, nose down). Check that:
- R B (a) As the nose jack collet locks disengage, the red unlocked indication illuminates, the collet locks 5 deg. L caption illuminates (amber), and as the nose begins to lower the NOSE magnetic indicator shows cross-hatch.
- R B (b) When the nose is fully down the red light and the 5 deg L caption extinguishes: the arrow caption illuminates (green), and the NOSE magnetic indicator shows DOWN.
- R B (c) The time taken to lower is between 4 and 5.5 seconds.
- (6) Set the VISOR/NOSE control lever to "5 deg" (visor down, nose 5 deg); check that:
- R B (a) As the nose moves upward the red unlocked indication and the 5 deg L caption illuminate, the green arrow caption extinguishes and the NOSE magnetic indicator shows cross-hatch.
- R B (b) As the nose approaches 5 deg, the nose magnetic indicator shows UP. When the nose reaches the 5 deg position the collet locks 5 deg. L caption and the red light extinguish.
- R B (c) The time taken for the nose to rise is between

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4.5 and 6.5 seconds.

- (7) Set the VISOR/NOSE control lever to "VIS/0 deg."  
(visor down, nose up); check that:

R B  
R B

(a) As the nose moves upward the red unlocked indication illuminates and the NOSE magnetic indicator shows cross-hatch.

R B

(b) As the nose approaches 0 deg, the nose magnetic indicator shows UP. When the nose engages in the uplocks the red light extinguishes.

R B

(c) The time taken to rise is between 3 and 5.5 seconds.

- (8) Set the VISOR/NOSE control lever to "UP"  
(visor up, nose up); check that:

R B  
R B

(a) As the visor begins to rise the red unlocked indication illuminates and the VISOR magnetic indicator shows cross-hatch.

R B

(b) As the visor engages in its uplock the red light extinguishes, and the VISOR magnetic indicator shows UP.

R B

(c) The time taken to raise the visor is between 4 and 8 seconds.

### 7. Visor and Droop Nose Operational Test - Standby System

#### A. Prepare to Test

- (1) Observe the preparatory procedure given in para.6B and C.

#### B. Test (Ref. Fig.508 and 509)

- (1) With the nose and visor in the 'up' positions (VISOR/NOSE normal selector switch at UP), hinge the guard clear of the STBY visor lowering switch and set the switch from "OFF" to "VISOR LOWER". Check visor

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operation and indication as detailed in para.6D.

- (2) Set the STBY nose lowering switch from "OFF" to "NOSE 5 deg" and check nose operation and indication as detailed in para.6D.
- (3) Set the STBY nose lowering switch from "OFF" to "NOSE DOWN" and check nose operation and indication as detailed in para.6D.
- (4) Reset the droop nose and visor operating system using the procedure given in para.9.

### 8. Visor and Droop Nose Operational Test - Emergency Release System

#### A. Prepare to Test

- (1) Observe the preparatory procedure given in para.6B and C, but do not pressurize the green and the yellow hydraulic systems. Ensure that they are depressurized (Ref.29-00-00, Servicing).

#### B. Test (Ref. Fig.508 and 509)

- (1) With the nose and visor in the 'up' position, withdraw the pip-pin securing the EMERGENCY NOSE/VISOR UPLOCK RELEASE lever and pivot the lever upward to operate the system; ensure that lever automatically latches in the raised position. Check that:
  - (a) The uplocks disengage and the nose free-falls smoothly to the 5 deg position.
  - (b) When the nose reaches the 5 deg position the NOSE magnetic indicator shows 5 deg and that the red unlocked indication remains illuminated showing that the visor uplock has released.
  - (c) The time taken for the nose to lower is 4 to 8 seconds.

NOTE: The visor will not lower owing to seal friction, but, for the purpose of this test, caption indication that the visor uplock has released is adequate.

- (2) Reset the droop nose and visor operating system using the procedure given in para.9.

### 9. Resetting Procedure for Droop Nose and Visor System after

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### Standby or Emergency Lowering

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Hydraulic ground generation rig	-

#### B. Reset.

- (1) Ensure that the pressure in the green and the yellow hydraulic systems is at zero.
- (2) Ensure that the VISOR/NOSE normal control lever on the co-pilot's (RH) dash panel is set to agree with the position of the nose.
- (3) Return the standby selector switch(es) to "OFF" and/or return the EMERGENCY NOSE/VISOR UPLOCK RELEASE lever to its normal stowed position, as applicable. If the lever is in the operated position depress the latch release plunger in the end of the lever shaft and return and secure the lever in the stowed position.
- (4) Connect the ground hydraulic rigs to the aircraft (Ref. 29-00-00, Servicing).
- (5) Pressurize the yellow hydraulic system and gradually pressurize the green hydraulic system.

NOTE: The green system must be pressurized gradually to avoid an upward kick of the droop nose.

- (6) Carry out a complete operational test of the visor and droop nose using the normal system only (Ref. para 6C and D). Repeat the test twice to prove the reinstatement of the system.
- (7) If this procedure follows the use of the standby (yellow hydraulic) system, check and adjust the fluid levels in the green and the yellow hydraulic reservoirs (Ref. 12-12-29).

NOTE: Using the standby system causes a volume of fluid to be transferred from the green to the yellow hydraulic system. Therefore after using the standby system the fluid levels in the two

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reservoirs must be checked and adjusted if necessary.

### 10. Test Windshield Wipers Override Switch

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit breaker clips	-

#### B. Test

- (1) Make available ground electrical power (Ref.24-41-00).
- (2) Pressurize the green and the yellow hydraulic systems. Using the aircraft ground hydraulic checkout system (Ref.29-00-00, Servicing).
- (3) Lower the visor (Ref. para.6).
- (4) Electrically isolate the windshield wipers circuit by tripping the associated circuit breakers, fit safety clips.

NOTE: This will de-energize the windshield wipers parked relays thus simulating a circuit failure and prevent the visor from raising.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
LH W/SCREEN WIPER CONT	1-213	1H72	J 8
RH W/SCREEN WIPER CONT	15-216	2H72	A15

- (5) Ensure that the wipers are in the parked position, set the VISOR/NOSE normal control switch to "UP" and check that the visor does not raise.
- (6) Set the WIPER/O/RIDE switch to "O/RIDE". Check visor

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operation and indication as in para.6D.

- (7) On completion of the test:
- (a) Set the WIPER/O/RIDE switch to "NORMAL".
  - (b) Reset the circuit breakers previously tripped.
  - (c) Switch off and disconnect electrical ground power.
  - (d) Set the ground hydraulic checkout switches to "OFF".

### 11. Test Windshield Wipers Inhibition

#### A. General.

Fitted to the bottom of the visor rails are the visor 'down' indication microswitches M34 (RH) and M60 (LH) which are operated with the lowering and raising of the visor mechanism. These microswitches are utilized for the inhibition of the windshield wipers when the visor is raised.

#### B. Test

- (1) Make available ground electrical power (Ref. 24-41-00).
- (2) Pressurize the green and the yellow hydraulic systems. Using the aircraft ground hydraulic check out system (Ref.29-00-00. Servicing).
- (3) Lower the visor by setting the normal selector switch from UP to VIS/O deg.
- (4) Set the wipers control switches on the centre console panel 9-211 to "SLOW" and check that the wipers are operative. Return the switches to "OFF".

NOTE: The wipers must be operated only on a wet windshield.

- (5) Ensure that the wipers are in the parked position and raise the visor by setting the normal selector lever to 'UP'.
- (6) Set the wipers control switches to "SLOW" and check that the wipers are inoperative. Return

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the switches to "OFF".

- (7) Set the ground hydraulic check out switches to "OFF".
- (8) Disconnect ground electrical power (Ref.24-41-00).

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### VISOR AND DROOP NOSE SYSTEM - INSPECTION/CHECK

#### 1. General

This inspection/check is confined to the visor and droop nose system mechanism. For the inspection/check procedure for the visor and droop nose hydraulic system refer to 27-62-00. The visor and nose are lowered to permit inspection of the uplocks: inspection of the visor spring assister mechanism requires the visor raised.

#### 2. Inspection/Check - Visor and Droop Nose Mechanism

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Locking link, visor down	D925468030
Locking sleeves, nose jacks	E925091000
Locking pins, visor up	E925045030
Locking pins, nose up	E925045031
Safety clips, circuit breakers	-
Hydraulic ground rig	-

##### B. Prepare to Inspect (Ref. Fig. 601 )

- (1) Ensure that the visor and nose are lowered.
- (2) Electrically isolate the visor and droop nose controls by tripping the associated circuit breakers; fit circuit breaker safety clips.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
VISOR & NOSE CONT	15-215	M11	F 8
NOSE 7 1/2 CONT	1-213	M12	Q16
NOSE/VISOR STBY LOWER SUP	1-213	M13	Q17

- (3) Fit the ground locking sleeves to the nose actuator jacks and the visor down locking link to its attachment points on the droop nose and visor structures.

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- (4) Remove access panels 113AB, BB, CB, DB, BL, FZ, BZ, 114BR, FZ, 211AL, BL, 212AR and BR.
- (5) Illuminate the service lights in the droop nose, if required, as follows:
  - (a) Make available ground electrical power (Ref. 24-41-00).
  - (b) Set the GRD LIGHTING CONTROL switch, on the oxygen panel in the flight compartment, to "ON".

### C. Inspect

- (1) Inspect the visor support mechanism (comprising A-frame, operating leg, tracking legs, struts and carriages), visor guide rails, visor spring assisting mechanism, emergency release mechanism and the visor uplock for cleanliness, freedom from corrosion, distortion and damage and security attachment of all parts.
- R  
R (2) Ensure all visor mechanism electrical bonding leads between the operating leg, visor, tracking legs and their connecting rods are unbroken.
- (3) Inspect the side load links, nose uplocks, nose emergency release mechanism, nose jacks gimbal fittings nose guide rails and carriages for cleanliness, freedom from corrosion, distortion and damage, and security of attachment of all parts.
- R (4) Ensure that all droop nose system electrical bonding leads are unbroken.

### D. Check

- (1) Check that the visor uplock hooks and locking rollers contact surfaces are clean, undamaged and lubricated with grease (Ref. 12-22-27).
- (2) Check the visor guide rails rear end mounting pin and fail-safe pin retaining bolts are secure and locked with wire.
- (3) Check that the droop nose fairing uplock pins and the uplock hooks are clean and undamaged and that their contact surfaces are lubricated with grease (Ref. 12-22-27).
- R (4) Check that the nose transmitter unit link rod attach-

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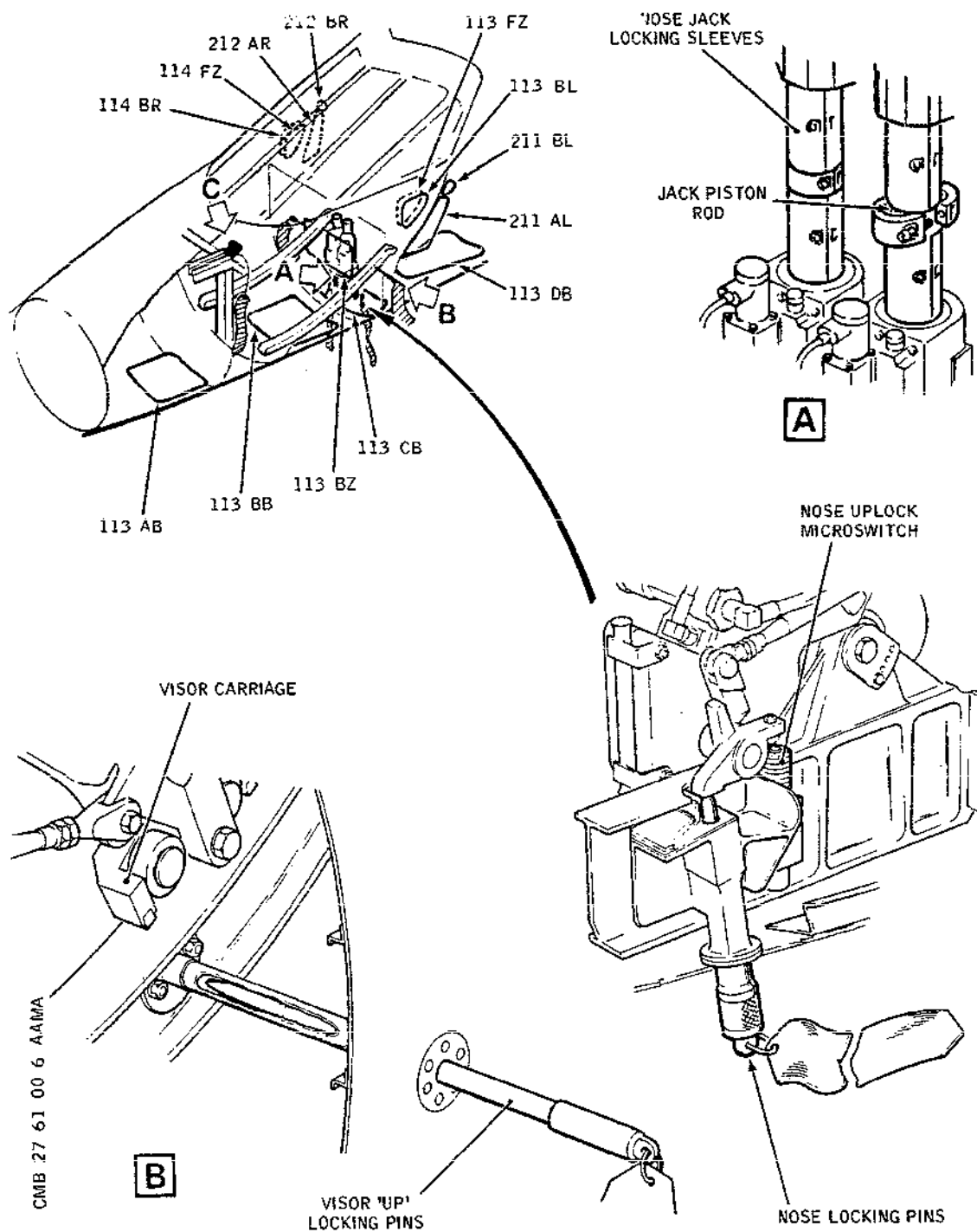
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Access Panels and Ground Safety Equipment  
(Sheet 1 of 2)  
Figure 601

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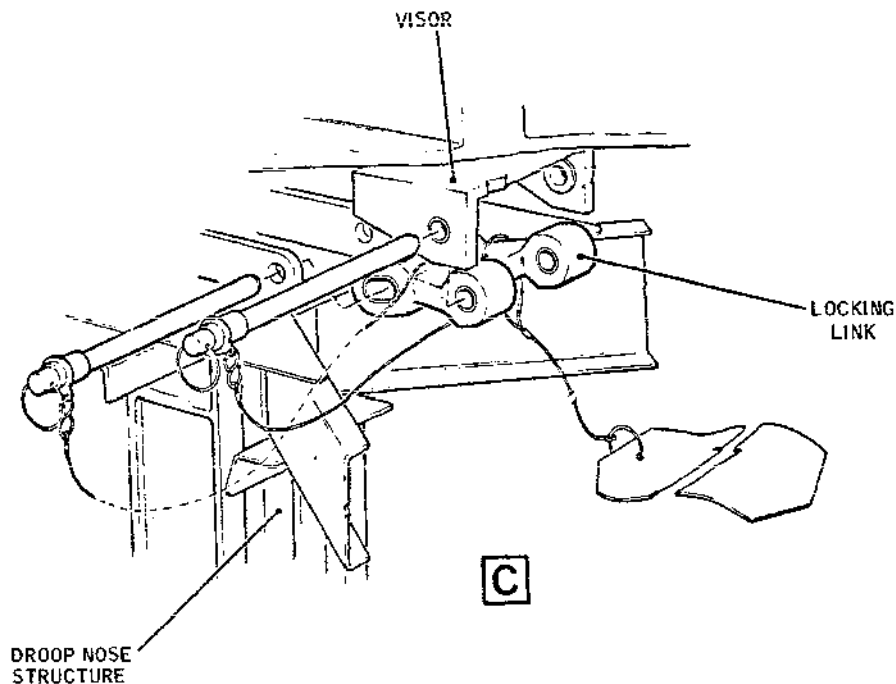
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Access Panels and Ground Safety Equipment  
(Sheet 2 of 2)  
Figure 601

- R  
R
- ment bolts are secure and that the turnbuckle locknuts are secure and wirelocked.
- R  
R  
R  
R
- (5) Check that the clearance between the link rod and the fail safe box is within 0.04 and 0.06 in (1.0 and 1.5 mm) and that the box lid bolts are tight and wirelocked.
- R  
R
- (6) Check that all wire locking of the visor and nose emergency release system rod locknuts is intact.
- R
- (7) Raise the visor and droop nose:
- (a) Remove the nose jack ground locking sleeves and the visor down locking link.
- (b) Reset the circuit breakers previously tripped.
- (c) Reconnect a ground hydraulic rig and pressurize the green and the yellow hydraulic systems.

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(d) Raise the visor and nose as instructed in the operational test for visor and droop nose in 27-61-00, Adjustment/Test.

(e) Trip the circuit breakers (Ref. para. 2B).

(f) Fit ground locking pins to the visor and to the nose.

- R
- (8) Check the visor spring assistor mechanism:
- (a) Check and inspect the condition of spring assistor mechanism while under tension with the visor up.
  - (b) Check that the clearance between the lever stop bolt and the stop is between 0.09 and 0.11 in (2.28 and 2.79 mm), and that the clearance between the spring pot rod-end and the lever is not less than 0.157 in (4 mm).
  - (c) Check that the turnbuckles are securely locked with wire clips.
  - (d) Check that the cables clear the adjacent mechanism and structure.

### E. Conclusion

- (1) Switch off the servicing lights.
- (2) Replace the access panels and torque-tighten their attachment screws to between 40 and 45 lbf in (0.45 and 0.50 mdaN).
- (3) Remove the visor and nose up ground locking pins.
- (4) Reset the circuit breakers.

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**END OF THIS  
SECTION**

**NEXT**

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### VISOR - REMOVAL/INSTALLATION

#### 1. General

The visor is secured by bolts to a hydraulically operated mechanism that raises and lowers the visor on rails. It also has electrical connections for the visor window panel de-icing. Installation instructions include those for fitting a replacement visor and the subsequent necessary adjustments. Adjustment of the visor emergency release mechanism is given under the adjustment/test procedure for the visor and droop nose (Ref. 27-61-00). When removing and installing the visor, the nose must be fully lowered to give the visor maximum clearance with the windshield.

#### 2. Visor

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Screwjack, visor	D925156001
Torque handle, visor screwjack	Richmont Products Ltd. LTC.1-SBH 7/8 or equivalent.
Sling, visor	D935061001
Checking sling, droop nose	D935085000
Attachment bracket, sling	D935063000
Spring balance (2 ton)	-
R Locking pin (2), droop nose	E925045031
Locking sleeve, nose actuator jacks	E925091000
Bolt extractor set:	D925164000
Barrel	D925581000
Body	D925582000
Bolt	D925578000
Torque spanner, 0 to 340 lbf in (0 to 3.85 mdaN) range	-
Safety clips, circuit breaker	-

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DESCRIPTION	PART NO.
Locking wire, 0.028 in (0.71 mm) dia.	-
Hydraulic ground generation rig	-
Lifting equipment (SWL 700 lb (310 kg))	-

### B. Prepare to Remove Visor

(1) If the nose is not in the 12-1/2 deg. position:

- (a) Make available ground electrical power (Ref. 24-41-00).
- (b) Pressurize the green and the yellow hydraulic systems using the aircraft ground hydraulic checkout system (Ref. 29-11-00, 29-21-00, Servicing).
- (c) Operate the VISOR/NOSE normal control lever on the co-pilot's dash panel to set the nose DOWN.

(2) Fit the visor ground equipment screwjack:

- (a) Depressurize the green and yellow hydraulic systems by operating the manual pressure relief units located in zone 151, and the pressure relief valves fitted to the base of the relevant hydraulic reservoir in zone 153.
- (b) Electrically isolate the visor and nose normal and standby controls by tripping circuit breakers M11 on panel 15-215 ref. F8, and M12 and M13 on panel 1-213 ref. Q16 and Q17; fit safety clips.
- (c) Disconnect the electrical plugs from the normal and the standby selector valves (M45 and M51) in the equipment bay (zone 121) (Ref. Fig. 401 ).
- (d) Fit the screwjack (Ref. Fig. 402 ).

(3) Fit the safety locking sleeves to the nose actuator jacks (Ref. Fig. 401 ).

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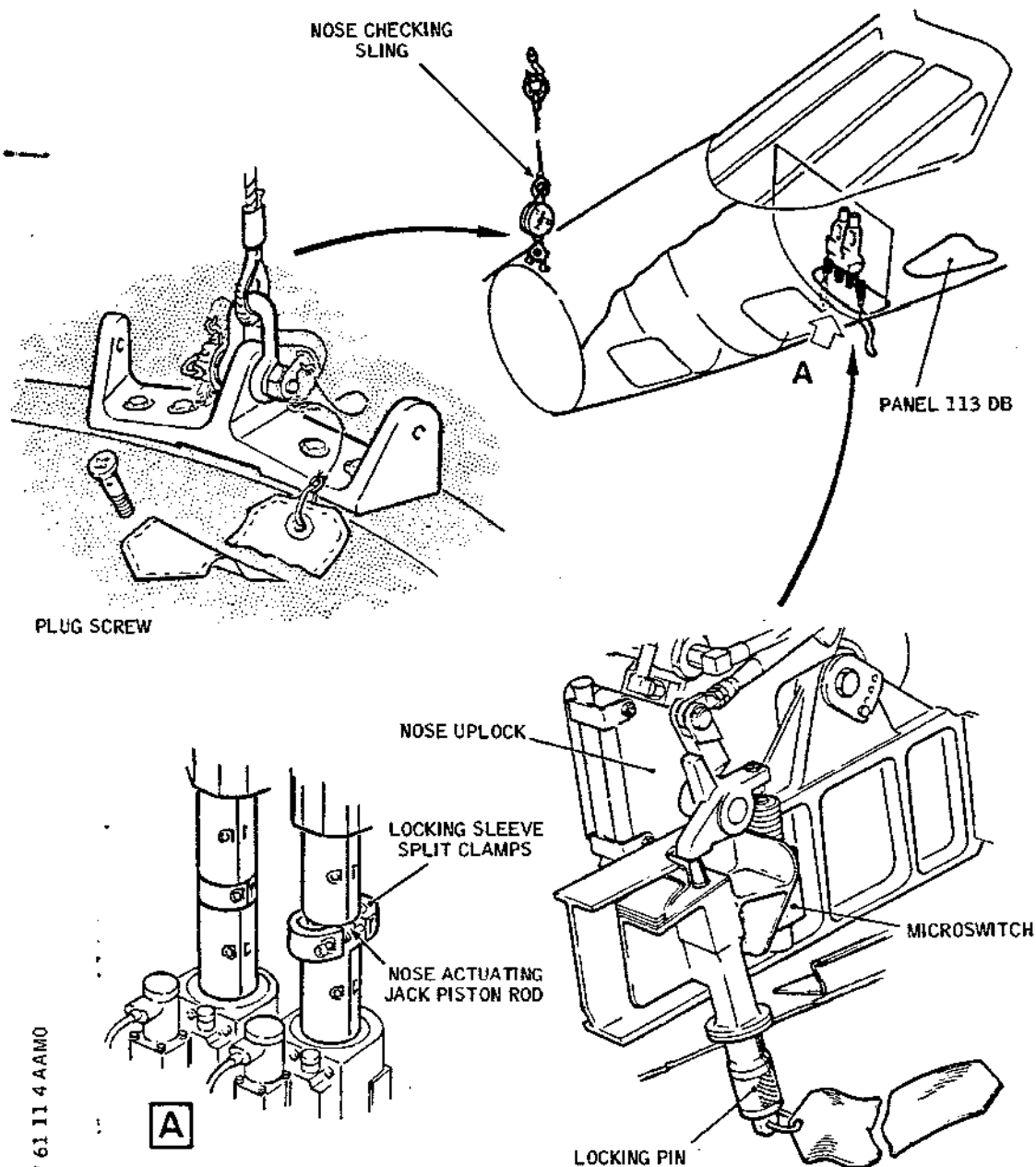
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Ground Equipment  
Figure 401

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- (4) Electrically isolate the visor de-icing window panels by tripping the associated circuit breaker ; fit safety clips.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
VISOR SCREEN DE-ICING			
MAIN FLAT WINDOW			
LH FLAT VISOR HTR CONT.	15-215	1H222	C11
RH FLAT VISOR HTR CONT.	15-216	2H222	C15
LH FLAT VISOR HTR SUP.	14-215	1H221	G5
RH FLAT VISOR HTR SUP.	13-216	2H221	G13
CURVED WINDOW			
LH BOTTOM & CURVED VISOR HTR. CONT.	15-215	1H224	C12
RH BOTTOM & CURVED VISOR HTR CONT.	15-216	2H224	C16
LH CURVED VISOR HTR SUP.	14-215	1H223	G8
RH CURVED VISOR HTR SUP.	13-216	2H223	G10
DETACHABLE WINDOW			
LH BOTTOM VISOR HTR SUP.	14-215	1H225	E9
RH BOTTOM VISOR HTR SUP.	13-216	2H225	B10

- (5) Disconnect the visor window de-icing electrical cables from the operating leg at the plug breaks U1035 and U1036 and P-clips.

- (6) Fit the visor sling (Ref. Fig. 403 ):

- Raise the visor to an approximately three quarters raised position using the visor screwjack (Ref. Fig. 402 ) and remove the access panels and glazing retaining bar to gain access to the visor slinging points.
- Fit the lifting bracket to the visor at the forward slinging point.
- Lift the sling into position using suitable lifting equipment and attach the sling to the visor.
- Operate the lifting equipment to take the weight of the visor.

C. Remove Visor (Ref. Fig. 404 ):

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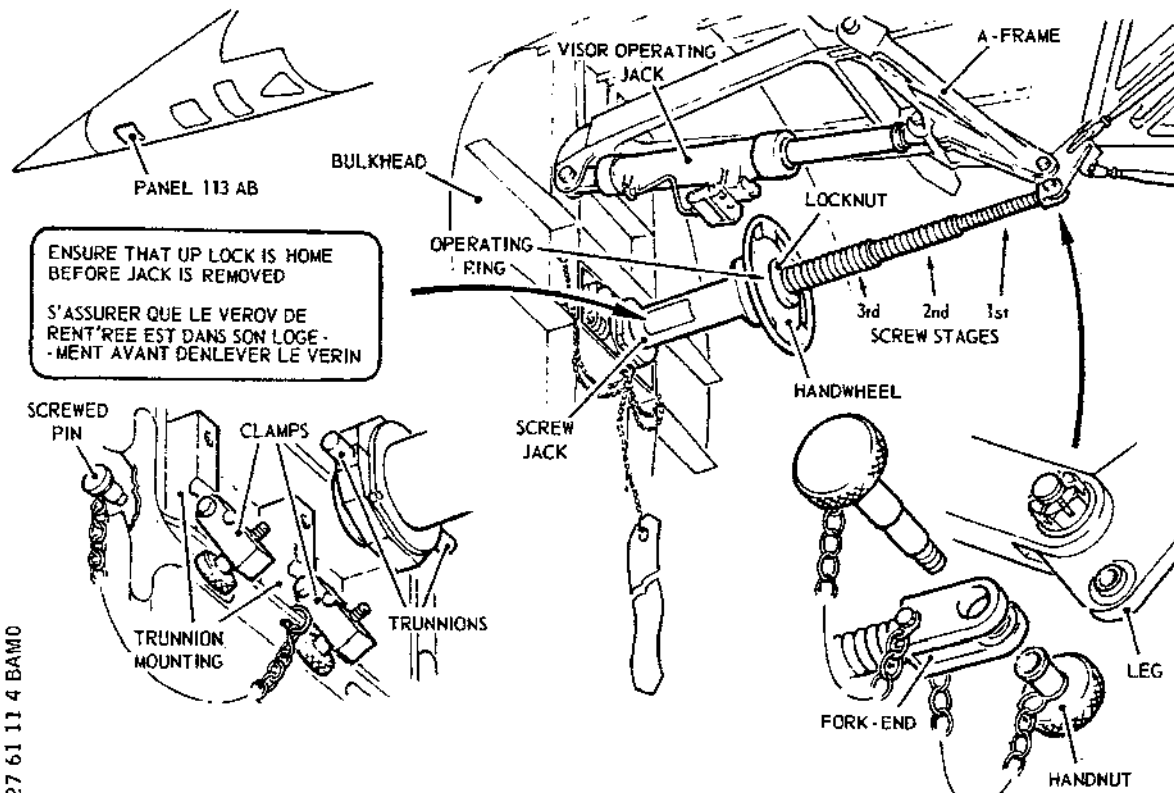
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**WARNING:** BEFORE INSTALLING THE SCREWJACK, THE VISOR ACTUATING JACK MUST BE ISOLATED FROM ITS ELECTRICAL AND HYDRAULIC SUPPLIES.

### INSTALLATION

1. Secure trunnions to bulkhead with screwed pins. Open clamps.
2. Position screwjack and secure trunnions with clamps.
3. Operate screwjack to engage fork-end with leg; secure with captive bolt and nut.

### OPERATION

#### Extension

1. Lock 3rd stage screw in closed position with locknut.
2. Operate screwjack handwheel to extend 1st and 2nd stage screws.
3. Release locknut and extend 3rd stage screw.

#### Retraction

1. Lock 3rd stage screw in extended position.
2. Operate screwjack until 1st and 2nd stage screws are retracted.
3. Release locknut and retract 3rd stage screw.

Visor Screwjack Installation  
Figure 402

EFFECTIVITY: ALL

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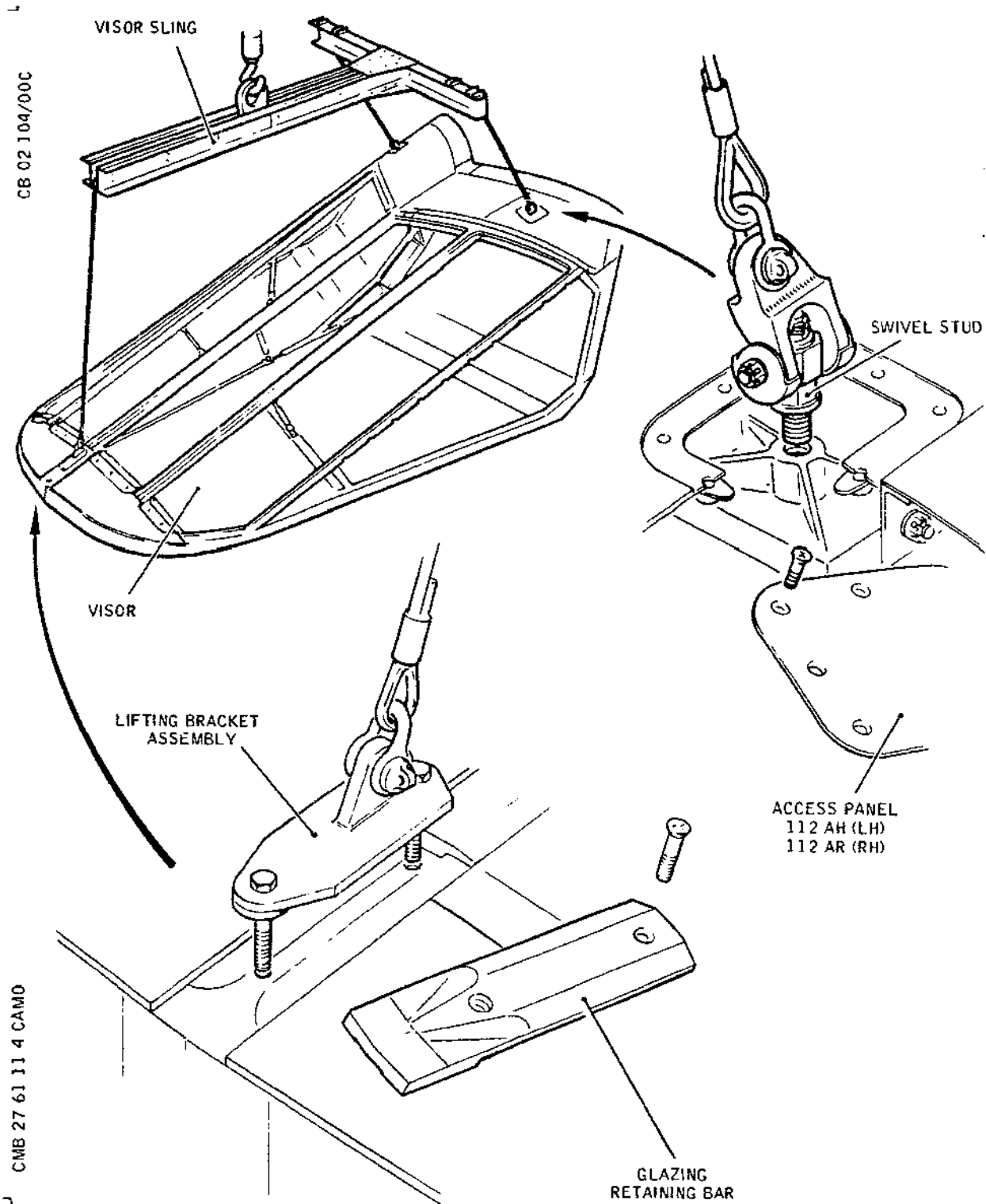
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## MAINTENANCE MANUAL



Visor Sling  
Figure 403

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- (1) Disconnect the four bonding leads connecting the tops of the operating leg and the strut assemblies to the visor.
- (2) Disconnect the operating leg, the tracking legs and the struts from the visor. Use the extractor tool to withdraw the bolts where shown.

CAUTION: TAKE SUITABLE PRECAUTIONS TO AVOID DAMAGING THE WINDSHIELDS.

- (3) Remove the visor, lower it on to a suitable stand and detach the visor sling. Refit the access panels and glazing bar at the visor slinging points.

### D. Install Visor

- (1) Ensure that the following conditions still prevail following the removal procedure:
  - (a) Hydraulic green and yellow systems off-loaded.
  - (b) Electrical safety precautions still in force.
  - (c) Nose lowered to the 12-1/2 deg. fully down position and safety sleeves fitted to the nose actuator jacks.
  - (d) Visor screwjack fitted and holding the visor carriage mechanism just short of the fully raised position.

- (2) Fit the sling to the visor (Ref. Fig. 403 ).

CAUTION: TAKE SUITABLE PRECAUTIONS TO AVOID DAMAGE TO THE WINDSHIELDS.

- (3) Using suitable lifting equipment raise the visor into position.
- (4) Fit the visor to its mechanism (Ref. Fig. 404 ):
  - (a) Secure the operating leg to the visor (Ref. Details A and B). Torque load the left hand nut to between 320 and 340 lbf in (3.55 and 3.78 mdaN) and the right hand nut to between 140 and 155 lbf in (1.58 and 1.75 mdaN). Secure each nut with a split pin. Connect the bonding leads.
  - (b) Secure the tracking legs to the visor (Ref.

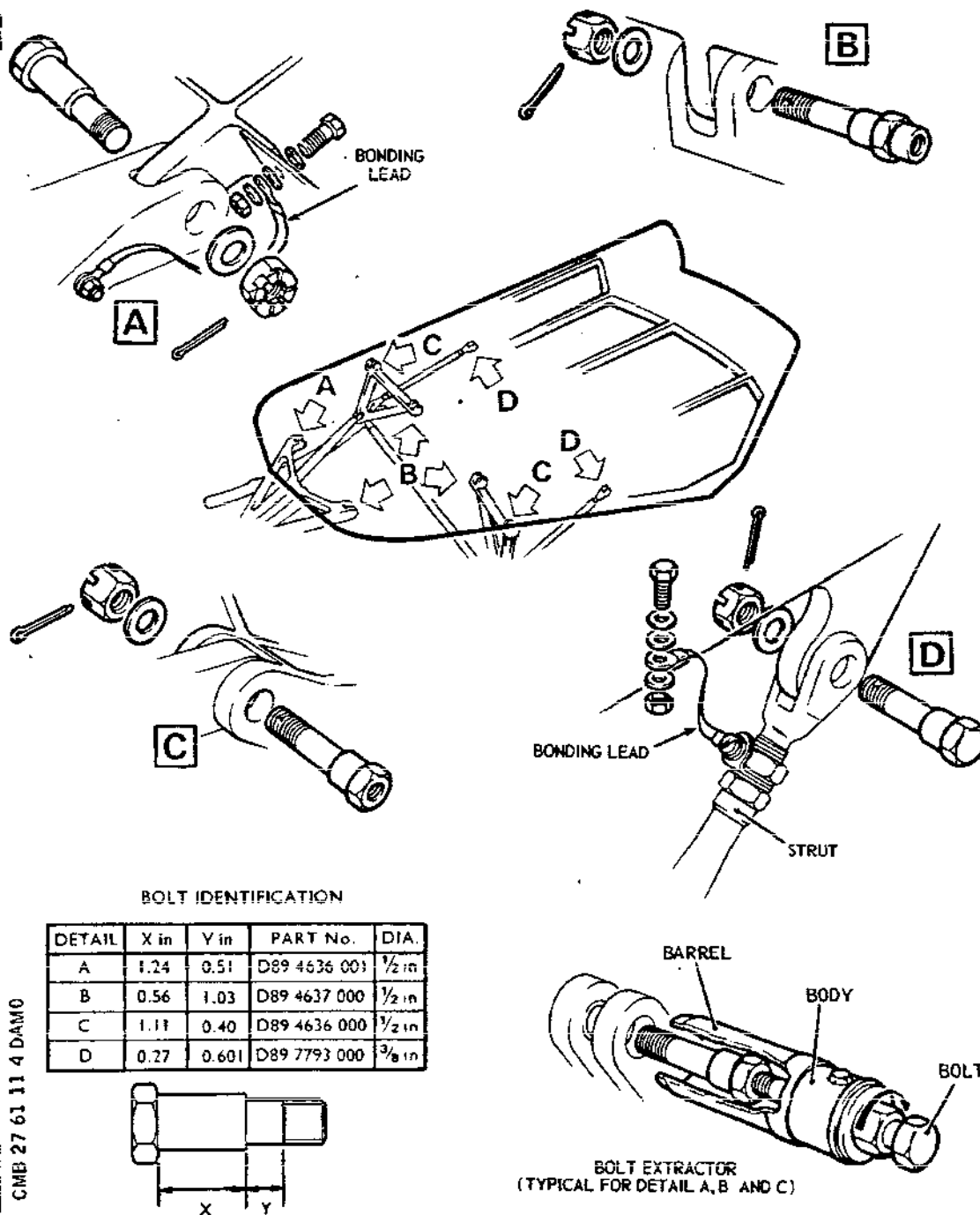
EFFECTIVITY: ALL

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Visor Installation  
Figure 404

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details B and C). Torque load the outboard bolt of each leg to between 140 and 155 lbf in (1.58 and 1.75 mdaN) and the inboard bolt to between 320 and 340 lbf in (3.55 and 3.78 mdaN). Secure each nut with a split pin.

- (c) Secure the strut assemblies to the visor (Ref. Detail (D)). Torque load each nut to between 80 and 90 lbf in (0.9 and 1.02 mdaN) and lock it with a split pin. Connect the bonding leads.

NOTE: Ensure that the bush is in the strut fork-end before connecting it to the visor and ensure that the fork end is visible through the inspection hole in the strut.

- (5) Remove the sling and the lifting bracket from the visor and refit the access panels and forward glazing retaining bar that covers the sling attachment joints (Ref. Fig. 403 ).
- (6) Remove the safety sleeves from the droop nose actuator jacks.
- (7) Remove the screwed plugs from the sling attachment bracket point and fit the bracket. Attach the checking sling, complete with spring balance, and with it raise the nose to the fully up position. Fit the locking pins to the droop nose.

NOTE: The weight on the checking sling must not exceed 1070 lb (485 kg)

- (8) Raise the visor to the fully-up position using the screwjack and check that the metal to metal gap between the rear edge of the visor and the fuselage is 0.22 in to 0.30 in (5.58 to 7.62 mm), and that between the visor and the nose fairing is 0.23 in to 0.29 in (5.84 to 7.36 mm). If necessary, position the visor to obtain these clearances by adjusting the visor uplock rollers (Ref. Para.3, B, (3) (C)).
- (9) Check that the visor engages correctly with the visor locating fitting on the windshield by opening the hinged side window panels in the visor and checking that with the visor fully up there is a mean gap of 0.001 in to 0.010 in (0.025 to 0.254 mm) between the visor hooks and the stop-pin on the locating fitting (Ref. Fig. 405 ). If the gap is outside the limits, adjust the visor locating fitting as detailed in para.3, Install Replacement Visor.

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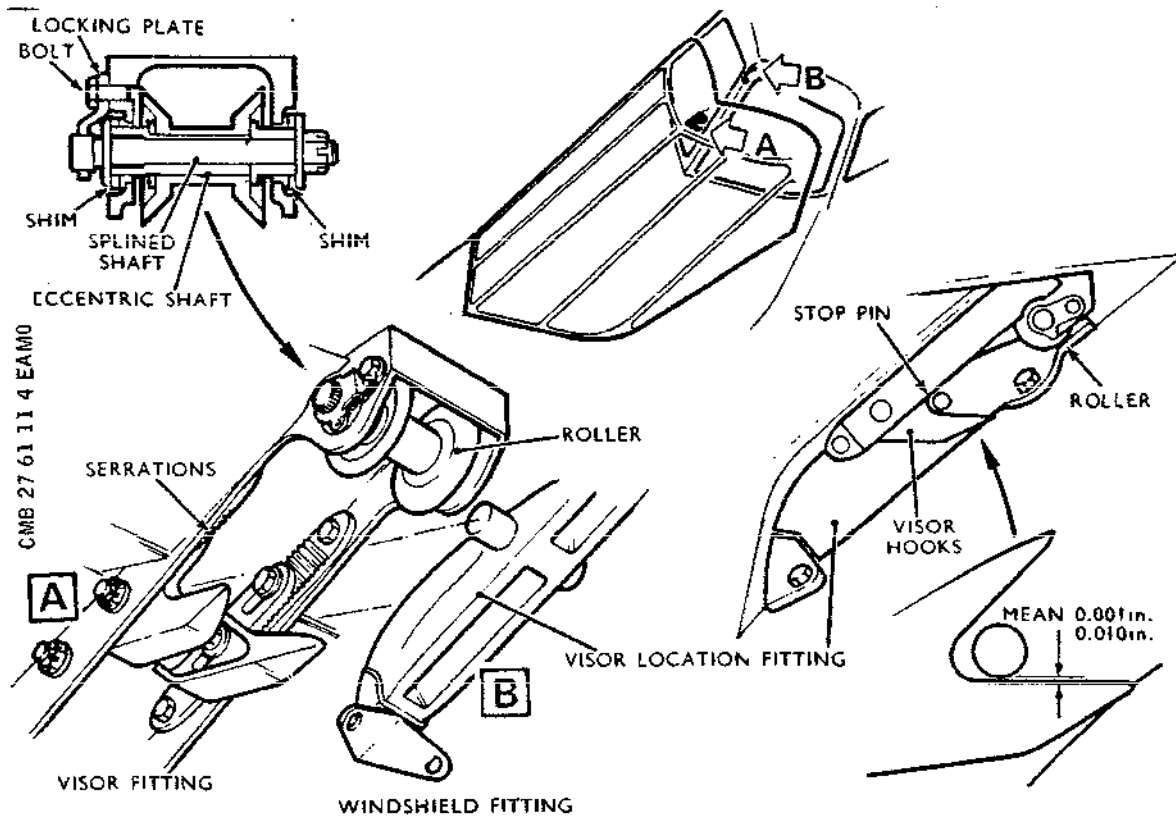
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Visor Location Fittings Adjustment  
Figure 405

- (10) Connect the visor window de-icing electrical cables at the plug breaks U1035 and U1036 on the operating leg, and secure the cables to the leg with P-clips.
- (11) Remove the visor screwjack.
- (12) Remove the checking sling and bracket from the droop nose and refit the screwed plugs to the bracket attachment holes.
- (13) Reconnect the electrical plugs to the normal and standby selector valves in the equipment bay.

### E. Conclusion

- (1) Reset the visor and nose control, and visor window panel de-icing circuit breakers.
- (2) Function test the visor window panel de-icing (Ref. 30-41-00, Adjustment/Test).

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- (3) Remove the locking pins from the droop nose.
- (4) Carry out the visor and droop nose operational test (Ref. 27-61-00, Adjustment/Test).

### 3. Install Replacement Visor

#### A. Prepare to Install

- (1) Prepare the replacement visor prior to installation:
  - (a) Remove the visor seals (Ref. 53-51-22, Removal/Installation).
  - (b) Remove the electrical wiring and clips from the old visor, carry out an inspection/check to ensure that they are serviceable and undamaged and fit them to the new visor. Connect the electrical plugs to the visor window panels ensuring that the plug and receptacle mating surfaces are clean and undamaged.
  - (c) Remove the shims from either side of the visor index roller and set the eccentric shaft so that maximum clearance will be obtained between the roller and the visor locating fitting on the windshield (Ref. Fig. 405 ).
  - (d) Ensure that the visor hooks are set to their lowest position on the serrated plates to give maximum clearance between the hooks and the stop-pin on the locating fitting (Ref. Fig. 405 ).
- (2) Ensure that the following conditions still prevail after removal:
  - (a) Hydraulic green and yellow systems off-loaded.
  - (b) Electrical safety precautions still in force.
  - (c) Nose lowered to the 12-1/2 deg. (fully down) position and ground safety sleeves fitted to nose actuator jacks.
  - (d) Visor screwjack fitted and holding the visor carriage mechanism in approximately a three-quarters raised position.

#### B. Install Replacement Visor

- (1) Install the visor as detailed in para.2.D, operations

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(2) to (8).

- (2) Check the continuity of the visor profile with the nose fairing and fuselage. If any discrepancy between the surfaces exceeds 0.060 in (1.52 mm) adjust the sideways position of the visor to reduce the discrepancy below that figure, where practicable, by adjusting the shims fitted to the tracking and operating legs (Ref. 27-61-12).

- (3) Adjust the visor location fittings (Ref. Fig. 405 ).

NOTE: When the nose and visor are in the fully raised position there must be a mean clearance of 0.001 in to 0.010 in (0.025 to 0.254 mm) between the hooks and the visor locating stop-pin on the windshield.

In the following sequence it is necessary to remove the ground locking pins from the droop nose each time the nose is lowered; refit them each time the nose is raised.

- (a) With the visor raised and secured in its uplock, open the hinged access window panels in the visor and measure the clearances between the visor hooks and the stop-pin on the visor locating fitting.
- (b) Lower the nose to 5 deg down by operating the EMERGENCY NOSE/VISOR UPLOCK RELEASE handle on the pilots' centre console to release the nose uplocks and lowering the nose on the checking sling. Adjust the hooks on their serrations to obtain the minimum possible clearance between hooks and stop-pin without actually touching when the nose is raised.

NOTE: Each serration is equivalent to 0.028 in (0.71 mm) thus the clearance will be between 0.001 in and 0.028 in (0.025 and 0.71 mm) giving an initial coarse adjustment.

- (c) Raise the nose and recheck the clearance. If the mean clearance is between 0.001 in and 0.010 in (0.025 and 0.254 mm), no further adjustment to the hooks is necessary. If the clearance is between 0.011 in and 0.017 in (0.279 and 0.43 mm), then a further and finer adjustment must be made at the uplock rollers to obtain the required

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clearance, as follows (Ref. Fig. 406 ):

- (i) Slacken the clamp bolt upon which the uplock levers pivot.
- (ii) Cut the locking wire and slacken the lock-nuts on both turnbuckles.
- (iii) Shorten the left hand turnbuckle, which will pivot the visor upwards on its roller in the uplock, until the clearances are reduced to a mean 0.001 in to 0.010 in. Similarly adjust the right hand turnbuckle to maintain the clearance between the right hand roller and its uplock hook.
- (iv) Torque load the locknuts to between 75 and 85 lb in (0.83 and 0.94 mdaN) secure them to the lockwashers with wire.
- (v) Torque load the clamp bolt to between 140 and 155 lbf in (1.55 and 1.72 mdaN).
- (d) If the mean clearances are between 0.018 in and 0.028 in (0.45 and 0.71 mm) lower the nose to 5 deg down (Ref. (b)) and raise the visor hooks by one serration. Raise the nose and obtain the mean 0.001 in to 0.010 in clearance between the hooks and the stop-pin by lowering the visor through adjustment of the visor uplock rollers as in operation (c), but lengthening the turnbuckles instead of shortening them.
- (e) With the visor in the raised position and with the visor roller laterally located by its flanges on the visor locating fitting on the windshield, measure the side gaps, and prepare shims to suit and fit them in the associated gaps.

NOTE: The total thickness of the shims must equal the sum of the two measured gaps to within +0.000 in and -0.010 in (+0.0 and -0.25 mm).

- (f) Adjust the splined shaft and the eccentric shaft so that the roller just contacts the visor locating fitting, and secure them with the locking plate and bolt. Secure the locking plate bolt with wire. Fit the washer and nut to the splined shaft, torque-tighten the nut to between 100 and 120 lbf in (1.13 and 1.36 mdaN) and

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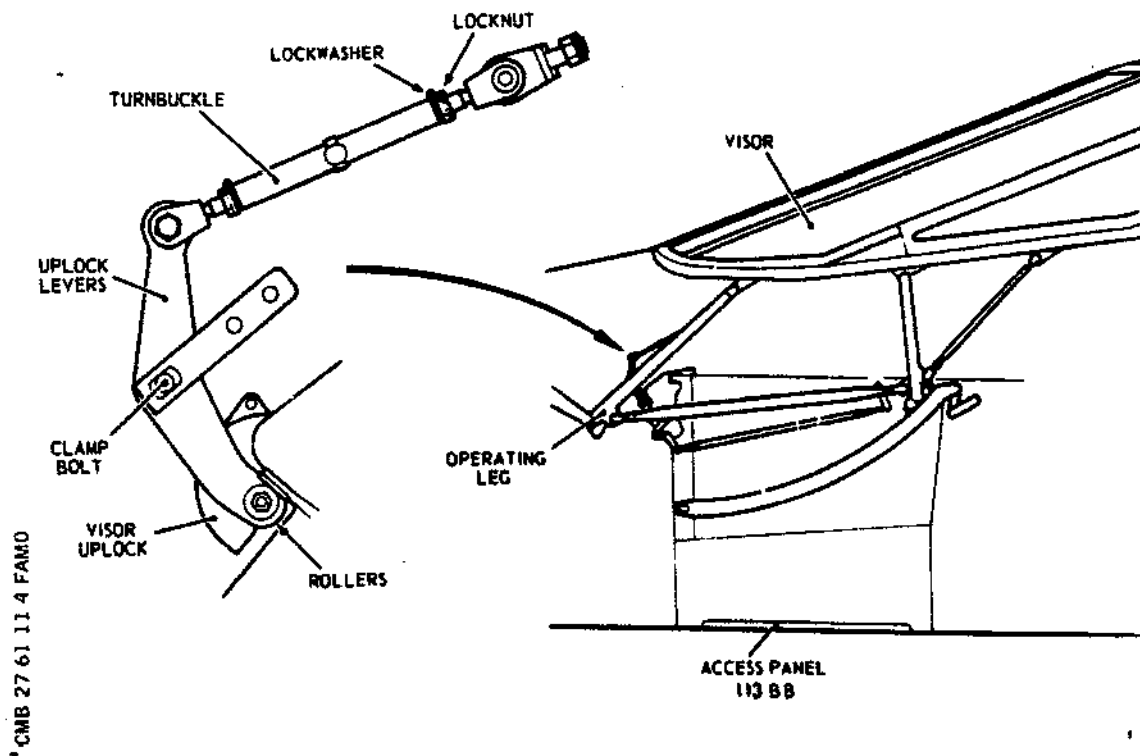
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## MAINTENANCE MANUAL



Visor Uplock Roller Adjustment  
Figure 406

R

secure it with a split-pin.

- (4) Fit the visor seals (Ref. 53-51-22, Removal/Installation).
- (5) Raise the nose and visor and engage them in their uplocks using the checking sling and the screwjack respectively. Fit the locking pins to the droop nose.
- (6) Remove the checking sling and attachment bracket. Refit the screwed plugs to the bracket attachment holes.
- (7) Connect the visor window de-icing electrical cables at the plug breaks U1035 and U1036 on the operating leg and secure the cables to the leg with P-clips.
- (8) Remove the visor screwjack.
- (9) Reconnect the electrical plugs to the normal and stand-by selector valves in the equipment bay.

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### C. Conclusion

- (1) Reset the visor and nose control, and the visor window panel de-icing circuit breakers tripped in para.2.B.
- (2) Function test the visor window panel heating circuits (Ref. 31-41-00, Adjustment/Test).
- (3) Remove the locking pins from the droop nose.
- (4) Carry out the visor and nose operational test (Ref. 27-61-00, Adjustment/Test).

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## MAINTENANCE MANUAL

### VISOR MECHANISM - REMOVAL/INSTALLATION

#### 1. General

The visor mechanism comprises:

- (1) Tracking legs
- (2) Operating leg
- (3) A-frame
- (4) Struts

For information on the visor carriages and guide rails refer to 27-61-13 and 27-61-16 respectively.

Removal and installation of any of these parts is made with the visor in the raised position. In all cases the visor is held by its uplock except during removal and installation of the operating leg when the visor is retained in the raised position by the visor locating ground equipment because the visor/uplock rollers form part of the operating leg. If a new operating leg is fitted the uplock roller assembly must be transferred from the old leg to the new.

With the exception of the struts all parts are fitted with shims ground to the requisite thickness. If a new part is fitted new shims must be ground to suit.

To maintain the rigidity of the structure no more than one of the five struts is to be removed at any one time.

#### 2. Tracking Legs (Ref. Fig.401 and 402)

##### A. Equipment and Materials

	DESCRIPTION	PART NO.
R	Safety clips, circuit breaker	-
R	Locking sleeve, visor jack	D925157001
R	Locking pin (2), droop nose	D925045031
R	Extractor set, comprising:	D925164000
R	Bolt	D925578100

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	DESCRIPTION	PART NO.
R	Body	D925582000
R	Barrel	D925581000
R R	Torque spanner, range: 18 lbf in to 340 lbf in (0.2 to 3.8 mdaN)	-
R R R	Non-corrodible steel locking wire 0.028 in (0.7 mm) dia	-

### B. Prepare to Remove

- (1) Raise the nose and visor to the fully raised position.
  - (a) Make available electrical ground power (Ref. 24-41-00).
  - (b) Connect a ground hydraulic test rig to the aircraft hydraulic system (Ref. 29-\*\*-\*\*) and pressurize the green and the yellow hydraulic systems.
  - (c) Operate the VISOR/NOSE normal selector switch on the co-pilot's dash panel to fully raise the nose and visor.
- (2) Electrically isolate the visor and nose normal and standby controls by tripping circuit breakers M11 on panel 15-215 map ref. F8, and M12 and M13 on panel 1-213 map refs. Q16 and Q17; fit safety clips.
- (3) Fit the droop nose locking pins and the visor jack safety locking sleeve (Ref. Fig. 401 ).

### C. Remove (Ref. Fig. 402 )

- (1) Remove the bolt securing the carriage to the tracking leg and remove the carriage together with the shims and wiper pads.
- (2) Disconnect the three struts, together with their bonding leads from the tracking leg.

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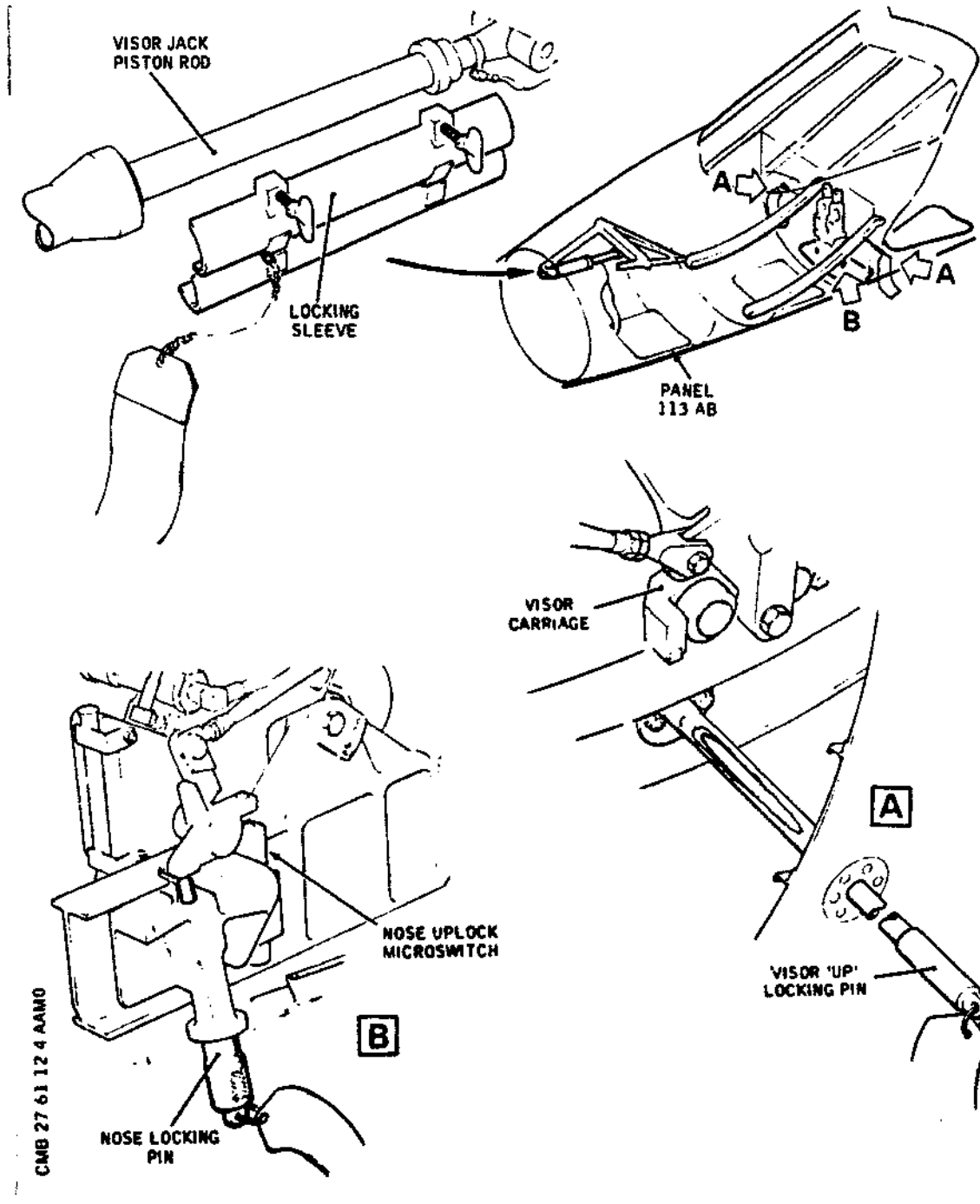
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## MAINTENANCE MANUAL



Ground Safety Locks  
Figure 401

EFFECTIVITY: ALL

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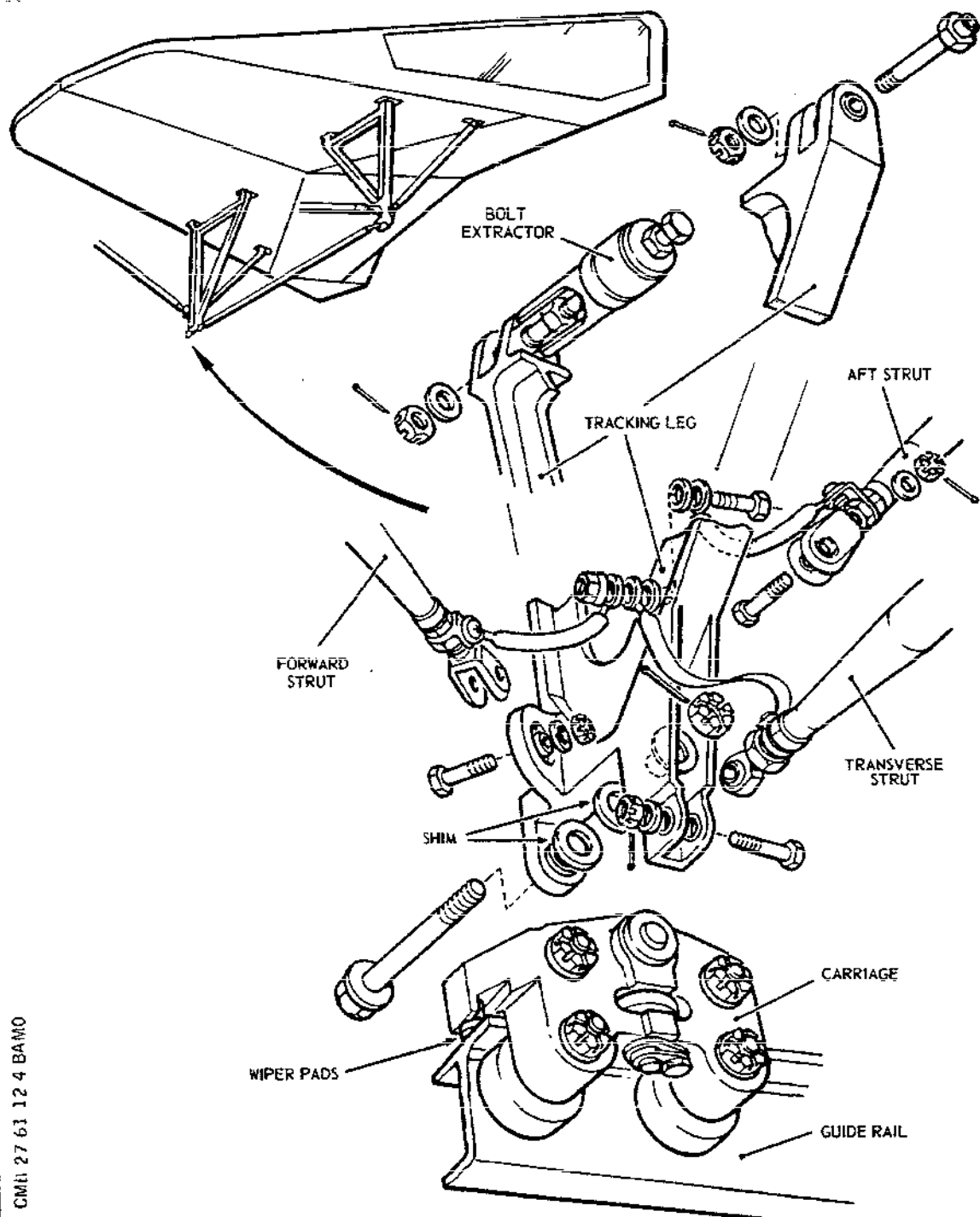
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Tracking Legs - Installation  
Figure 402

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NOTE: Do not disturb the strut length setting.

- (3) Remove the two bolts that secure the tracking leg to the visor lugs, using the extractor tool, and remove the tracking leg.

### D. Install (Ref. Fig. 402 )

- (1) Fit the tracking leg to the visor lugs with the bolt, nut and washer. Do not tighten the nuts at this stage, the leg must be free to move.
- (2) Fit the carriage complete with wiper pads to the guide rail and secure it, together with the shims, to the tracking leg with the bolt, nut and washer. Tighten the nut to a torque value of 320 to 340 lbf in (3.55 to 3.75 mdaN) and secure it with a split pin.

NOTE: (1) The shims are identified by grooves cut in the perimeter and should be fitted as follows:

<u>No. of Grooves</u>	<u>Location</u>
1	LH OUTBD.
2	RH OUTBD.
3	LH INBD.
4	RH INBD.

- (2) If the tracking leg, carriage or guide rail has been renewed, refit the carriage as instructed in 27-61-13.
- (3) Tighten the nuts on the bolts securing the tracking leg to the visor legs; that on the inner bolt to a value of 320 to 340 lbf in (3.55 to 3.8 mdaN) and that on the outer bolt to 140 to 155 lbf in (1.55 to 1.73 mdaN) and secure them with split pins.
- (4) Secure the transverse strut to the tracking leg with a bolt only. Check that the bolt can be slipped freely in its hole then secure it with the nut and washer. Torque tighten the nut to 75 to 80 lbf in (0.83 to 0.9 mdaN). If the strut length must be adjusted or a new strut is fitted refer to para.5.
- (5) Secure the forward strut to the tracking leg in the same way as for the transverse strut in (4) but first ensuring that the upper rollers of the carriages are in contact with the visor rail.

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- (6) Check that the gaps between the carriage side rollers and the rails are 0.0005 to 0.0015 in (0.015 to 0.04 mm). If necessary, adjust the side rollers eccentric pin to achieve this figure.
- (7) Secure the aft strut to the tracking leg using the procedure in (4).
- (8) Attach the bonding lead from each of the three struts to the tracking leg.
- (9) At the completion of installation:
  - (a) Reset the circuit breakers previously tripped in para 2.8.
  - (b) Remove the droop nose locking pins and the visor jack safety locking sleeve (Ref. Fig. 401 ).
  - (c) Carry out the visor operational test (Ref. 27-61-00, Adjustment/Test) and check the satisfactory operation of the visor.

### 3. Operating Leg

#### A. Equipment and Materials

	DESCRIPTION	PART NO.
R	Locking pin (2), Visor 'up'	D925045030
R	Locking pin (2), droop nose	D925045031
R	Visor locating equipment	E925080000
R	Extractor set, comprising:	D925164000
R	Bolt	D925578100
R	Barrel	D925581000
R	Body	D925582000
R	Safety clips, circuit breaker	-
R	Non-corrodible steel wire, 0.028	-
R	in (0.7 mm) dia.	-

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### DESCRIPTION

### PART NO.

Torque spanner, 12 to 425 lbf in  
(0.13 to 4.7 mdaN) range

-

### B. Prepare to Remove

(1) If the nose and visor are not in the fully raised position, raise them:

(a) Make available electrical ground power (Ref. 24-41-00).

(b) Connect a ground hydraulic test rig to the aircraft hydraulic system and pressurize the the green and the yellow hydraulic systems (Ref. 29-11-00, and 29-21-00, Servicing).

(c) Operate the VISOR/NOSE normal selector switch on the co-pilot's dash panel as necessary to raise the nose and visor.

(2) Electrically isolate the visor and droop nose controls and the visor de-icing window panels by tripping the associated circuit breaker: fit safety clips:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
VISOR & NOSE			
CONT	15-215	M11	F 8
NOSE 7 1/2 DEG			
CONT	1-213	M12	Q16
NOSE/VISOR STBY			
LOWER SUP	1-213	M13	Q17
VISOR SCREEN			
DE-ICING			
MAIN FLAT WINDOW			
LH FLAT VISOR			
HTR CONT	15-215	1H222	C11
RH FLAT VISOR			
HTR CONT	15-216	2H222	C15
LH FLAT VISOR			
HTR SUP	14-215	1H221	G 5

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RH FLAT VISOR			
HTR SUP	13-216	2H221	G13
CURVED WINDOW			
LH BOTTOM &			
CURVED VISOR			
HTR CONT	15-215	1H224	C12
RH BOTTOM &			
CURVED VISOR			
HTR CONT	15-216	2H224	C16
LH CURVED			
VISOR HTR SUP	14-215	1H223	G 8
RH CURVED			
VISOR HTR SUP	13-216	2H223	G10
DETACHABLE WINDOW			
LH BOTTOM			
VISOR HTR SUP	14-215	1H225	E 9
RH BOTTOM			
VISOR HTR SUP	13-216	2H225	B10

- (3) Fit the droop nose locking pins and the visor 'up' locking pins (Ref. Fig. 401 ).
- (4) Fit the visor locating equipment to the nose fairing and visor:

### Stage 1 (Ref. Fig. 403 )

- (a) Fit the forward and the rear LH and RH attachment brackets to the nose fairing slinging points.
- (b) Fit the front and the LH and RH rear tubular frames to their respective attachment brackets and secure the front frame to the rear frames.
- (c) Adjust the bridge pad on the forward tubular frame to fit snugly on the nose fairing.
- (d) Adjust the crutching pads on the side frames to position the framework centrally on the nose fairing and to position the spigots to receive the mounting frame.

### Stage 2 (Ref. Fig.404 and 405).

- (e) Prepare the visor for attachment of the mounting frame:
- (e1) Remove the access panels 112 AL(LH), 112AR(RH) to gain access to the visor rear

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lifting points.

(e2) Remove the visor side glazing panels and fit the forward pin assemblies.

R  
R

(f) Lift the mounting frame by means of its sling and locate it on the tubular frame spigots. Secure it with bolts washers and nuts.

(g) Secure the mounting frame to the visor.

(h) Disconnect the sling and the two access panels in the visor hood.

### C. Remove (Ref. Fig. 406 )

(1) Disconnect the visor window de-icing cables from the operating leg at plugbreaks U1035 and U1036 and the P-clips.

(2) Disconnect the bonding leads connecting the operating leg to the A-frame, forward struts and visor.

NOTE: Ensure that the strut lengths are not disturbed.

(3) Disconnect the fail safe cables from the operating leg.

(4) Disconnect the two forward struts from the operating leg.

(5) Disconnect the operating leg from the A-frame; note the disposition of the shims.

(6) Disconnect the operating leg from the visor, using the extractor tool to withdraw the bolts, and remove the leg.

### D. Install (Ref. Fig. 406 )

NOTE: The following procedure is for installing the same operating leg as removed in para. C. To install a new operating leg refer to para. E.

(1) Ensure that the visor is securely held in the visor locating equipment and that the safety precautions instituted in para. B are still effective.

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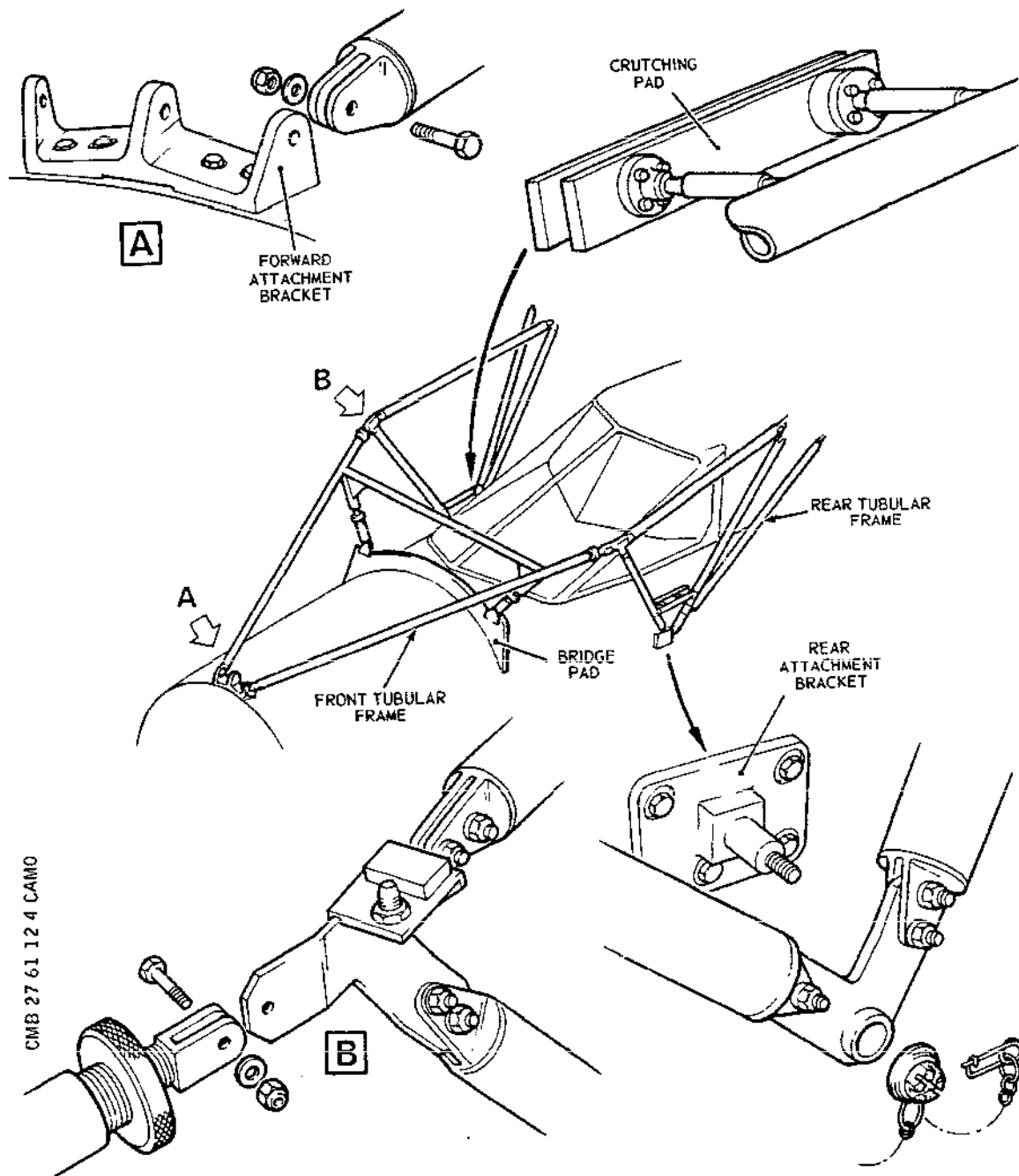
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## MAINTENANCE MANUAL



Visor Location Fitting - Stage 1 Attachment  
of Tubular Frames to Nose Fairing  
Figure 403

EFFECTIVITY: ALL

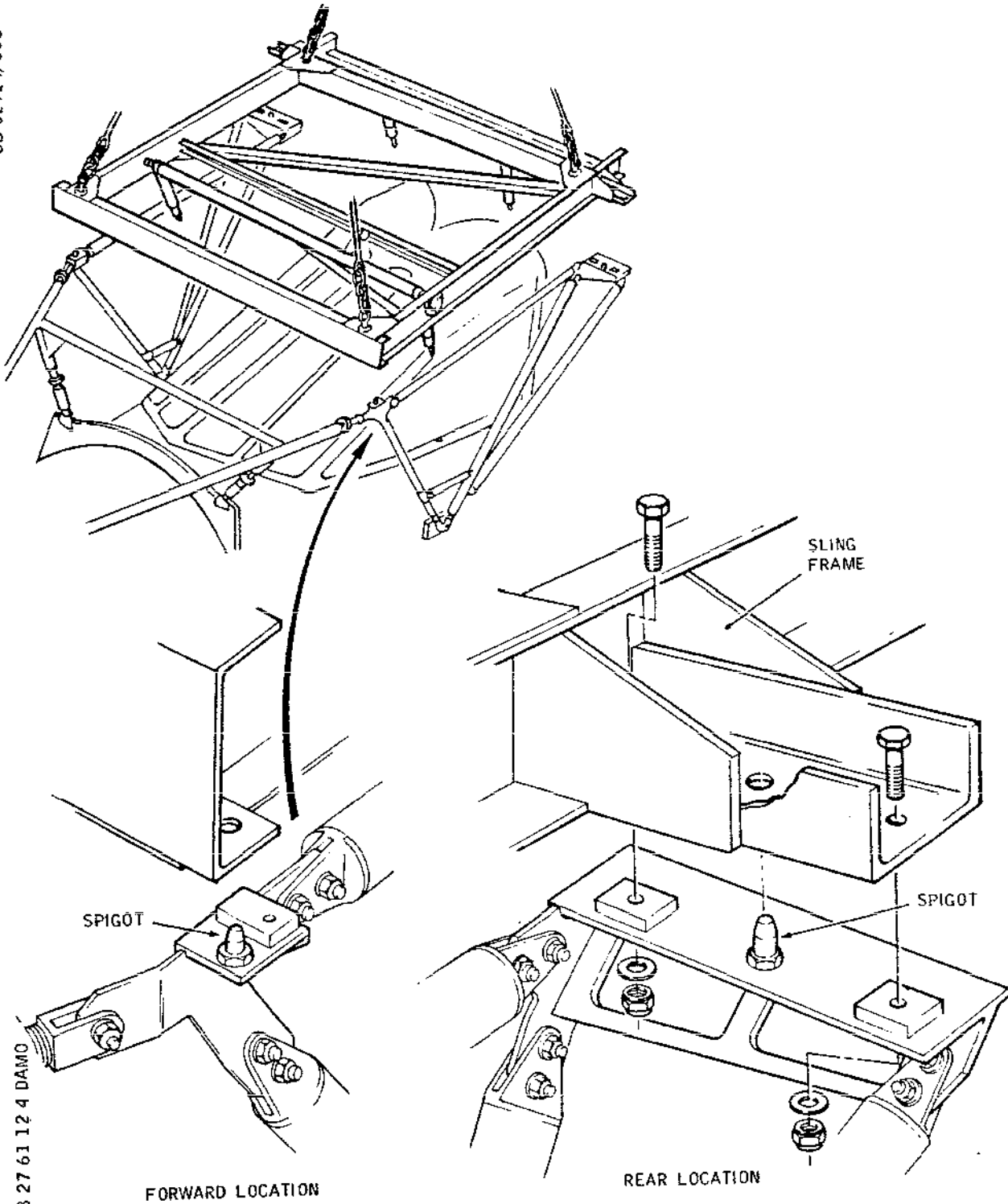
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Visor Location Fitting - Stage 2  
Attachment of Mounting Frame  
Figure 404

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EFFECTIVITY: ALL

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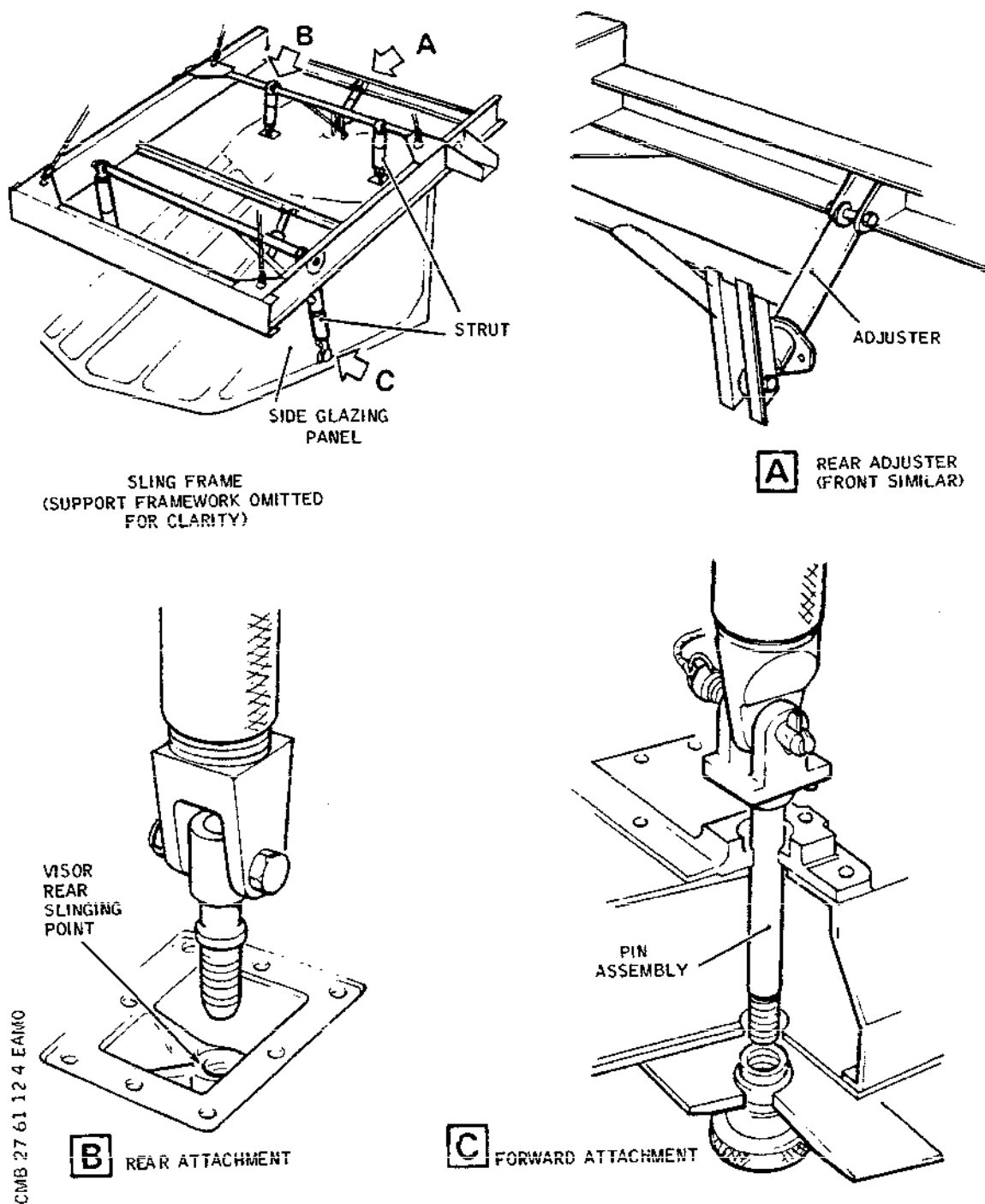
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Visor Location Fitting - Stage 3  
Attachment of Mounting Frame to Visor  
Figure 405

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- (2) Fit the operating leg to the visor with the bolt assemblies, washers and nuts. Tighten the nut fitted to the long bolt assembly on the left hand side to a torque value of 320 to 340 lbf in (3.6 to 3.8 mdaN), and the right hand nut to 140 to 155 lbf in (1.55 to 1.72 mdaN); fit split pins.
- (3) Swing the operating leg to engage the visor uplock rollers in the uplock hooks.
- (4) Connect the operating leg to the A-frame with the bolt assembly, washer and nut, and refitting the shims as noted during removal. Tighten the nut to a torque value of 400 to 425 lbf in (4.45 to 4.7 mdaN), and secure it with a split-pin.
- (5) Check that the LH roller is held snugly in its uplock and that the RH roller has a clearance of 0.005 to 0.006 in (0.127 to 0.152 mm) with its hook. If necessary adjust the turnbarrels to obtain this condition.
- (6) Connect the two forward struts to the operating leg with the bushes, bolts, washers and nuts. Tighten the nuts to a torque value of 75 to 85 lbf in (0.83 to 0.95 mdaN) and fit split pins.
- (7) Remove the visor locating equipment.
- (8) Connect the fail safe cables to the operating leg with the split clamp, bolt washer, and nut. Torque tighten the nut to between 25 and 30 lbf in (0.28 to 0.34 mdaN) and secure it with a split pin.
- (9) Connect the bonding leads to the operating leg.
- (10) Connect the visor window de-icing cables at the plug breaks U1035 and U1036 on the operating leg and secure the cables with P-clips.
- (11) Remove the droop nose locking pins and the visor jack safety locking pins.
- (12) Reset the circuit breakers previously tripped in para. 3B.
- (13) Carry out the visor operational test (Ref. 27-61-00, Adjustment/Test) and check the satisfactory operation of the visor.
- (14) Tighten and lock the uplock rollers turnbarrels if

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adjusted in (5).

### E. Install (Replacement operating leg) (Ref. Fig. 406 )

- (1) Remove the brackets for the visor window de-icing cable P-clips and plug-breaks from the old operating leg by drilling out the attachment rivets and assemble them to the new leg.
- (2) Dismantle the uplock roller assembly from the old operating leg (Ref. Fig. 407 ):
  - (a) Remove the uplock cover.
  - (b) Disconnect the two turnbarrels from the roller levers.
  - (c) Remove the retaining plates.
  - (d) Remove the bolt securing the roller levers and remove the levers and sleeve clamps.
  - (e) Remove the nuts and washers securing the rod end bearings and remove the bearings complete with mounting plate and turnbarrels.
- (3) Ensure that the visor is securely held in the visor locating equipment and that the safety precautions instituted in para. 3B are still in effect.
- (4) Fit the operating leg to the visor. Do not tighten the bolts at this stage, the leg must be free to move.
- (5) Fit the uplock roller assembly, removed from the old operating leg, to the new leg (Ref. Fig. 407 ):
  - (a) Fit the clamp sleeves.
  - (b) Fit the rod end bearings complete with mounting plate and turnbuckles; secure them with nuts, washers and split pins.
  - (c) Engage the rollers of the lever assemblies in the visor uplock hooks, and close the hooks.
  - (d) Move the operating leg over the levers and secure the levers to the leg with the bolt, washers and nut. Do not fully tighten the nut at this stage or fit a split pin.

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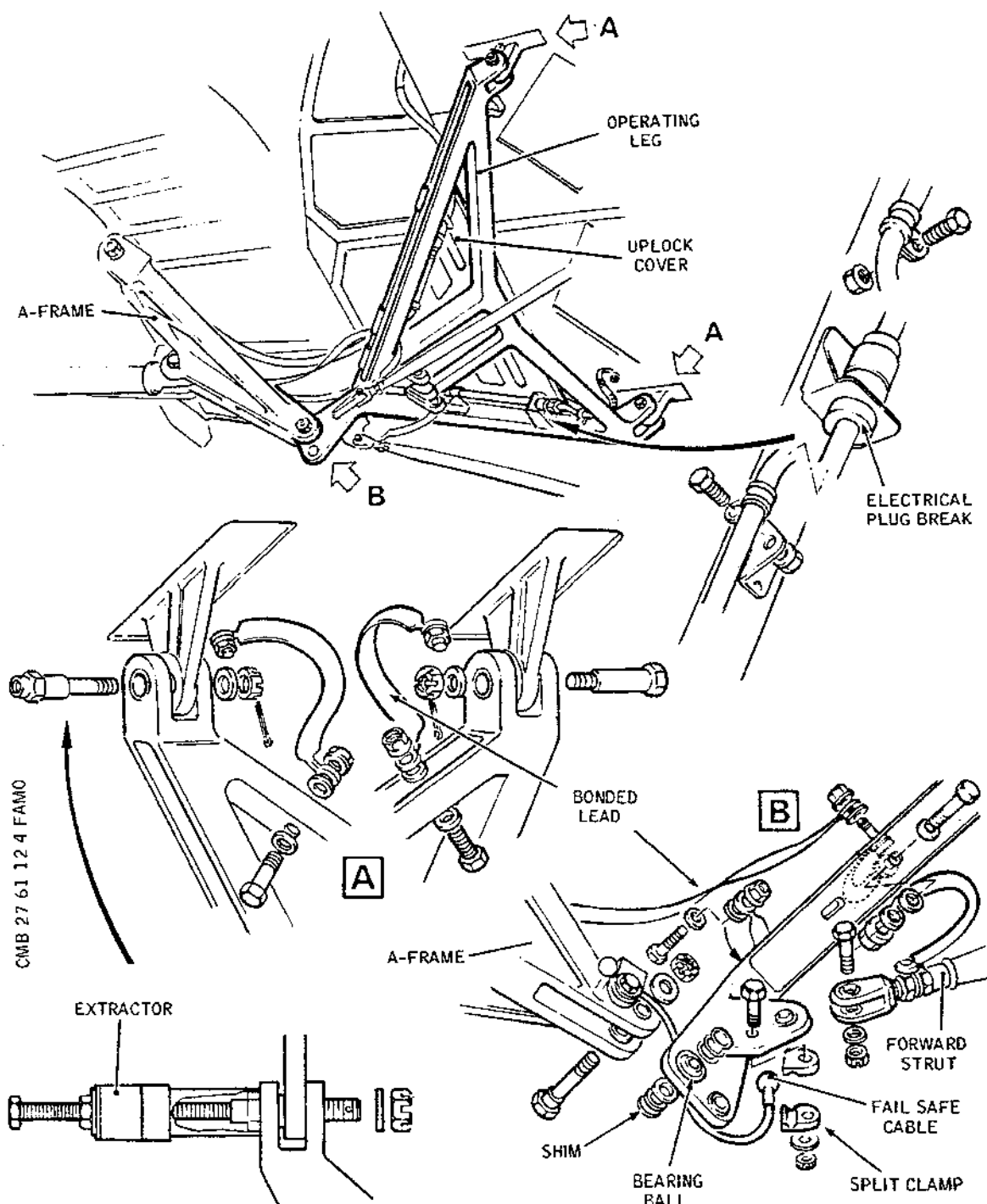
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Operating Leg - Installation  
Figure 406

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- (6) Temporarily connect the A-frame to the operating leg with the bolt, nut and washer, but omitting the shims (Ref. Fig. 406 ).
- (7) Position the LH forks of the A-frame and the operating leg so that:
  - (a) The A-frame outboard bush flange contacts the outboard bearing flange of the structure bracket.
  - (b) The operating leg inboard lug is in contact with the inboard face of the visor lug.
- (8) Measure the gaps between the LH and RH sides of the bearing ball in the operating leg and the sides of the A-frame fork. Select shims to fill in the gaps: the LH side with a clearance of 0.001 to 0.000 in (0.025 to 0.000 mm); the RH side with no clearance. Make up the shim packs to comprise a thin shim(s) interposed between two thick shims.
- (9) Remove the bolt securing the operating leg to the A-frame and refit it with the shim packs. Tighten the nut to a torque value of 400 to 425 lbf in (4.45 to 4.7 mdaN), and secure it with a split pin.
- (10) Tighten the nuts on the bolts securing the operating leg to the visor: the LH nut to a torque value of 320 to 340 lbf in (3.6 to 3.8 mdaN) and the RH nut to 140 to 155 lbf in (1.55 to 1.72 mdaN); fit split pins.
- (11) Complete the assembly of the visor uplock levers by fitting the turnbarrels to the roller levers. Adjust the barrels so that with the LH uplock roller snug in its uplock hook there is a clearance of 0.005 to 0.006 in (0.127 to 0.152 mm) between the RH roller and its hook.
- (12) Connect the two forward struts to the operating leg with the bushes, bolts, nuts and washers. Tighten the nuts to a torque value of 75 to 85 lbf in (0.83 to 0.95 mdaN) and fit split pins.
- (13) Connect the bonding lead from the operating leg to the visor.
- (14) Remove the visor locating equipment (Ref. Fig. 403, 404 and 405):

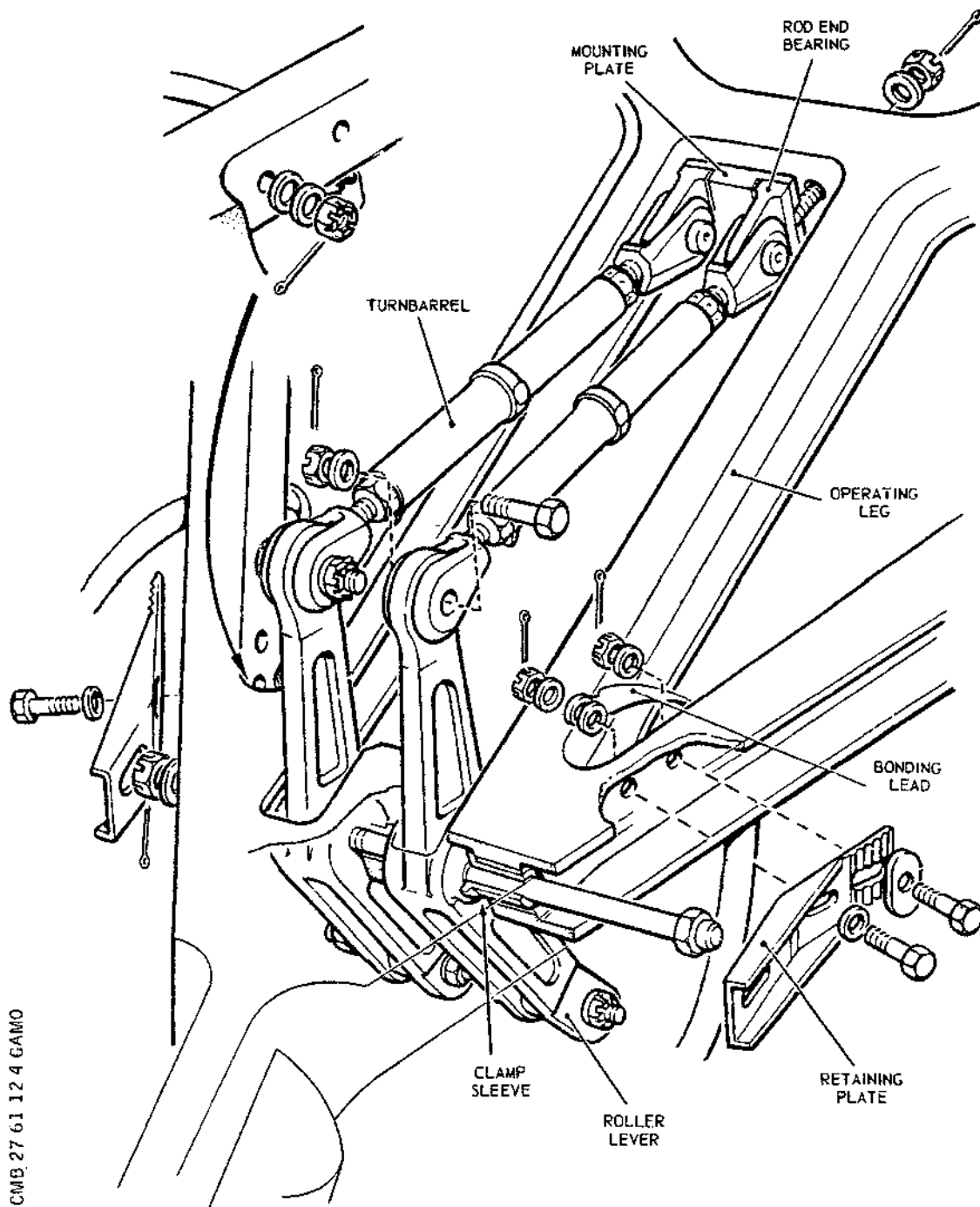
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Assembly of Visor Uplock Rollers to  
Operating Leg  
Figure 407

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- (a) Fit the sling to the hoisting frame.
  - (b) Disconnect the hoisting frame from the visor.
  - (c) Lift the hoisting frame clear of the tubular frame spigots and lower it to a suitable support or stand.
  - (d) Remove the bolts securing the front and rear tubular frames together and remove the frames from the nose fairing.
- (15) Connect the visor window de-icing cables at the plugbreaks U1035 and U1036 on the operating leg and secure the cables with P-clips.
- (16) Connect the fail safe cables to the operating leg with the split clamp, bolt, washer and nut. Torque tighten the nut to between 25 and 30 lbf in (0.28 and 0.34 mdaN) and secure it with a split pin.
- (17) Reset the circuit breakers previously tripped in para. B.
- (18) Remove the droop nose locking pins and the visor locking pins (Ref. Fig. 401 ).
- (19) Carry out the visor operational test (Ref. 27-61-00, Adjustment/Test) to check the satisfactory operation of visor and uplock.
- (20) After completion of the operational test procedure:
- (a) Tighten the visor uplock lever clamp bolt to a torque value of 140 to 155 lbf in (1.55 to 1.72 mdaN) and fit the split pin.
  - (b) Tighten the turnbarrel locknuts to a torque value of 75 to 85 lbf in (0.83 to 0.94 mdaN) and secure the nuts to the lockwashers with wire.
  - (c) Fit the visor uplock retaining plates (Ref. Fig. 407 ). When fitting the lower bolt attach the bonding leads from the forward struts fitting a washer on either side of the lead and a chamfered washer beneath the head of the bolt. Tighten the nuts to a torque value of 12 to 15 lbf in (0.133 to 0.165 mdaN).
  - (d) Fit the uplock cover. Torque tighten the two

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securing bolts to 40 to 45 lbf in (0.45 to 0.51 mdaN) and lock with wire.

- (e) Attach the operating leg and A-frame bonding leads to the cover.

### 4. A-Frame

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Locking pin (2), visor	F925045030
Locking pin (2), droop nose	D925045031
Extractor set, comprising:	D925164000
Bolt	D925578100
Barrel	D925581000
Body	D925582000
Non-corrodible steel wire 0.028 in (0.7 mm) dia	-
Torque spanner, 70 to 580 lbf in (0.78 to 6.50 mdaN) range	-

#### B. Prepare to Remove

- (1) If the nose and visor are not in the fully raised position:
- (a) Make available electrical ground power (Ref. 24-41-00).
  - (b) Connect a ground hydraulic test rig to the aircraft hydraulic system (Ref. 29-\*\*-\*\*) and pressurize the green and the yellow hydraulic systems.
  - (c) Operate the VISOR/NOSE normal selector switch on the co-pilot's dash panel as necessary to fully raise the nose and visor.
- (2) Electrically isolate the visor and nose normal and standby controls by tripping circuit breakers M11 on panel 15-215, map ref. F8, and M12 and M13 on panel 1-213 map refs. Q16 and Q17; fit safety

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clips.

- (3) Fit the droop nose locking pins and the visor 'up' locking pins (Ref. Fig. 401 ).

### C. Remove (Ref. Fig. 408 )

NOTE: If the A-frame is to be refitted, note the positions of all shims for reassembly.

- (1) Unclip the electrical cables from the A-frame.
- (2) Disconnect the three bonding leads from the A-frame.
- (3) Disconnect the fail safe cables from the A-frame.
- (4) Remove the bolt connecting the visor actuating jack to the A-frame.
- (5) Remove the bolt connecting the operating leg to the A-frame.
- (6) Remove the bolts securing the A-frame to the structure, using the extractor tool to remove the bolts, and remove the A-frame together with the shims.

### D. Install (Ref. Fig. 408 )

- (1) If a new A-frame is being fitted:
  - (a) Remove the three brackets for the attachment of the electrical cable clips from the old A-frame by drilling out the rivets and assemble the brackets to the new A-frame.
  - (b) Determine the thickness of shim required between the A-frame and the structure bracket:
    - (i) Fit the A-frame to the structure using bolts only.
    - (ii) On the left hand side ensure that the A-frame outer lug is in contact with the flange of the outer bearing in the structure, then measure the gap between the flanges of the inner bearing and bush.
    - (iii) Grind the shim to this dimension less 0.001 to 0.003 in (0.025 to 0.076 mm)

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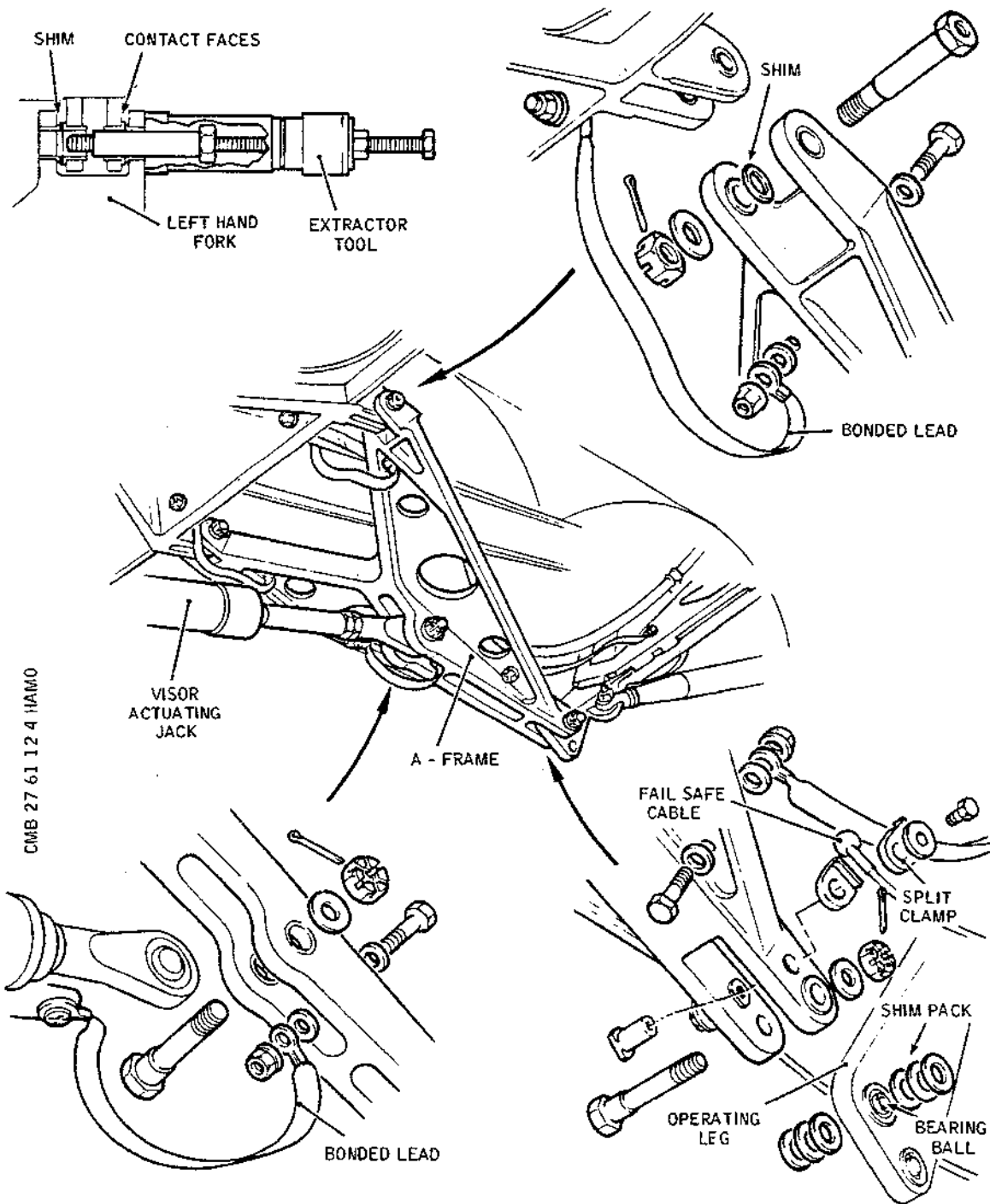
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A-Frame - Installation  
Figure 408

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with a surface finish of 16 micro-in.

- (c) Determine the thickness of shims required between the A-frame and the operating leg:
  - (i) Ensure that the A-frame is positioned as in (b) (ii) and that the operating leg LH inboard lug is in contact with the inboard face of the visor lug.
  - (ii) Measure the gap between the LH and the RH sides of the bearing ball in the operating leg and the sides of the A-frame fork. Select shims to fill the gaps: the LH side with a clearance of 0.001 to 0.000 in (0.025 to 0.000 mm); the RH side with no clearance. Make up the shim packs to comprise a thin shim(s) interposed between two thick shims.
- (2) Fit the A-frame to the structure with the shim, bolts, washers and nuts. Tighten the left hand and the right hand nuts to 240 to 260 lbf in (2.65 to 2.9 mdaN) and fit split pins.
- (3) Connect the A-frame to the operating leg with the shim packs, bolt, washer and nut. Tighten the nut to a torque value of 400 to 425 lbf in (4.45 to 4.7 mdaN) and secure it with a split pin.
- (4) Connect the fail safe cables to the A-frame using the split-clamps, lockwashers and bolts. Torque tighten the bolts to between 70 and 80 lbf in (0.78 and 0.9 mdaN) and lock with wire.
- (5) Connect the A-frame to the visor actuating jack with the bolt, washer and nut. Tighten the nut to a torque value of 550 to 580 lbf in (6.1 to 6.45 mdaN) and fit a split pin.
- (6) Connect the three bonding leads to the A-frame.
- (7) Attach the electrical cables to the A-frame with the three P-clips.
- (8) At the completion of the installation:
  - (a) Reset the circuit breakers previously tripped in para. B.

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- (b) Remove the droop nose locking pins and the visor 'up' locking pins.
- (c) Carry out the visor operational test (Ref. 27-61-00, Adjustment/Test) and check the satisfactory operation of the visor.

### 5. Struts (Ref. Fig. 409 )

#### A. Equipment and Materials

	DESCRIPTION	PART NO.
R	Locking sleeve, visor jack	D925157001
R	Locking pin (2) droop nose	D925045031
R	Safety clips, circuit breakers	-
R	Torque spanner 10 to 215 lbf in	
R	(0.2 to 2.4 mdaN) range	-
R	Non-corrodible steel locking wire	
R	0.028 in (0.7 mm) dia.	-
R		

#### B. Prepare to Remove

- (1) Raise the nose and visor to the fully raised position:
  - (a) Make available electrical ground power (Ref. 24-41-00).
  - (b) Connect a ground hydraulic test rig to the aircraft hydraulic system (Ref. 29-\*\*-\*\*) and pressurize the green and the yellow hydraulic systems.
  - (c) Operate the VISOR/NOSE normal selector switch on the co-pilot's dash panel as necessary to fully raise the nose and visor.
- (2) Electrically isolate the visor and nose normal and standby controls by tripping circuit breakers M11 on panel 15-215, map ref. F8, and M12 and M13 on panel 1-213, map refs. Q16 and Q17; fit safety clips.

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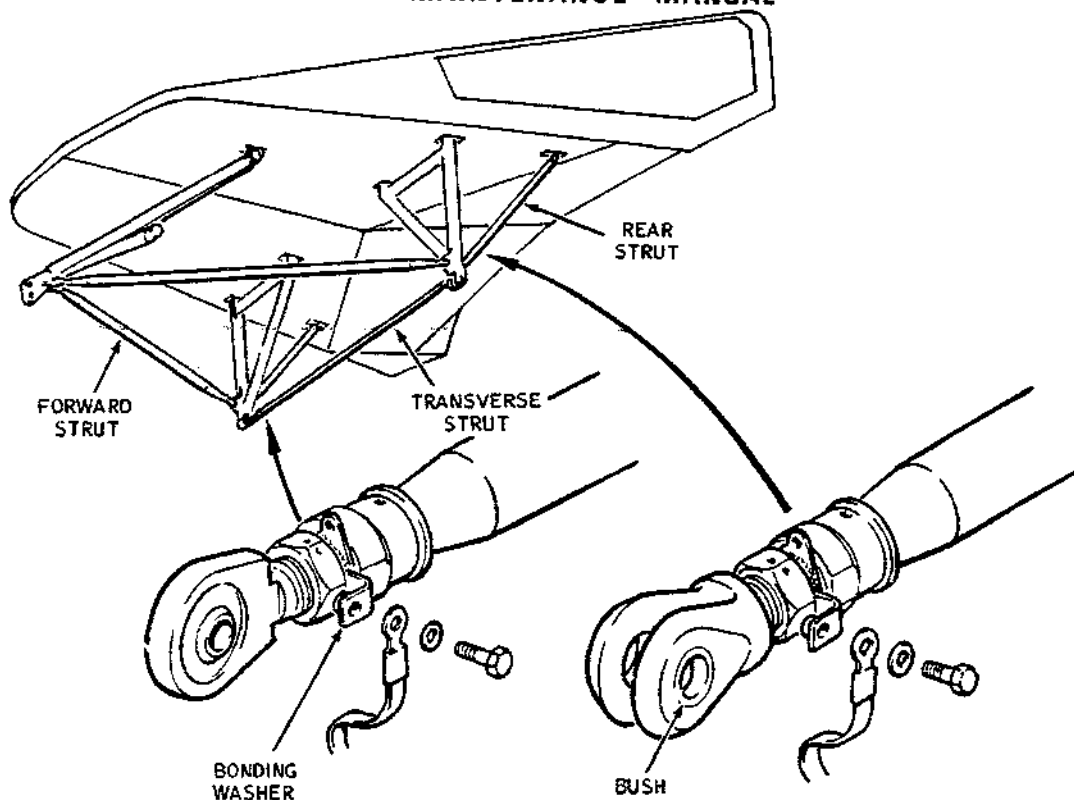
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Struts - Installation  
Figure 409

- (3) Fit the droop nose locking pins and the visor jack safety locking sleeve (Ref. Fig. 401 ).

### C. Remove

**WARNING:** REMOVE ONLY ONE STRUT AT A TIME. THIS MUST BE REFITTED BEFORE REMOVING A SECOND STRUT.

- (1) Remove the split-pin, nut, washer and bolt securing each end of the strut and remove the strut.

**NOTE:** If the same strut is to be refitted do not disturb the strut length.

- (2) Remove the bushes and bonding washers from the strut eye-ends.

**NOTE:** Bushes are not fitted to the transverse strut.

### D. Install

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- (1) Fit the bushes and bonding washers to the strut eye-ends.

NOTE: Bushes are not fitted to the transverse strut.

- (2) (a) If the same struts are being refitted:  
Fit the struts in place with bolts only, and check that the bolts can be slipped freely in their holes, i.e. that they are not under load. Secure the bolts with washers and nuts torque tightened to 75 to 85 lbf in (0.83 to 0.96 mdaN).
- (b) If the strut length has to be adjusted or a new strut has to be fitted:  
Adjust the strut length and fit as in (a) then secure the strut locknuts. Torque tighten the locknuts on the forward and transverse struts to 200 to 215 lbf in (2.2 to 2.4 mdaN), and the locknuts on the rear struts to 80 to 90 lbf in (0.89 to 1.00 mdaN). Check that the strut ends are in 'safety'.
- (3) At the completion of strut installation:
- (a) Reset the circuit breakers previously tripped in para. 5.8.
- (b) Remove the droop nose uplocks safety pins and the visor jack safety locking sleeve (Ref. Fig. 401 ).
- (c) Carry out the visor operational test (Ref. 27-61-00, Adjustment/Test) and check the satisfactory operation of the visor.

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### VISOR CARRIAGE - REMOVAL/INSTALLATION

#### 1. General

A carriage is removed with the visor held in the partially raised condition by the visor ground equipment screwjack. Both the LH and the RH carriages are fitted with a microswitch striker which must be removed from the old carriage and fitted to a new carriage. Shims, ground to the requisite thickness and identified by notches cut in the perimeter, are fitted to each carriage at its attachment to its respective tracking leg. If the carriage or guide rail or tracking leg is renewed, new shims must be ground to suit.

#### 2. Visor Carriage

##### A. Equipment and Materials

DESCRIPTION	PART NO
Screwjack, visor	D925156000
Locking pin (2), droop nose	E925045031
Spanner, visor carriage eccentric spigot	D925162000
Safety clips, circuit breaker	-
Wire, non-corrodible steel 0.028 in (0.7 mm ) dia.	-

##### B. Prepare to Remove

- (1) If the nose is not fully raised, raise it (Ref. 27-61-00, Adjustment/Test).
- (2) Electrically isolate the visor and nose normal and standby controls by tripping circuit breakers M11 on panel 15-215 map ref. F8, and M12 and M13 on panel 1-213 map refs. Q16 and Q17; fit safety clips.
- (3) Fit the droop nose locking pins and the visor ground equipment screwjack (Ref. Fig.401 and 402).
- (4) Raise the visor using the screwjack, until the visor

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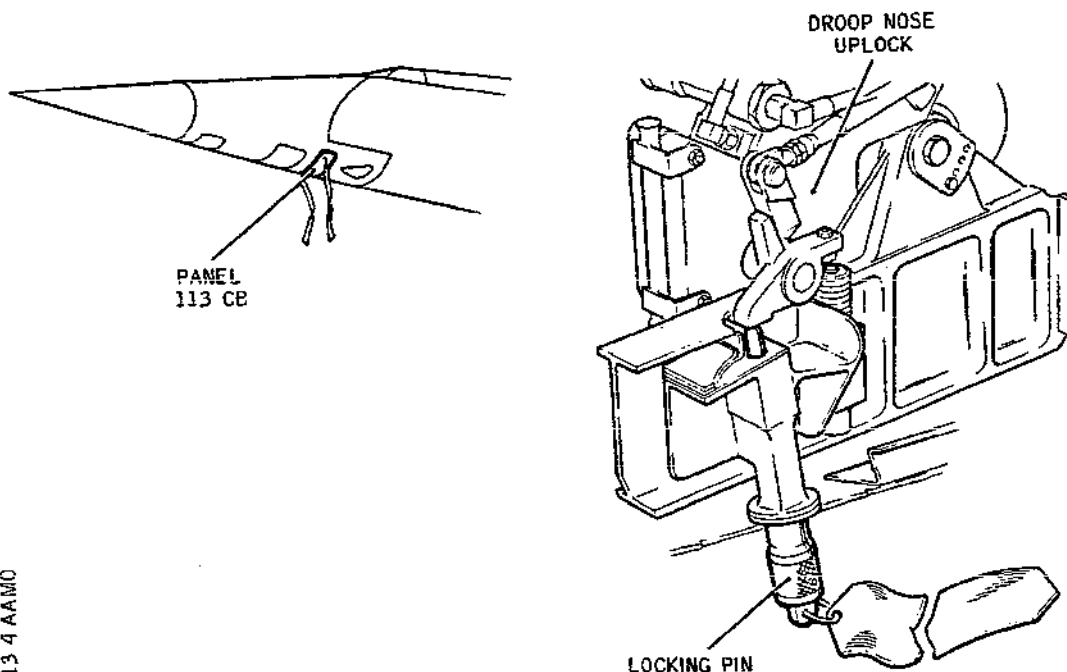
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- Droop Nose Up Locking Pins  
Figure 401

to windscreen location fitting is contacted by the roller at the rear of the visor. Slowly continue to raise the visor until the location fitting lifts the visor just sufficiently to take the vertical weight from the LH and RH carriage rollers, so that they are all capable of being rotated by hand. Retain the visor in this position with the screwjack.

C. Remove (Ref. Fig. 403 )

- (1) Remove the bolt securing the carriage to the tracking leg and remove the carriage together with the wiper pads and shims.
- (2) If either carriage has been removed in order to replace it with a new one, remove the striker from the studs. Retain the striker, nuts and washers.

D. Install (Ref. Fig.401 and 402)  
(Ref. Fig.403 and 404)

NOTE: If neither the carriage, nor guide rail, nor track-

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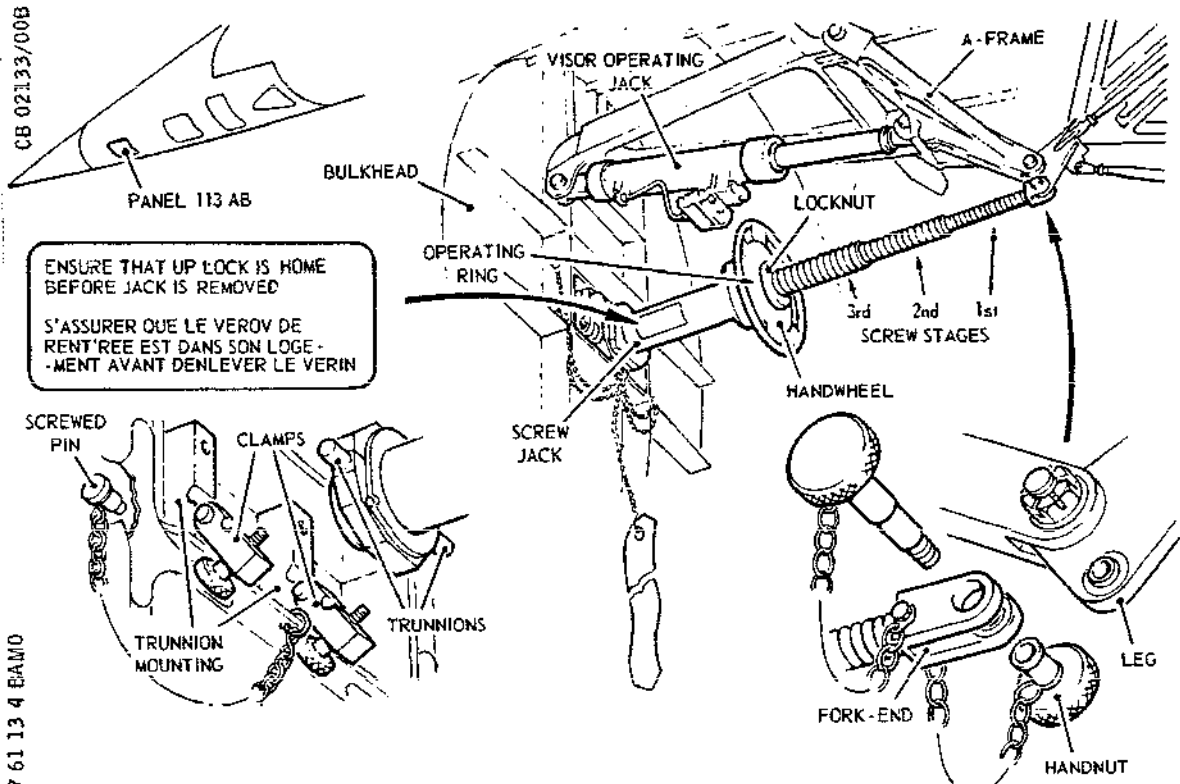
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**WARNING:** BEFORE INSTALLING THE SCREWJACK, THE VISOR ACTUATING JACK MUST BE ISOLATED FROM ITS ELECTRICAL AND HYDRAULIC SUPPLIES.

### INSTALLATION

1. Secure trunnions to bulkhead with screwed pins. Open clamps.
2. Position screwjack and secure trunnions with clamps.
3. Operate screwjack to engage fork-end with leg; secure with captive bolt and nut

### OPERATION

#### Extension

1. Lock 3rd stage screw in closed position with locknut.
2. Operate screwjack handwheel to extend 1st and 2nd stage screws.
3. Release locknut and extend 3rd stage screw.

#### Retraction

1. Lock 3rd stage screw in extended position.
2. Operate screwjack until 1st and 2nd stage screws are retracted.
3. Release locknut and retract 3rd stage screw.

Visor Screwjack Installation  
Figure 402

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ing leg has been renewed refit the carriage as instructed under Condition 1. If any one of them has been renewed refit the carriage as instructed in Condition 2.

### Condition 1

- (1) Fit the carriage complete with wiper pads to the guide rail and secure it, together with the shims, to the tracking leg with the bolt, nut and washer. Tighten the nut to a torque value of 320 to 340 lbf in (3.55 to 3.75 mdaN) and secure it with a split-pin.
- (2) Reset the circuit breakers previously tripped.
- (3) Lower the visor using the screwjack, then remove the screwjack and nose locking pins.
- (4) Carry out the visor operational test (Ref. 27-61-00, Adjustment/Test) and check for satisfactory operation and indication.
- (5) Refit the access panel 113AB and torque tighten the bolts to 40 to 45 lbf in (0.45 to 0.51 mdaN).

### Condition 2

- (1) Remove the nut, washer and splined/serrated washer from the lower roller eccentric spigots on the carriage.
- (2) With the special spanner adjust the eccentric spigots so that the gap between the upper and lower pairs of rollers is at a maximum. Do not refit the nuts, and washers at this stage.
- (3) Set the side roller eccentric pin to place the roller midway between the two extremes of adjustment. Secure the pin with the locking plate, retaining plate, washer and bolt. Torque tighten the bolt to 15 to 20 lbf in (0.16 to 0.22 mdaN) and lock with wire.
- (4) Temporarily fit the carriage to the rail and tracking leg without shims.
- (5) Determine the thickness to which the shims must be ground by measuring the gaps between the bearing flanges of the carriage and tracking leg, with the leg fork in contact with the outboard face of the visor inner lug and the carriage side roller in contact with the rail.

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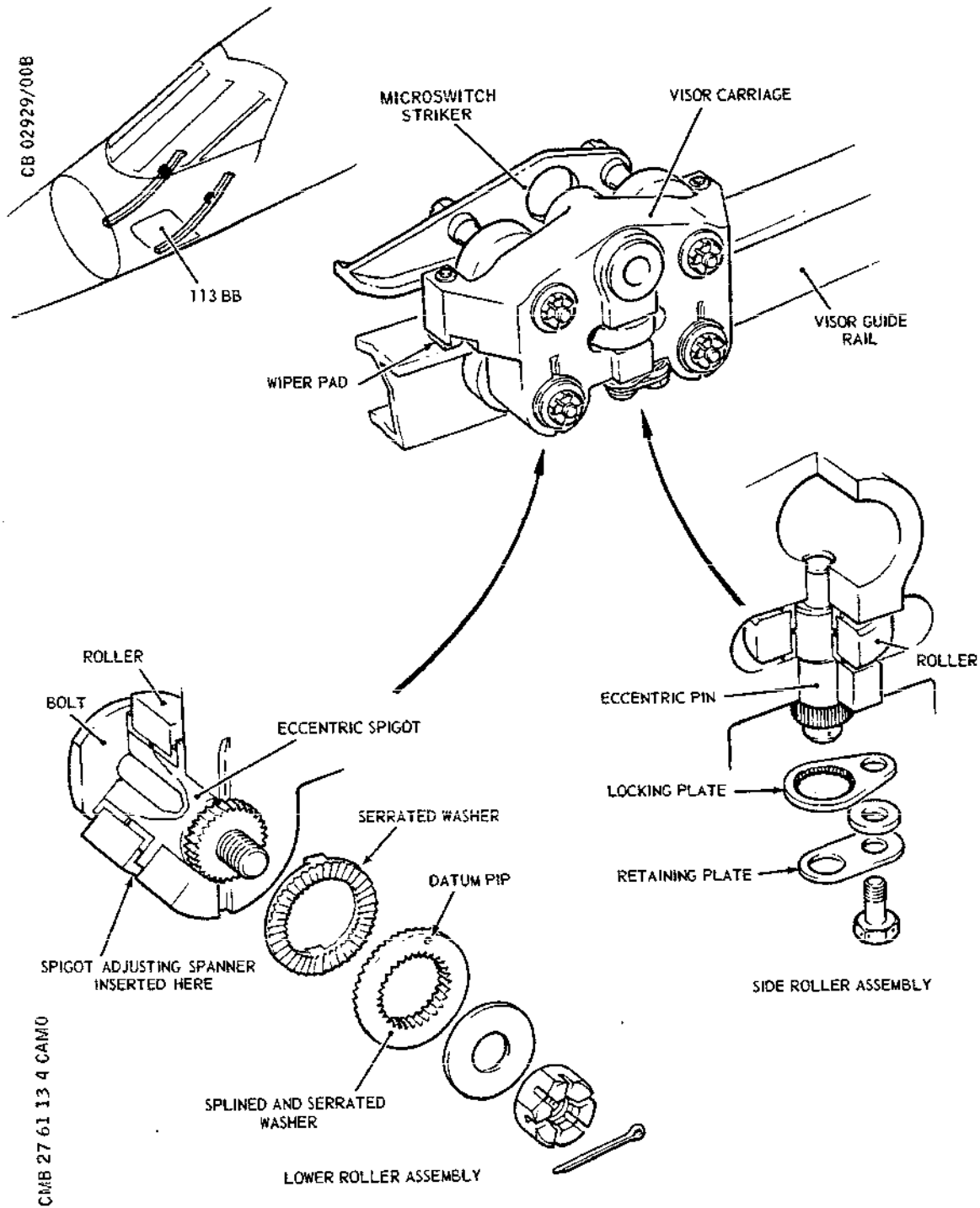
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Visor Carriage  
Figure 403

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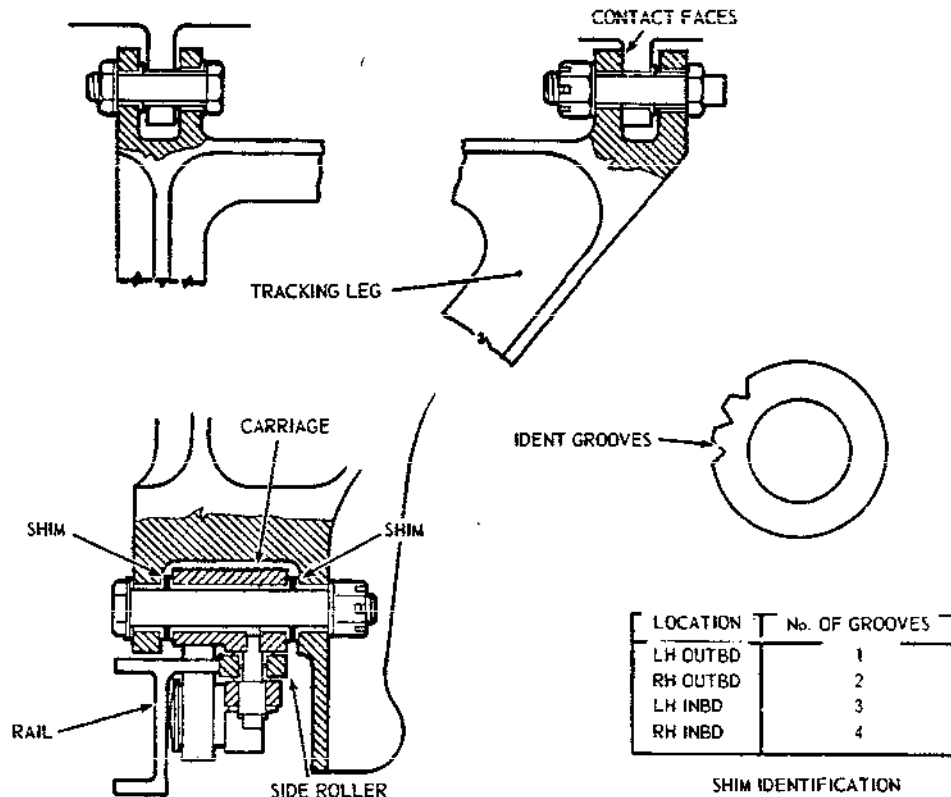
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- Carriage Shim Requirements  
Figure 404

- (6) Grind the shim washers to the required thickness less 0.0005 to 0.0015 in (0.012 to 0.038 mm) with a surface finish of 16 micro inches. When ground to size cut identifying grooves into the perimeter of each shim.
- (7) Remove the carriage and refit it together with the shims. Tighten the nut to a torque value of 320 to 340 lbf in (3.55 to 3.75 mdaN) and secure it with a split-pin.
- (8) Fit the microswitch striker to the carriage studs and secure it with the washers and nuts. Torque tighten the nuts to between 60 and 70 lbf in (0.67 and 0.80 mdaN) and fit split pins.
- (9) Lower the visor to approximately 75% down, using the screwjack, and in this position adjust the lower rollers on the replacement carriage:
  - (a) Using the special spanner turn the eccentric spindles locating the lower rollers until the rollers just contact the underside of the guide rail.

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- (b) Observe where the centre line through the crest of a spline on the eccentric spigot aligns with the centre line of a trough on the serrated washer keyed to the carriage and mark them both for reference.
- (c) Fit the splined/serrated washer on to the eccentric spigot so that its datum (pip) mark lies on the centre line passing through the spline and serration marked in (b). Secure it with the nut tightened to a torque value of 45 to 50 lbf in (0.5 to 0.55 mdaN).

NOTE: There are 56 serrations and 29 splines; a spline and serration coincide on a common centre line at only one position. On the splined/serrated washer this centre line is marked by a datum pip on the reverse face.

- (10) Remove the visor screwjack and the droop nose locking pin.
- (11) Carry out the visor operational test (Ref. 27-61-00, Adjustment/Test) and check the satisfactory operation of the visor.
- (12) Refit the access panel 113AB, BB and DB, and torque tighten the bolts to 40 to 45 lbf in (0.45 to 0.51 mdaN).

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## MAINTENANCE MANUAL

### VISOR UPLOCK - REMOVAL/INSTALLATION

**WARNING:** OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS IN 24-00-00.

OBSERVE THE HYDRAULIC SAFETY PRECAUTIONS IN CHAPTER 29.

BEFORE ENTERING THE DROOP NOSE FAIRING FIT THE GROUND SAFETY LOCKING DEVICES.

#### 1. General

The visor uplock is bolted to the mid-bulkhead of the nose fairing and comprises self-locking twin hooks and toggle mechanisms which are hydraulically released by a single jack. Before removing an uplock, the jack must be removed and the uplock indication microswitch (M32) electrically disconnected. The visor is secured in the fully raised position by rollers on the visor operating leg engaging the uplock. Therefore to remove an uplock the visor must be in the lowered position.

#### 2. Visor Uplock

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Locking pin (2), droop nose	E925045031
Locking link, visor down	D925468030
Locking pin (2), visor	E925045030
Circuit breaker safety clips	-
Chromium-nickel wire, 0.028 in (0.7 mm) diameter	-

##### B. Prepare to Remove

- (1) Comply with the electrical and hydraulic safety precautions.
- (2) Ensure that the droop nose fairing is up and that the visor is down.
- (3) Depressurize the green and yellow hydraulic systems by operating the pressure release valves located on the

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## MAINTENANCE MANUAL

relevant system manifolds in zones 151 and 152, and by unscrewing the knurled knob on the pressure relief valves fitted to the bottom of the hydraulic reservoirs located in zones 153 and 154.

- (4) Electrically isolate the visor and droop nose control system by tripping the circuit breakers. Fit safety clips.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
VISOR & NOSE CONT	15-215	M11	F 8
NOSE 7 1/2 DEG CONT	1-213	M12	Q16
NOSE/VISOR STBY LOWER SUP	1-213	M13	Q17
VISOR SERVICES A SYS CONT	1-213	M14	Q18
VISOR & NOSE IND	15-215	M15	F 9
VISOR SERVICES 'B' SYS CONT	15-216	M16	D18

- (5) Remove the access panel.
- (6) Fit the visor down locking link (Ref. Fig. 401 ).
- (7) Fit the droop nose locking pins (Ref. Fig. 401 ).

### C. Remove Uplock (Ref. Fig. 402 )

- (1) Remove the visor uplock jack (Ref. 27-62-14).
- (2) Disconnect the electrical plug from the microswitch (M32).
- (3) Disconnect the emergency release rod from the uplock lever.
- (4) Remove the four retaining plates that trap the two uplock attachment bolts.
- (5) Remove the uplock attachment bolts and remove the

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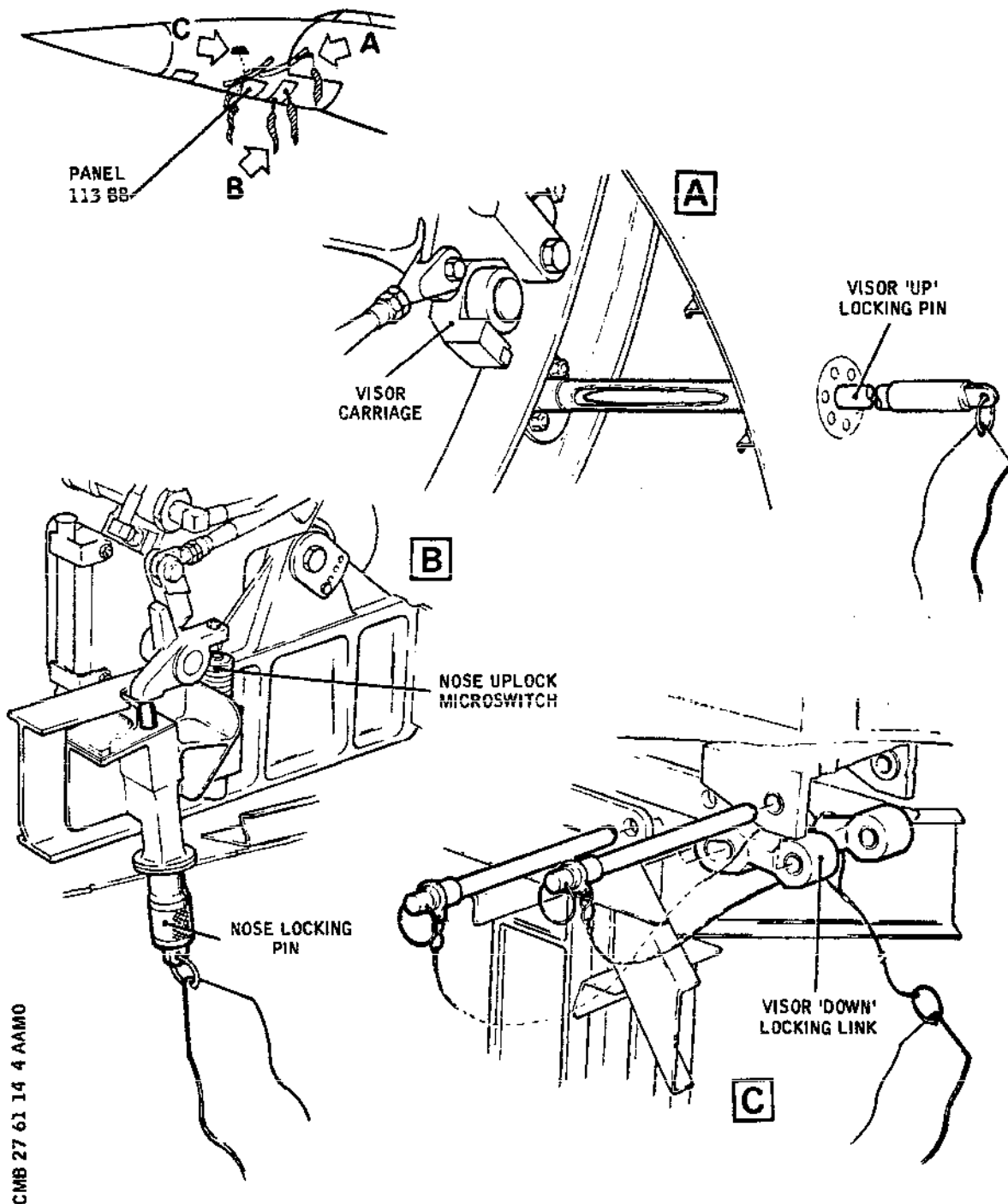
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Ground Safety Equipment  
Figure 401

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## MAINTENANCE MANUAL

uplock. Remove the microswitch (M32) from the uplock.

### D. Prepare to Install

- (1) If a replacement uplock is to be installed (Ref. Fig. 403 ):
  - (a) Remove the microswitch striker bolt from the cam lever and refit it to the lever less the shim, washer and nut.
  - (b) Remove the uplock indication micro-switch (M32) from the old uplock and fit it to the new uplock using the two sleeves and bolts. Secure the bolts with wire.
  - (c) With the uplock in the closed position screw out the striker bolt until the switch just operates. Screw out the bolt for one more complete turn and measure the gap (dimension 'X') beneath the bolt head and the cam lever.
  - (d) From a pack of six standard washers select a sufficient number to just fill the gap. Add one more washer and fit them beneath the bolt head; fit the remaining washers beneath the nut.
  - (e) Torque tighten the nut to between 15 and 20 lbf in (0.17 and 0.22 mdaN) and fit a split-pin.

### E. Install Uplock (Ref. Fig. 402 )

- (1) Fit the uplock to the nose fairing structure and align the attachment holes.
- (2) Insert both uplock securing bolts, each complete with a sleeve. Fit the washers and nuts and tighten each nut to a torque loading of between 75 and 85 lbf in (0.84 and 0.96 mdaN). Lock each nut with a split pin.
- (3) Locate a retaining plate on both ends of each uplock attachment bolt and secure each plate with a bolt and washer. Tighten each bolt and secure with lockwire to the hole in the retaining plate.
- (4) Connect the emergency release rod to the uplock release lever with the bolt, sleeve assembly (head adjacent to the uplock), washer and nut. Tighten the nut to a torque loading of between 27 and 32 lbf in

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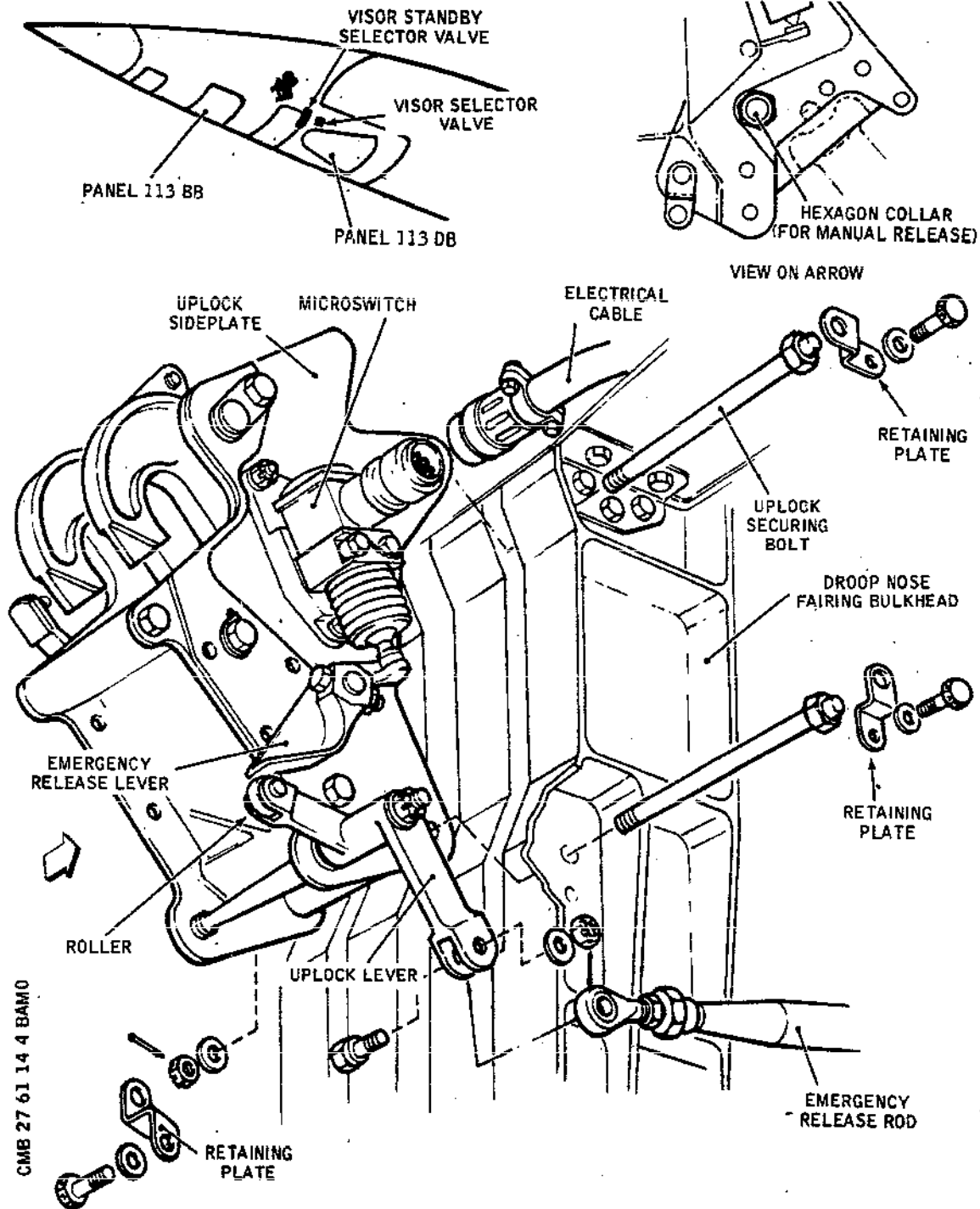
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## MAINTENANCE MANUAL



Visor Uplock Installation  
Figure 402

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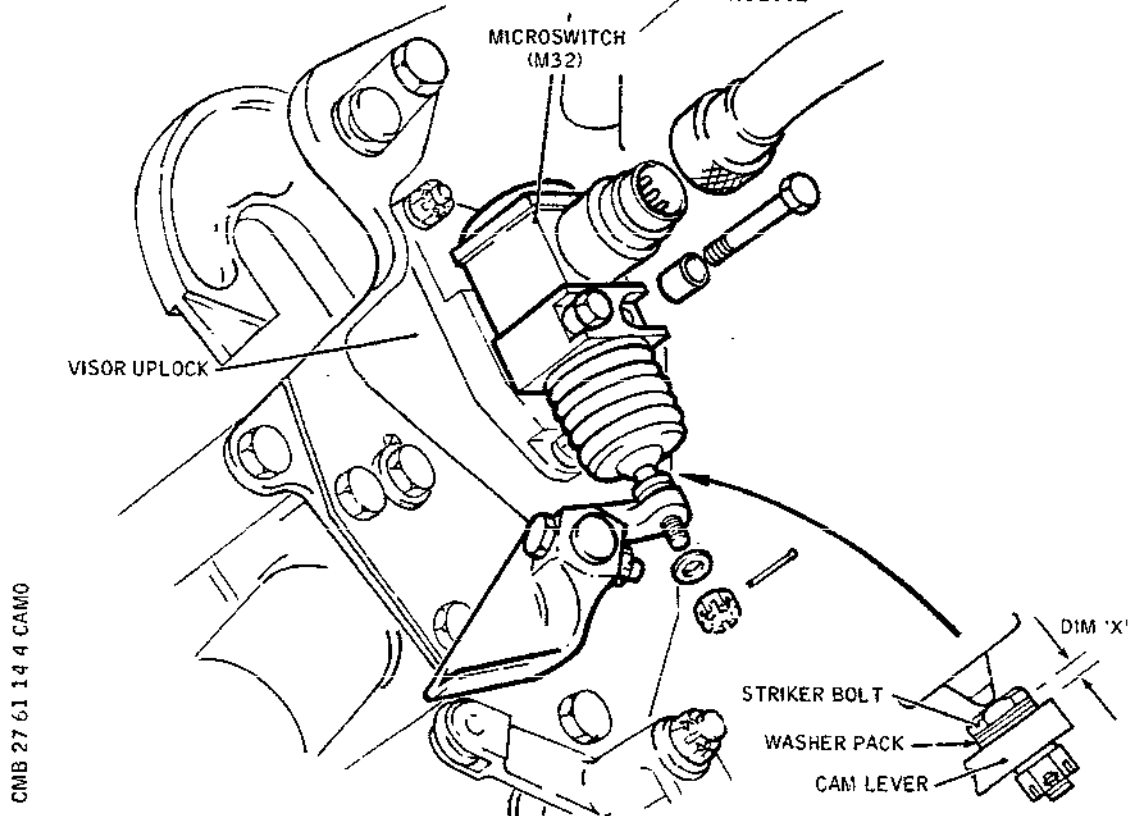
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## MAINTENANCE MANUAL



Uplock Microswitch and Striker Bolt Assembly  
Figure 403

- (0.30 and 0.35 mdaN), and lock it with a split pin.
- (5) Check the lock:
- (a) Close the hooks by hand and ensure that the uplock is locked.
  - (b) Control the hooks by hand. Rotate the hexagon collar counter-clockwise (viewed from the right-hand side) and check that the hooks open.
- (6) Install the visor uplock jack (Ref. 27-62-14).
- (7) Connect the electrical cable to the microswitch.
- (8) Remove the visor 'down' locking link.
- (9) Remove the droop nose locking pins.
- (10) Remove the safety clips and reset the circuit breakers that were tripped prior to removal.

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- (11) Raise the visor as detailed in 27-61-00, Adjustment/Test. Bleed the system (Ref. 27-62-00, Adjustment/Test) if necessary.
- (12) Depressurize the green and the yellow hydraulic systems and trip the circuit breakers as detailed in para.2B.
- (13) Fit the droop nose locking pins and the visor locking pins (Ref. Fig. 401 ).
- (14) Check that there is a clearance of between 0.065 and 0.075 in (1.651 and 1.905 mm) between the emergency release lever and the roller. If necessary adjust the longer strut to obtain this clearance, then ensure that the strut end fittings are in 'safety' and relock them.
- (15) Remove the droop nose locking pins and the visor 'down' locking pins. Reset the circuit breakers which were tripped prior to removal.
- (16) Carry out an operational test on the visor and droop nose system (Ref. 27-61-00, Adjustment/Test).
- (17) Refit the nose fairing access panels.

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## MAINTENANCE MANUAL

### VISOR GUIDE RAILS - REMOVAL/INSTALLATION

#### 1. General

R The following procedure is for the removal and re-installation of the existing rail, or the fitting of a new rail. Removal and Installation is made with the visor in the raised position and secured by its uplock.

#### 2. Visor Guide Rails

##### A. Equipment and Materials

R

R

DESCRIPTION	PART NO.
Locking pins, droop nose (2)	E925045031
Locking sleeve, visor jack	D925157001
Extractor set	D925164000
For visor rail rear pins:	
Bolt	D925604100
Body	D9255820000
Barrel	D925603000
For visor rail forward pins:	
Bolt	D925578100
Body	D925582000
Barrel	D925581000
Alignment tool, visor rails	D925150000
Safety clips, circuit breakers	-
Non-corrodible wire 0.028 in (0.77 mm) dia.	-
Torque spanner, 12 to 340 lbf in (0.13 to 3.75 mdaN) range	-

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### B. Prepare to Remove

- (1) If the nose and visor are not in the fully raised position raise it as follows:
  - (a) Make available electrical ground power (Ref.24-41-00).
  - (b) Connect a ground hydraulic test rig to the aircraft hydraulic system (Ref.29-20-00) and pressurize the green and the yellow hydraulic systems.
  - (c) Operate the VISOR/NOSE normal control lever on the co-pilot's dash panel as necessary to fully raise the nose and visor.
- (2) Electrically isolate the visor and nose normal and stand-by controls by tripping circuit breakers M11 on panel 15-215 map ref.F8, and M12 and M13 on panel 1-213 map ref. Q16 and Q17; fit safety clips.
- (3) Fit the droop nose locking pins and the visor jack safety locking sleeve (Ref. Fig. 401 ).

### R C. Remove (Ref. Fig. 402 )

- (1) Remove the microswitch and bracket from the forward end of the rail.
- (2) Remove the bolt securing the visor carriage to the tracking leg and remove the carriage together with the shims and wiper pads from the leg and guide rail.

R (3) Disconnect the bonding lead from the guide rail.

R (4) Unscrew the special bolt retaining the fail-safe pin beneath the rear end of the guide rail then  
R withdraw the pin.

R (5) Disconnect the rear end of the guide rail.

(a) Remove the guide rail mounting pin retaining bolt from the nose fairing rear bulkhead.

(b) Withdraw the mounting pin securing the end of the guide rail using the extractor set (Ref. Fig. 403 ).

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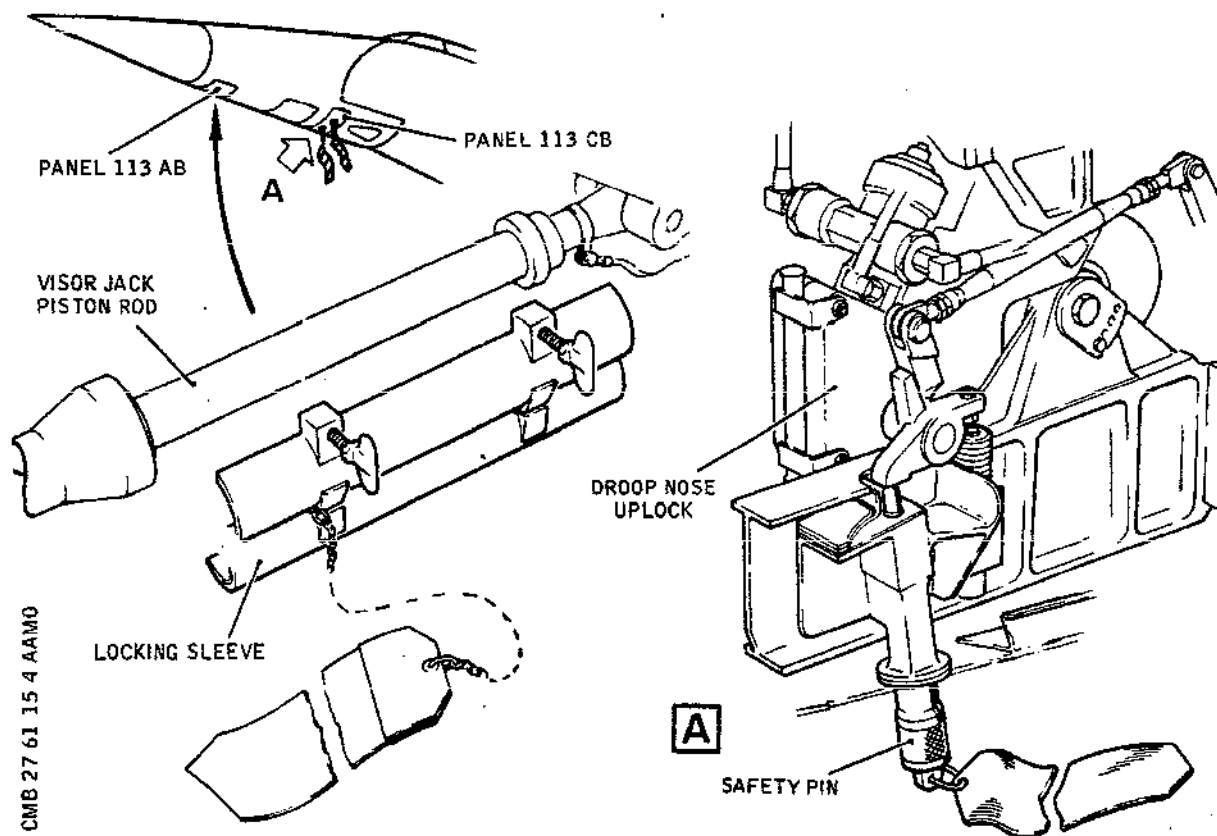
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## MAINTENANCE MANUAL



Ground Safety Locks  
Figure 401

- R (6) Disconnect the forward end of the guide rail from the mid-bulkhead mounting bracket, then remove the bolt securing it to the bracket using the extractor set (Ref. Fig. 403 ).
- R (7) Move the rail forward to disengage it from the rear mounting bracket and side brackets, then remove it complete with slipper block and special washers.
- D. Install (Ref. Fig. 402 ).
- (1) Locate the rail, together with the slipper block, onto the side brackets and end brackets, first inserting the forward end into the hole in the mid-bulkhead to enable the other end of the rail to be located in the rear bulkhead mounting bracket.
  - (2) Check that the rail is correctly positioned and aligned using the alignment tool (Ref. Fig. 404 ).
  - (3) Secure the rear end of the rail

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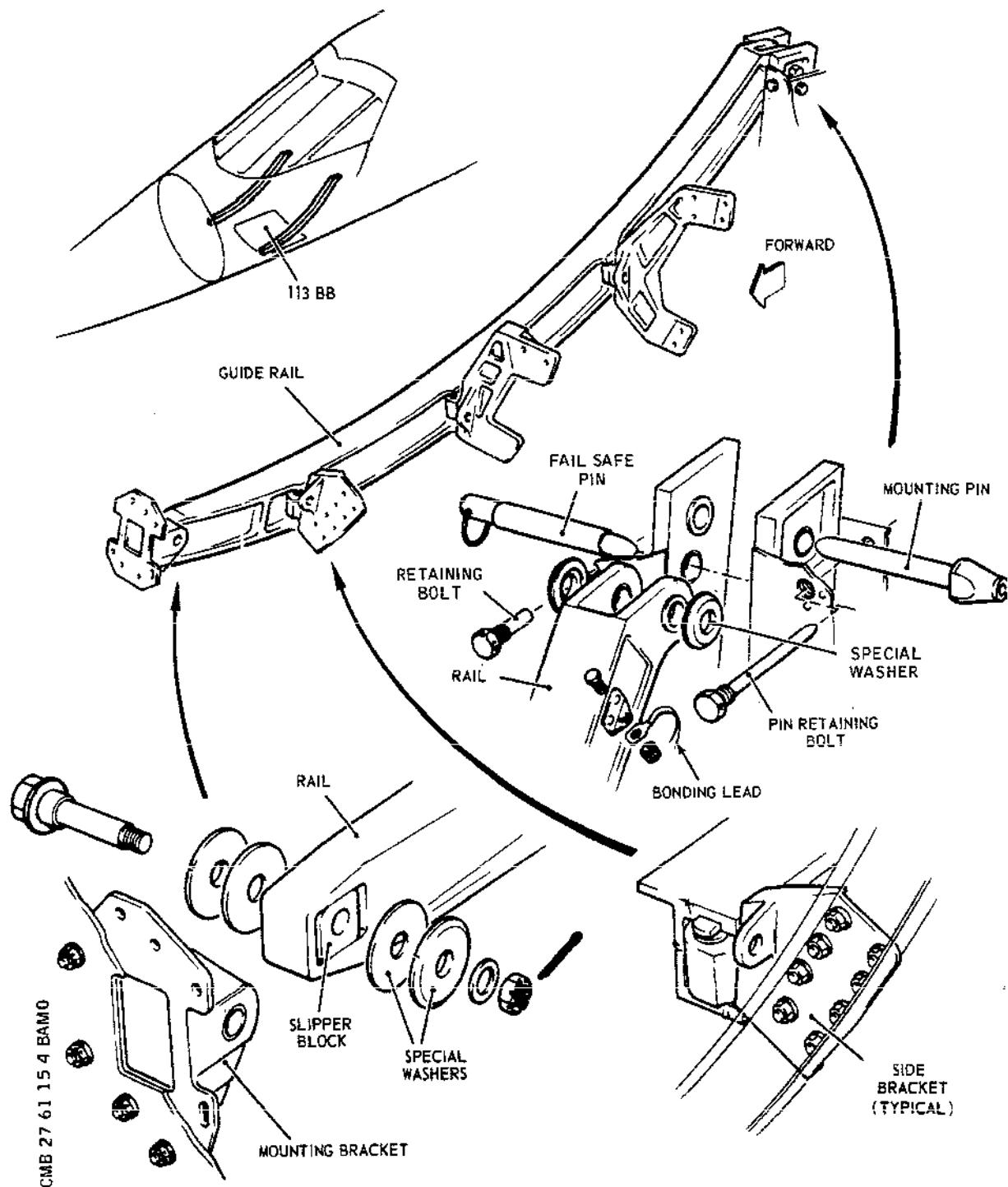
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## MAINTENANCE MANUAL



Visor Guide Rail - Installation  
Figure 402

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## MAINTENANCE MANUAL

- (a) Insert the special shim washers between the rail and the mounting bracket. Refer to Table 401 for washer identification and location.
  - (b) Secure the rail and shims with the mounting pin.
  - (c) Fit pin retaining bolt to the rear bulkhead; torque tighten the bolt to between 170 and 185 lbf in (1.89 to 2.3 mdaN), and secure it with lockwire.
- (4) Secure the forward end of the rail together with the special shim washers with the bolt, washer and nut. Refer to Table 401 for washer identification and location. Torque tighten the nut to between 16 and 24 lbf in (0.18 to 0.27 mdaN) and fit a split pin.
- (5) Fit the fail-safe pin beneath the rear end of the rail and fit the special bolt to retain it. Torque tighten the bolt to between 240 and 265 lbf in (2.7 and 2.98 mdaN) and secure it with lockwire.
- (6) Fit the carriage complete with wiper pads to the guide rail and secure it, together with the shims, to the tracking leg with the bolt, nut and washer. Torque tighten the nut to between 320 and 340 lbf in (3.55 to 3.75 mdaN) and secure it with a split pin.

	Location	No. of Grooves
Rail rear attachment	( LH outboard	1
	( RH outboard	2
	( LH inboard	3
	( RH inboard	4
Rail forward attachment	( LH,RH inboard	0
	( LH outboard	1
	( RH outboard	2
Visor carriage	( LH outboard	1
	( RH outboard	2
	( LH inboard	3
	( RH inboard	4

**NOTE:** Grooves cut in the perimeter of the shim washers denote the location in which the washer is fitted.

### Shim Washer Identification

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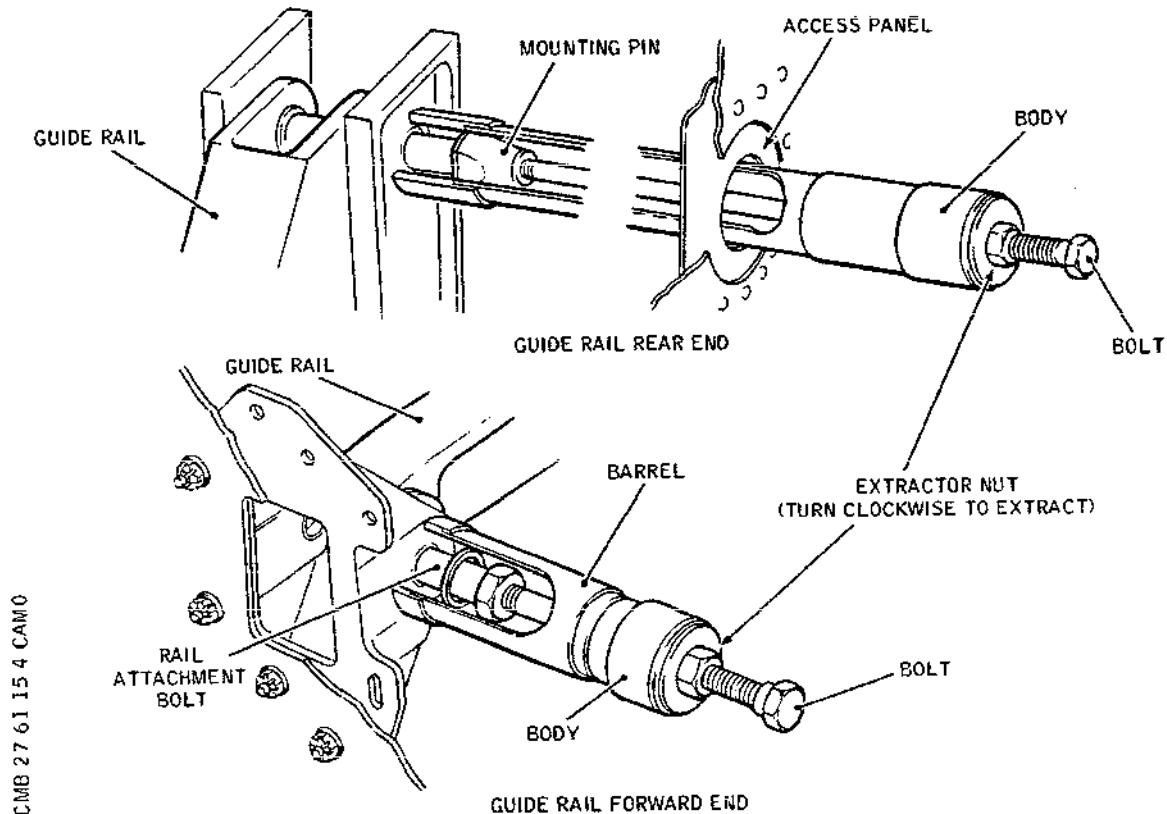
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## MAINTENANCE MANUAL

Location

No. of Grooves

Table 401



CMB 27 61 15 4 CAMO

Extractor Tool - Visor Guide Rail Pins  
Figure 403

**NOTE:** If the tracking leg of the carriage has been renewed the carriage must be refitted as detailed in 27-61-13.

(7) Fit the microswitch (M34(RH);M60(LH)) and bracket to the rail using the bolts, washers and nuts. Torque tighten the nuts to between 12 and 15 lbf in (0.13 and 0.17 mdaN) and fit split pins.

- R (8) Connect the bonding lead to the guide rail.
- R (9) Reset the circuit breakers tripped in 2.B.(2).
- R (10) Remove the droop nose uplocks safety pins and the

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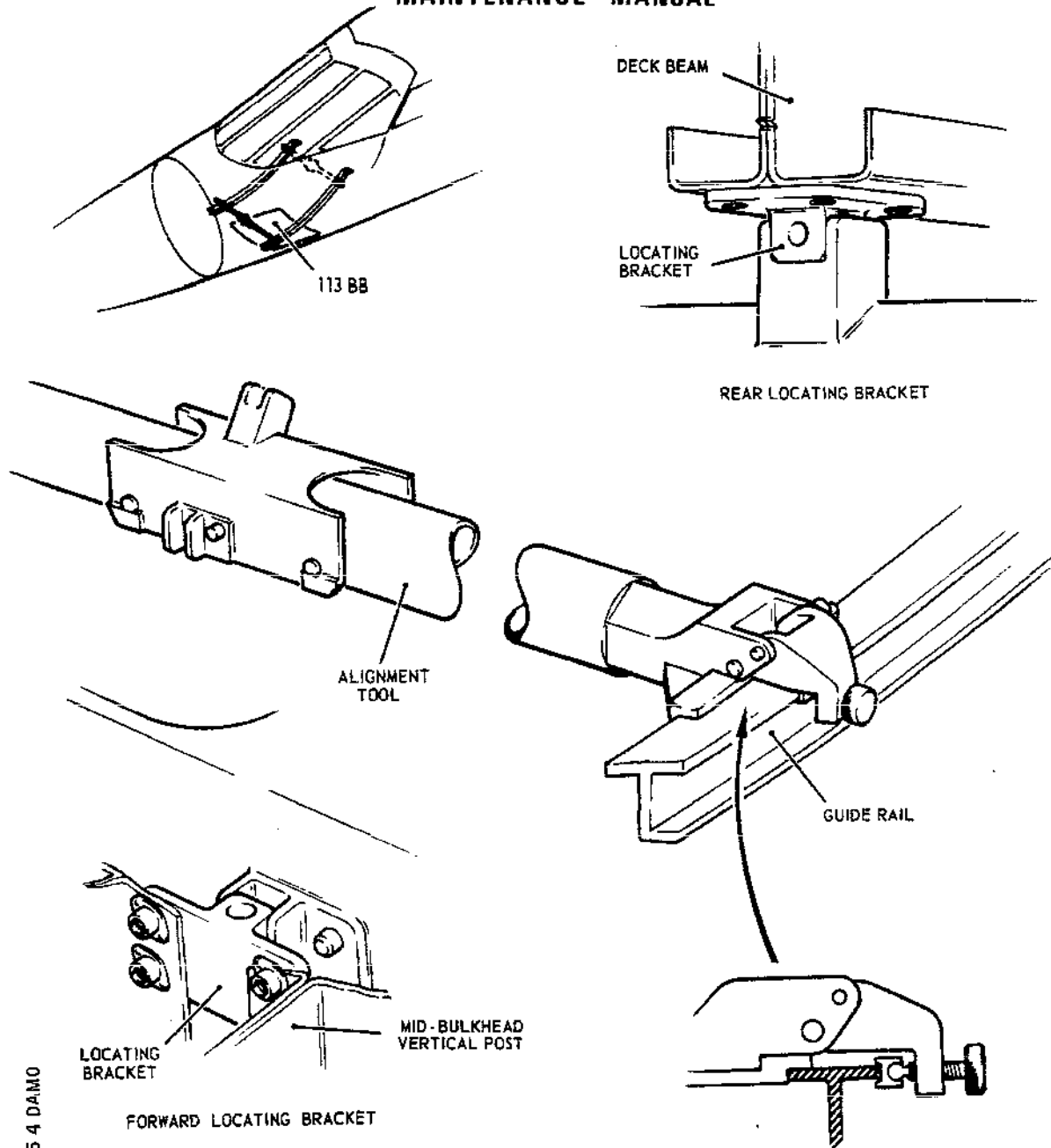
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## MAINTENANCE MANUAL



CMB 27 61 15 4 DAMO

Alignment Tool - Visor Guide Rail  
Figure 404

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## MAINTENANCE MANUAL

visor jack safety locking sleeve (Ref. Fig. 401 ).

- R (11) Carry out the visor operational test (Ref. 27-61-00, Adjustment/Test) and check the satisfactory operation of the visor.

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## MAINTENANCE MANUAL

### INTERACTION LEVER - REMOVAL/INSTALLATION

#### 1. General

The interaction lever assembly of the visor emergency release mechanism hinges on a bracket on the rear face of the droop nose aft bulkhead. One lever incorporates a shear pin connected to the system linkage leading to the visor uplock; the other lever is fitted with a roller that rides the cam on the fuselage pressure bulkhead to trip the linkage.

#### 2. Interaction Lever (Ref. Fig. 401 )

##### A. Equipment and Materials

R

R

R

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DESCRIPTION

PART NO.

Safety clips, circuit breakers

-

Locking pin (2), droop nose

E925045031

##### B. Prepare

- (1) Set the nose to the 5 deg lowered position as instructed in the operationnl test for droop nose and visor given in 27-61-00, Adjustment/Test.
- (2) Electrically isolate the droop nose by tripping the circuit breakers controlling the nose; fit safety clips.

		CIRCUIT	MAP
SERVICE	PANEL	BREAKER	REF.
VISOR & NOSE CONT	15-215	M11	F 8
NOSE 7 1/2 CONT	1-213	M12	Q16
NOSE/VISOR STBY LOWER SUP	1-213	M13	Q17

- (3) Place a warning notice on the droop nose controls that personnel are working inside the droop nose.

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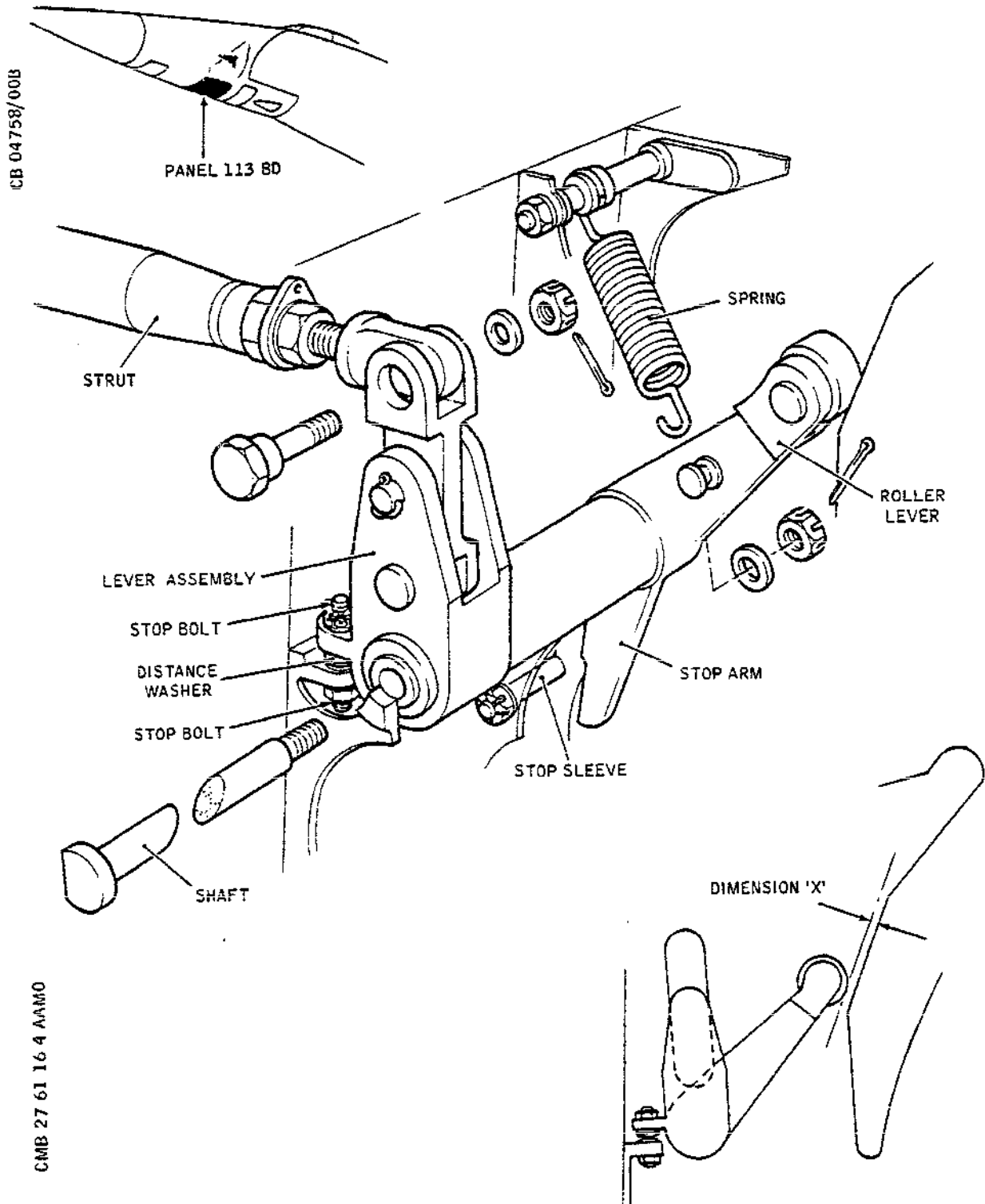
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## MAINTENANCE MANUAL



Interaction Lever - Installation  
Figure 401

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## MAINTENANCE MANUAL

### C. Remove

- (1) Disconnect the spring from the roller lever.
- (2) Disconnect the strut from the interaction lever assembly.
- (3) Remove the shaft upon which the lever hinges and remove the lever.

### D. Install

- (1) Ensure that the safety precautions given in 2B still apply.
- (2) If a new interaction lever is to be fitted remove the stop bolt from the old lever and fit it less the distance washer to the new lever.
- (3) Fit the lever to the bracket with the shaft. Align the flat on the shaft head to abut the stop on the bracket and secure the shaft with the washer and nut. Torque tighten the nut to between 27 and 32 lbf in (0.32 and 0.37 mdaN) and fit a split pin.

NOTE: The lever is fitted with dry lubricated journal bearings and when fitting the shaft no lubrication is to be used.

- (4) Connect the strut to the lever with the bolt, washer and nut. Torque tighten the nut to between 27 and 32 lbf in (0.32 and 0.37 mdaN) and fit a split pin.
- (5) Attach the spring to the roller lever.
- (6) If the old lever assembly has been refitted, check that with the nose in the 5 deg lowered position and the stop bolts making contact that the gap 'X' is between 0.050 and 0.060 in (1.27 and 1.52 mm). If not or if new lever has been fitted, adjust the visor emergency release mechanism as detailed in 27-61-00, Adjustment/Test.
- (7) Reset the circuit breakers.
- (8) Raise the nose to the fully up position.
- (9) Fit the ground locking pins to the droop nose. (Ref. Fig. 402 ).
- (10) Check that the gap between the interaction lever stop

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**27-61-16**

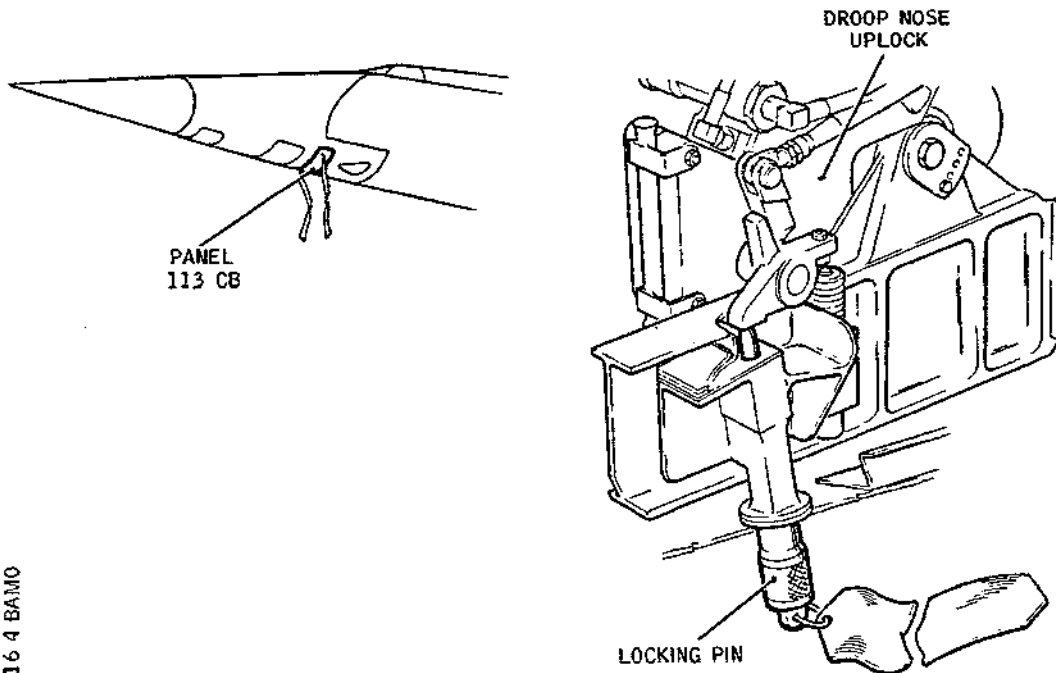
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## MAINTENANCE MANUAL



CMB 27 61 16 4 BAMO

Droop Nose Locking Pins  
Figure 402

arm and the stop sleeve is between 0.030 and 0.12 in  
(0.76 and 3.04 mm).

- (11) Remove the locking pins from the droop nose.
- (12) Carry out an operational test of the droop nose and visor emergency release system (Ref. 27-61-00, Adjustment/Test).

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## MAINTENANCE MANUAL

### VISOR SPRING ASSISTOR MECHANISM - REMOVAL/INSTALLATION

#### 1. General

The spring assistor mechanism consists of two spring-pots, levers and cables assembled to cross-shafts at the rear of the nose fairing forward bulkhead. Its function is to apply spring-tension on the visor when raised to ensure positive lowering when released by the emergency release mechanism. Removal and installation of any part of the spring assistor mechanism is made with the visor lowered when the spring tension is minimal.

#### 2. Spring pot - Removal/Installation

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Safety clips, circuit breakers	-
Locking pins (2), droop nose	E925045031
Torque spanner 0 to 60 lbf in (0 to 0.67 mdaN) range	-
Locking wire, non-corrodible steel 0.028 in (0.7 mm) dia.	-

##### B. Prepare to Remove

- (1) Ensure that the visor is in the lowered position.
- (2) Electrically isolate the visor and droop nose control system by tripping the circuit breakers; fit safety clips.

R

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R

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
VISOR & NOSE CONT	15-215	M11	F 8
NOSE 7 1/2 DEG CONT	1-213	M12	Q16

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## MAINTENANCE MANUAL

R

R  
R

R  
R

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
NOSE/VISOR STBY LOWER SUP	1-213	M13	Q17

- (3) Fit the ground safety locking pins to the droop nose uplocks (Ref. Fig. 401 )
- (4) Remove the access panel from the droop nose to gain access to the spring assistor mechanism.

C. Remove (Ref. Fig. 402 )

- (1) Support the spring pot and disconnect the rod end from the lever.
- (2) Remove the spring pot from the lower shaft.

D. Install (Ref. Fig. 402 )

- (1) Comply with the safety precautions in para.2B.
- (2) Locate the spacer and spring-pot together on the lower shaft, and secure it with a nut and washer. Torque tighten the nut to 25 - 30 lbf in (0.28 to 0.34 mdaN) and fit a split pin. Check that the spring-pot pivots freely on the shaft.
- (3) Adjust the rod-end of the spring-pot so that the bolt that secures the rod end to the lever can be inserted without tension. Tighten the locknut and secure it with wire. Fit the nut and washer to the bolt; torque tighten the nut to 50 to 60 lbf in (0.56 to 0.67 mdaN) and secure it with a split-pin.
- (4) Remove the ground safety locking pins from the droop nose uplocks.
- (5) Reset the circuit breakers.
- (6) Operationally test the visor (Ref. 27-61-00 Adjustment/Test) then carry out an emergency lowering of the droop nose and check that the visor fully lowers under the action of the spring assistor mechanism.
- (7) Replace the access panels.

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## MAINTENANCE MANUAL

### 3. Cable - Removal/Installation

#### A. Equipment and Materials

---

DESCRIPTION	PART NO.
-------------	----------

---

Safety clips, circuit breakers	-
--------------------------------	---

Locking pin (2), droop nose	E925045031
-----------------------------	------------

Torque spanner, 0 to 60 lbf in (0 to 0.67 mdaN) range	-
--	---

Locking wire, non-corrodible steel 0.28 in (0.7 mm) dia.	-
---	---

---

#### B. Prepare to Remove

(1) Ensure that the visor is down.

(2) Electrically isolate the visor and droop nose control system by tripping the circuit breakers; fit safety clips.

R

---

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
---------	-------	--------------------	------------

---

R

R

R

VISOR & NOSE CONT	15-215	M11	F 8
-------------------	--------	-----	-----

R

NOSE 7 1/2 DEG CONT.	1-213	M12	Q16
----------------------	-------	-----	-----

R

NOSE/VISOR STBY LOWER SUP.	1-213	M13	Q17
----------------------------	-------	-----	-----

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(3) Fit the ground safety locking pins to the droop nose uplocks (Ref. Fig. 401 ).

(4) Remove the access panel from the droop nose to gain access to the spring assistor mechanism.

#### C. Remove (Ref. Fig. 402 )

(1) Remove the cable:

(a) Disconnect the forward end of the cable by

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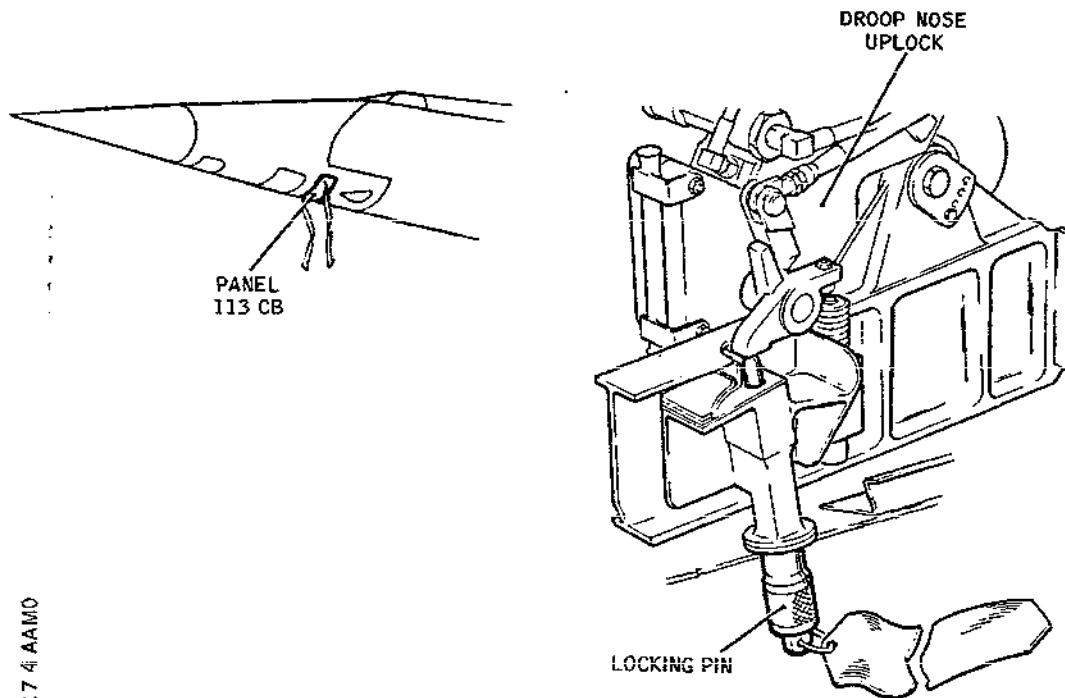
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## MAINTENANCE MANUAL



CMB 27 61 17 4 AAMO

Droop Nose Safety Locking Pins  
Figure 401

removing the locking clips and unscrewing the turnbuckle.

- (b) Disconnect the rear end of the cable from the link by removing the pin.

D. Install (Ref. Fig. 402 )

- (1) Connect the rear end of the cable to the link with the pin, washer and split-pin.
- (2) Connect the forward end of the cable to the eye-end using the turnbuckle. Adjust the turnbuckle so that the threaded ends of both the eye-end and the cable are screwed in an equal distance and give the maximum permitted thread protrusion of no more than three threads.
- (3) Check and adjust the mechanism (Ref. Fig. 403 )
  - (a) Reset the circuit breakers.

EFFECTIVITY: ALL

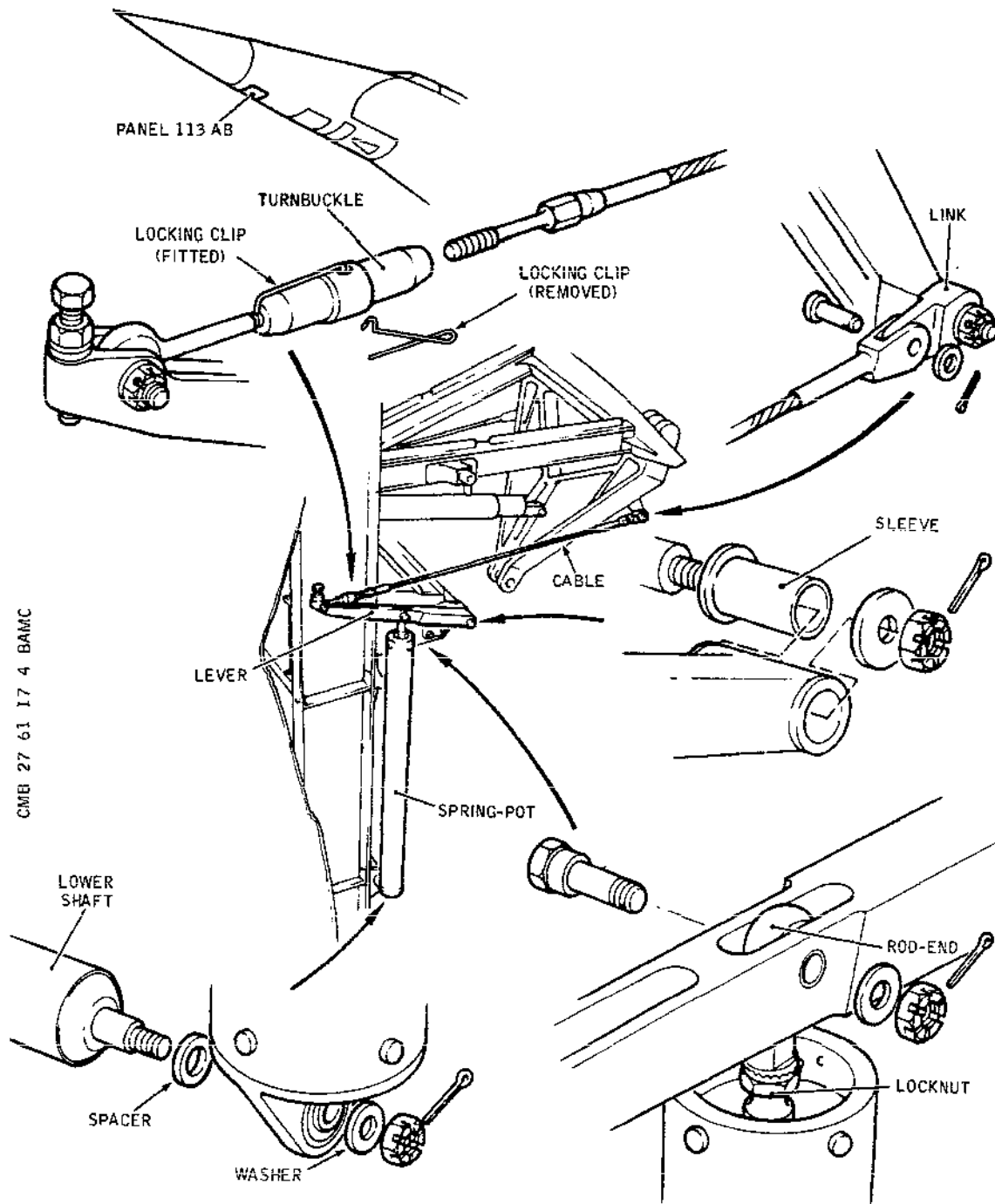
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## MAINTENANCE MANUAL



Visor Spring Assistor Mechanism  
Figure 402

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## MAINTENANCE MANUAL

- (b) Raise the visor.
  - (c) Trip the circuit breakers.
  - (d) Adjust the turnbuckle to give a clearance between the spring-pot rod end and the lever (dim 'X') of not less than 0.157 in (4 mm) and secure the turnbuckle with clips.
  - (e) Check that the clearance between the lever stop-bolt and the stop (dim 'Y') is between 0.09 and 0.11 in (2.28 and 2.79 mm). If necessary, adjust the stop bolt to obtain this dimension; torque load the lock nut to 25 to 30 lbf in (0.28 to 0.4 mdaN) and lock it with wire.
  - (f) Reset the circuit breakers.
  - (g) Lower the visor.
  - (h) Trip the circuit breakers.
  - (i) Remove the split-pin, nut and washer from the bolt securing the spring-pot rod end to the lever and check that the bolt can be removed and inserted without tension. If necessary, adjust the rod-end to achieve this condition, retighten the lock-nut and lock it with wire. Refit the nut and washer and torque load the nut to 50 to 60 lbf in (0.56 to 0.67 mdaN); fit the split-pin.
- (4) Remove the locking pins from the droop nose.
  - (5) Reset the circuit breakers.
  - (6) Operationally test the visor (Ref. 27-61-00, Adjustment/Test), then carry out an emergency lowering of the droop nose and check that the visor fully lowers under the action of the spring assistor mechanism.
  - (7) Replace the access panels.

#### 4. Lever

##### A. Equipment and Materials

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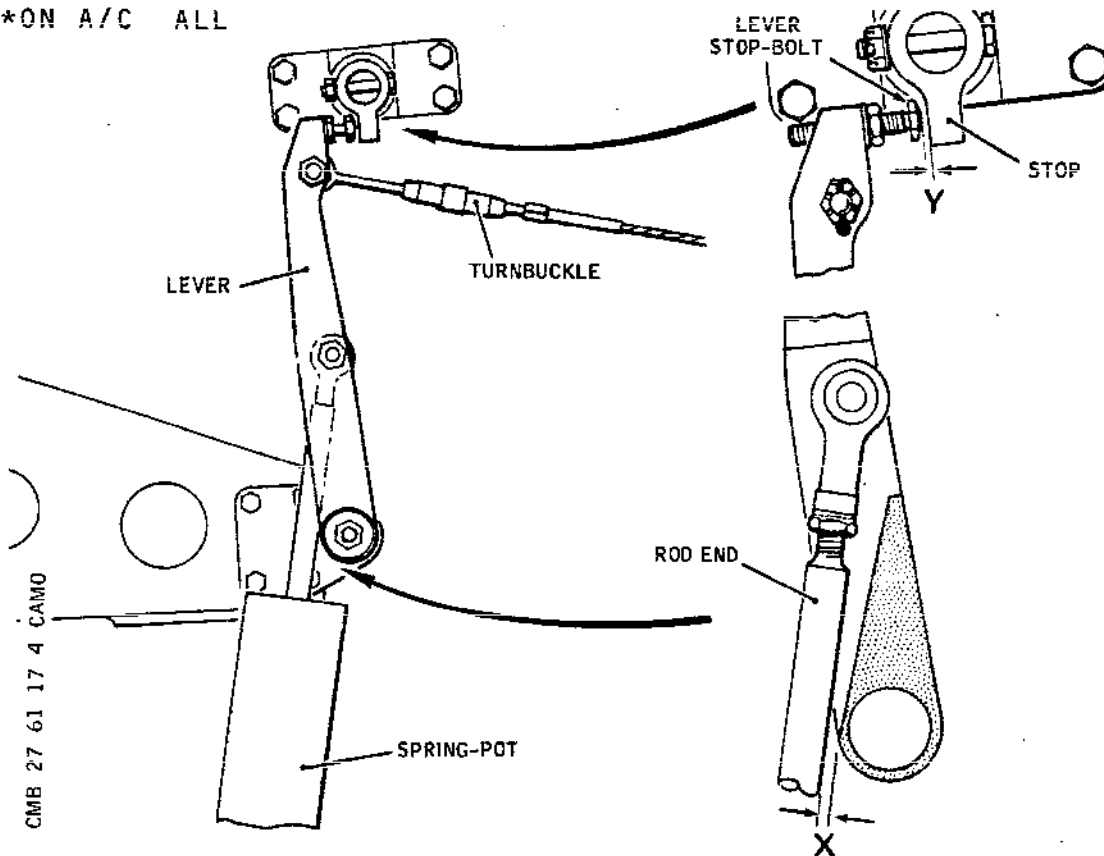
# Concorde

## MAINTENANCE MANUAL

DESCRIPTION

PART NO.

\*\*ON A/C ALL



Adjustment  
Figure 403

DESCRIPTION

PART NO.

Safety clips, circuit breakers

-

Locking pin (2), droop nose

E925045031

Torque spanner, 0 to 90 lbf in  
(0 to 1.02 mdaN) range

-

Locking wire, non-corrodible  
steel 0.028 in (0.7 mm) dia.

-

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### B. Prepare to Remove

- (1) Ensure that the visor is down.
- (2) Electrically isolate the visor and droop nose control system by tripping the circuit breakers;

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
VISOR & NOSE CONTROL	15-215	M11	F 8
NOSE 7 1/2 CONT.	1-213	M12	Q16
NOSE/VISOR STBY LOWER SUP.	1-213	M13	Q17

- (3) Fit the ground safety locking pins to the droop nose uplock (Ref. Fig. 401 ).
- (4) Remove the access panel from the droop nose to gain access to the spring assistor mechanism.

### C. Remove (Ref. Fig. 402 )

- (1) Disconnect the turnbuckle eye-end from the lever.
- (2) Support the spring-pot and disconnect the rod end from the lever.
- (3) Remove the lever and sleeve from the cross shaft.

### D. Install

- (1) Refit the lever together with the sleeve to the cross-shaft and secure them with the washer and nut. Torque tighten the nut to between 80 and 90 lbf in (0.9 and 1.02 mdaN) and fit a split pin.
- (2) Connect the turnbuckle eye-end to the lever with the bolt, washer and nut. Torque tighten the nut to between 25 and 30 lbf in (0.28 and 0.34 mdaN) and secure it with a split pin.
- (3) Connect the spring pot rod end to the lever using the bolt, washer and nut. Torque tighten the nut to between 50 and 60 lbf in (0.56 and 0.67 mdaN) and fit a split pin.

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## MAINTENANCE MANUAL

- (4) Check and adjust the mechanism (Ref. Fig. 403 ).
- (a) Reset the circuit breakers.
  - (b) Raise the visor.
  - (c) Trip the circuit breakers.
  - (d) Adjust the turnbuckle to give a clearance between the spring-pot rod end and the lever (dim 'X') of not less than 0.157 in (4 mm) and secure the turnbuckle with clips.
  - (e) Check that the clearance between the lever stop-bolt and the stop (dim 'Y') is between 0.09 and 0.11 in (2.28 and 2.79 mm). If necessary, adjust the stop bolt to obtain this dimension; torque load the lock nut to 25 to 30 lbf in (0.28 to 0.4 mdaN) and lock it with wire.
  - (f) Reset the circuit breakers.
  - (g) Lower the visor.
  - (h) Trip the circuit breakers.
  - (i) Remove the split-pin, nut and washer from the bolt securing the spring-pot rod end to the lever and check that the bolt can be removed and inserted without tension. If necessary, adjust the rod-end to achieve this condition, re-tighten the lock-nut and lock it with wire. Refit the nut and washer and torque load the nut to 50 to 60 lbf in (0.56 to 0.67 mdaN); fit the split-pin.
- (5) Remove the locking pins from the droop nose.
- (6) Reset the circuit breakers.
- (7) Operationally test the visor (Ref. 27-61-00, Adjustment/Test), then carry out an emergency lowering of the droop nose and check that the visor fully lowers under the action of the spring assistor mechanism.
- (8) Replace the access panels.

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## MAINTENANCE MANUAL

### VISOR AND DROOP NOSE MICROSWITCHES - REMOVAL/INSTALLATION

**WARNING:** OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DETAILED  
IN 24-00-00

#### 1. General

Removal and installation procedures are given for micro-switches M23, M24, M25, M26, M32, M37, M34, M60, M21 and M54. The microswitches are located in the droop nose and are generally accessible from panels in the underside of the nose fairing. Collet lock microswitches M35 and M36 are not included in this topic as they are an integral part of the nose actuator jacks and cannot be removed.

#### 2. Nose Uplock Microswitches M23, M24 (Ref. Fig. 401 )

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit breaker safety clips	-
Droop nose locking pins (2)	E925045031
Locking wire, non-corrodible steel 0.028 in (0.7 mm dia)	-
Aeroshell grease 16 (Ref.20-30-00, No.51)	-

##### B. Prepare

- (1) Move the droop nose, if necessary, to the fully raised position (Ref.27-61-00, Adjustment/Test).
- (2) Trip the circuit breakers and fit safety clips.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
NOSE 7 1/2 CONT	1-213	M12	Q16
VISOR & NOSE CONT	15-215	M11	F 8

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## MAINTENANCE MANUAL

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	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
R	VISOR & NOSE IND	15-215	M15	F 9

- R (3) Remove access panel 113 BB and BZ.
- R (4) Fit the droop nose locking pins to the droop nose  
R uplocks.

### C. Remove

- (1) Disconnect the electrical cable from the microswitch.
- (2) Remove the microswitch from its mounting.

### D. Install

- (1) Comply with the electrical safety precautions.
- (2) Ensure that the droop nose locking pins are fitted.
- (3) Remove the locking pin, nut, washers and bolt from the microswitch striker lever on the uplock mechanism. Note the number of washers removed.
- (4) Smear the bolt with Aeroshell grease 16, and screw it finger tight in the microswitch striker lever.
- (5) Temporarily attach the microswitch by means of its two bolts, bushes, stop plates, washers and nuts.
- (6) Screw out the bolt fitted in the striker lever until its head just operates the microswitch. Screw out a further two turns.
- (7) Measure the gap between the bolt head and the striker lever.
- (8) Calculate the number of 0.030 in (0.762 mm) thick washers which can be accommodated in the gap.
- (9) Remove the microswitch.

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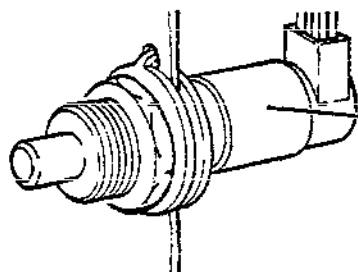
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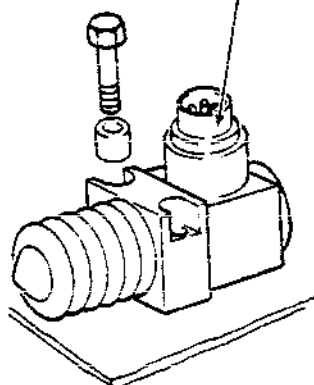
## MAINTENANCE MANUAL

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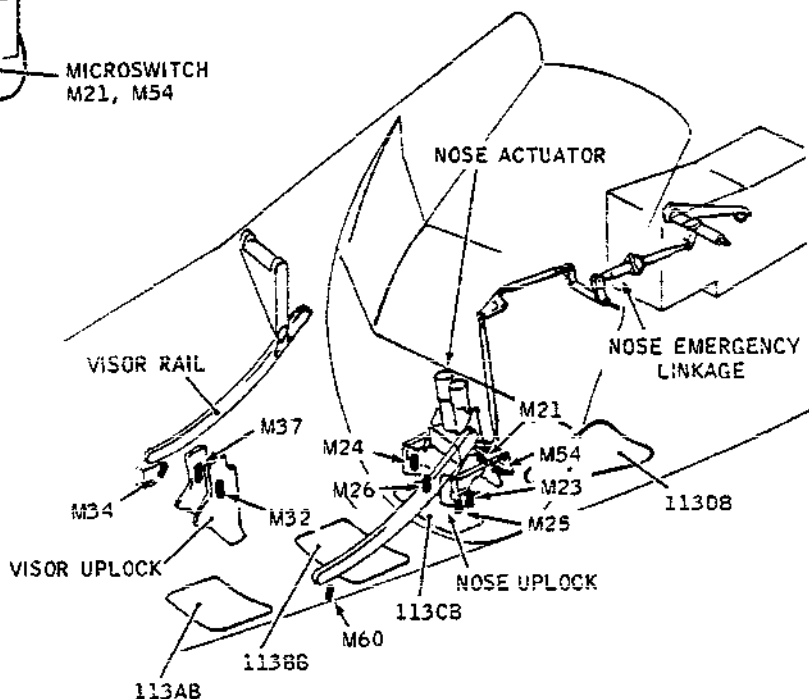


SIMILAR TO M34

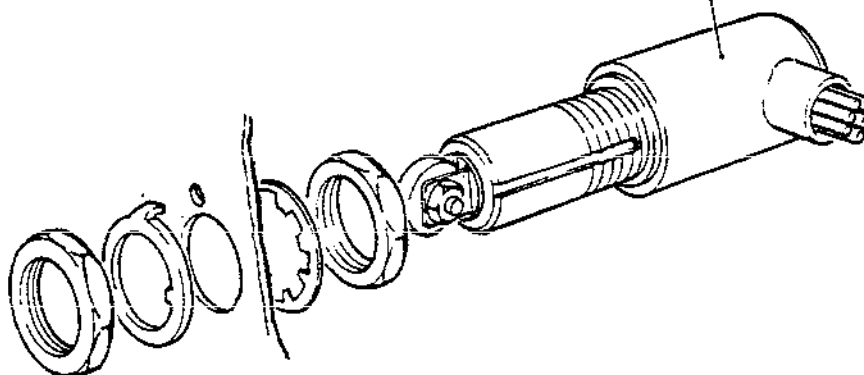
MICRO SWITCH  
M23  
M24  
M25  
M26  
M32  
M37



NOTE:  
ANNOTATIONS WITH  
PREFIX 'M' REFER TO  
IDENTIFICATION CODE



MICROSWITCH  
M34, M60



CMB 27 61 26 4 AAM0

Microswitch Installation  
Figure 401

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## MAINTENANCE MANUAL

- (10) Unscrew the bolt fitted in the striker lever and refit it with the calculated number of 0.030 in (0.762 mm) thick washers plus an additional one between the bolt head and the striker lever. Torque tighten the bolt to between 27 and 32 lbf in (0.30 to 0.36 mdaN).
- (11) Subtract the number of washers fitted at operation (10) from the total noted in operation (3) and fit the remaining number of similar washers under the nut on the bolt. Torque tighten the nut to between 27 and 32 lbf in (0.30 to 0.36 mdaN) and lock with wire.
- (12) Smear the two attachment bolts with Aeroshell grease, 16. Fit the microswitch and secure it with the bolts, washers, bushes, stop plates and nuts. Torque tighten the nuts to between 12 and 15 lbf in (0.135 and 0.17 mdaN) and lock them with split pins.
- (13) Ensure that the mating surfaces of the electrical connections are clean and undamaged, and connect the electrical cable to the microswitch.

### E. Conclude

- (1) Remove the droop nose locking pins.
- (2) Ensure that the droop nose and visor controls are at positions relating to the droop nose and visor configuration.
- (3) Remove the safety clips and reset the circuit breakers previously tripped.
- R (5) Carry out an operational test of the visor and droop nose system (Ref. 27-61-00, Adjustment/Test), and check the microswitches for continuity (Ref. 27-61-26, Adjustment/Test).
- R (6) Refit access panels 113 BB and B2.

### 3. Nose Uplock Microswitches M25, M26 (Ref. Fig. 401 )

#### A. Equipment and Materials

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## MAINTENANCE MANUAL

### DESCRIPTION

### PART NO.

Circuit breaker safety clips

-

Locking sleeves, nose actuator  
jacks

E925091000

Aeroshell grease 16  
(Ref.20-30-00, No.51)

-

### B. Prepare

- (1) Move the droop nose (Ref. 27-61-00), if necessary, to 'fully lowered'.
- (2) Trip the circuit breakers and fit safety clips.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
NOSE 7 1/2 CONT	1-213	M12	Q16
VISOR & NOSE CONT	15-215	M11	F 8
VISOR & NOSE IND	15-215	M15	F 9

- (3) Remove access panels 113 DB and CB
- (4) Fit the locking sleeves to the droop nose actuator jacks.

### C. Remove

- (1) Disconnect the electrical cable from the microswitch.
- (2) Remove the microswitch from its mounting.

### D. Install

- (1) Comply with the electrical safety precautions.
- (2) Ensure that the droop nose locking sleeves are fitted to the nose actuator jacks.

EFFECTIVITY: ALL

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- (3) Smear the attachment bolts with Aeroshell grease 16. Fit the microswitch and secure it with the bolts, spacers, washers and nuts. Torque tighten the nuts to between 12 and 15 lbf in (0.135 and 0.17 mdaN) and lock them with split pins.
- (4) Ensure that the mating surfaces of the electrical connections are clean and undamaged, and connect the electrical cable to the microswitch.

### E. Conclude

- (1) Remove the locking sleeves from the droop nose actuator jacks.
- (2) Ensure that the droop nose and visor controls are at positions relating to the droop nose and visor configuration.
- (3) Remove the safety clips and reset the previously tripped circuit breakers.
- (4) Test the microswitches for continuity as instructed in in 27-61-26, Adjustment/Test, and function test the visor and droop nose system (Ref 27-61-00, Adjustment/Test).

R (5) Refit access panels 113 DB and CB.

### 4. Visor Uplock Microswitch M32 (Ref. Fig. 401 )

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit breakers safety clips	-
Droop nose locking pins (2)	E925045031
Aeroshell grease 16 (Ref.20-30-00, No.51)	-
Non-corrodible steel wire 0.028 in (0.7 mm) dia	-

#### B. Prepare

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- (1) Move the droop nose (Ref. 27-61-00), if necessary, to 'fully raised' and the visor to 'down'.
- (2) Trip the circuit breakers and fit safety clips.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
NOSE 7 1/2 CONT	1-213	M12	Q16
VISOR & NOSE CONT	15-215	M11	F 8
VISOR SERVICES 'A' SYS CONT	1-213	M14	Q18

- (3) Fit the nose locking pin in the 0.5 in (12.7 mm) dia hole in each side of access panel 113 CB.
- (4) Remove access panel 113 AB.

### C. Remove

- (1) Disconnect the electrical cable from the microswitch.
- (2) Remove the microswitch from its mounting.

### D. Install

**WARNING:** IT WILL BE NECESSARY TO OPERATE VISOR DURING ADJUSTMENT OF MICROSWITCH CAM LEVER BOLT. THEREFORE IT MUST BE ENSURED THAT PERSONNEL AND EQUIPMENT ARE CLEAR OF THE AREA PRIOR TO REMOVAL OF LOCKING PINS AND RESELECTING OF THE C.B.'s. SYSTEM MUST THEN BE MADE SAFE BEFORE RE-ENTRY TO ACCESS BAY.

- (1) Comply with the electrical safety precautions.
- (2) Ensure that the droop nose locking pins are fitted.
- (3) Remove the split pin, nut, bolt and washers from the cam lever. Note the number of washers removed.
- (4) Refit the bolt, lightly smeared with Aeroshell grease 16, finger tight in the cam lever.
- (5) Fit the microswitch by means of its two sleeves and bolts lightly smeared with Aeroshell grease, 16. Torque tighten the bolts to between 40 and 45 lbf in. (0.45 and 0.51 mdaN) and wirelock them.

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- (6) With lock in closed position, screw out the bolt from the cam lever until the microswitch just operates. Screw out a further one turn.
- (7) Measure the gap between the bolt head and the cam lever.
- (8) Calculate the number of 0.030 in (.762 mm) thick washers which can be accommodated in the gap.
- (9) Unscrew the bolt fitted in the cam lever and refit it with the calculated number of 0.30 in (.762 mm) thick washers plus an additional one between the bolt head and cam lever. Torque tighten the bolt to between 15 and 20 lbf in (0.17 and 0.23 mdaN).
- (10) Subtract the number of washers fitted at operation (9) from the total noted in operation (3) and fit the remaining number of similar washers under the nut on the bolt. Torque tighten the nut to between 12 and 15 lbf in (0.135 and 0.17 mdaN).
- (11) Fit a split pin.
- (12) Ensure that the mating surfaces of the electrical connections are clean and undamaged, and connect the electrical cable to the microswitch.

### E. Conclude

- (1) Remove the nose locking pins.
- (2) Ensure that the droop nose and visor controls are at positions relating to the droop nose and visor configuration.
- (3) Remove the safety clips and reset the previously tripped circuit breakers.
- (4) Carry out an operational test of the visor and droop nose system (Ref. 27-61-00, Adjustment/Test).
- (5) Fit access panel 113 AB.

## 5. Visor 'up' Microswitch M37 (Ref. Fig. 401 )

### A. Equipment and Materials

---

DESCRIPTION	PART NO.
Circuit breaker safety clips	-

---

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## MAINTENANCE MANUAL

### DESCRIPTION

### PART NO.

Droop nose locking pins (2)

E925045031

Aeroshell grease 16  
(Ref.20-30-00, No.51)

-

Non-corrodible steel wire  
0.028 in (0.7 mm) dia

-

### B. Prepare

- (1) Move the droop nose (Ref. 27-61-00), if necessary, to 'fully raised' and the visor to 'down'.
- (2) Trip the circuit breakers and fit safety clips.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
NOSE 7 1/2 CONT	1-213	M12	Q16
VISOR & NOSE CONT	15-215	M11	F 8
VISOR & NOSE IND	15-215	M15	F 9
VISOR SERVICES 'B' SYS CONT	15-216	M16	D18

- (3) Fit the nose locking pins in the 0.5 in (12.7 mm) dia. holes in access panel 113 CB.

- (4) Remove access panel 113 AB.

### C. Remove

- (1) Disconnect the electrical cable from the microswitch.
- (2) Remove the microswitch from the visor uplock.

### D. Install

- (1) Comply with the electrical safety precautions.

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- (2) Ensure that the droop nose locking pins are fitted.
- (3) Smear the bolts with Aeroshell grease 16. Fit the microswitch and secure it with the bolts and sleeves. Torque tighten the bolts to between 40 and 45 lbf in (0.45 and 0.51 mdaN) and wirelock them.
- (4) Ensure that the mating surfaces of the electrical connections are clean and undamaged, and connect the electrical cable to the microswitch.

### E. Conclude

- R (1) Remove the nose locking pins.
- R (2) Ensure that the droop nose and visor controls are at positions relating to the droop nose and visor configuration.
- R (3) Remove safety clips and reset the previously tripped circuit breakers.
- R (4) Carry out an operational test of the visor and droop nose system (Ref. 27-61-00, Adjustment/Test).
- R (5) Fit access panel 113 AB.

## 6. Visor 'Down' Microswitches M34, M60 (Ref. Fig. 401 )

### A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit breaker safety clips	-
Droop nose locking sleeves	E925091000
Aeroshell grease 16 (Ref.20-30-00, No.51)	-
Non-corrodible steel wire 0.028 in (0.7 mm) dia	-

### B. Prepare

- (1) Move the droop nose, if necessary, to the fully

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lowered position (Ref. 27-61-00, Adjustment/Test).

- (2) Trip the circuit breakers and fit safety clips.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
NOSE 7 1/2 CONT	1-213	M12	Q16
VISOR & NOSE CONT	15-215	M11	F 8
VISOR & NOSE IND	15-315	M15	F 9

- (3) Remove the access panel 113 BB.

- (4) Fit the droop nose locking sleeves to the nose actuator jacks.

### C. Remove

- (1) Disconnect the microswitch flying leads from the adjacent terminal block.

- (2) Remove the microswitch.

### D. Install

- (1) Comply with the electrical safety precautions.

- (2) Ensure that the locking sleeves are fitted to the nose actuator jacks.

- (3) Loosely fit the microswitch to its bracket by means of the key washer, (with its locking tab in the hole provided in the bracket) the two lock washers and locknuts.

- (4) With the visor in the fully down position, adjust the microswitch towards the striker until its contacts just make.

- (5) Adjust the microswitch further towards the striker by an amount equal to one complete turn of a locknut.

- (6) Tighten both locknuts to between 60 and 70 lbf in (0.678 and 0.791 mdaN) and wirelock them.

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- (7) Connect the microswitch flying leads (Ref. Wiring Diagram) shortening them as necessary.
- (8) Check that the microswitch key washer tab is still located in the hole in the bracket.

### E. Conclude.

- R (1) Remove the droop nose locking sleeves.
- R (2) Ensure that the droop nose and visor controls are at positions relating to the droop nose and visor configuration.
- R (3) Remove safety clips and reset the previously tripped circuit breakers.
- R (4) Carry out an operational test of the visor and droop nose system (Ref. 27-61-00, Adjustment/Test).
- R (5) Fit access panel 113 BB.

### 7. Nose Emergency Release Uplock Microswitches M21, M54 (Ref. Fig. 401 )

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit breaker safety clips	-
Locking sleeves, nose actuator jacks	E925091000
Aeroshell grease 16 (Ref.20-30-00, No.51)	-
Non-corrodible steel wire 0.028 in (0.7 mm) dia	-

#### B. Prepare

- (1) Move the droop nose (Ref. 27-61-00), if necessary, to 'fully lowered'.
- (2) Trip the circuit breaker and fit safety clips.

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
VISOR & NOSE CONT	15-215	M11	F 8
NOSE 7 1/2 CONT	1-213	M12	Q16
NOSE/VISOR STBY	1-213	M13	Q17

R

(3) Remove access panels 113 BB and BZ.

(4) Fit the droop nose locking sleeves to the nose actuator jacks.

### C. Remove

(1) Disconnect the microswitch flying leads from the terminal block fitted near the microswitch.

(2) Remove the microswitch from its mounting.

### D. Install

(1) Comply with the electrical safety precautions.

(2) Ensure that the locking sleeves are fitted to the nose actuator jacks.

(3) Lift the droop nose emergency release handle (on the RH side of the centre console in the flight compartment) until the upper latch is engaged.

(4) Fit the microswitch loosely to its mounting bracket by means of the key washer, (with its locking tab in the hole provided in the bracket) two locknuts and lockwashers.

(5) With the nose in the fully down position, adjust the microswitch towards the striker until its contacts just make.

(6) Adjust the microswitch further towards the striker by an amount equal to two complete turns of a locknut.

(7) Tighten both locknuts to between 10 and 15 lbf in

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(0.113 and 0.170 mdaN) and wirelock them.

- (8) Connect the microswitch flying leads (Ref. Wiring Diagram) shortening them as necessary.
- (9) Check that the microswitch key washer tab is still in the hole in the bracket.
- (10) Place the emergency release handle in the OFF position.

### E. Conclude

- R (1) Remove the locking sleeves.
- R (2) Ensure that the droop nose and visor controls are at positions relating to the droop nose and visor configuration.
- R (3) Remove the safety clips and reset the circuit breakers tripped previously.
- R (4) Carry out an operational test of the visor and droop nose system (Ref. 27-61-00, Adjustment/Test).
- R (5) Fit access panel 113 BB and BZ.

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### VISOR AND DROOP NOSE MICROSWITCHES - ADJUSTMENT/TEST

**WARNING:** OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS GIVEN IN 24-00-00.

#### 1. General

Test procedures are given for microswitches M23, M24, M25 and M26. Because these pairs of switches (M23, M24) (M25, M26) are wired in parallel, an operational test of the system will not prove their continuity.

#### 2. Test - Microswitches M23, M24

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Safety clips, circuit breaker	-
Locking sleeves, nose actuator jacks	E925091000
Checking Sling	D935085000
Attachment Bracket sling	D935063000
Spring balance (2 ton)	-

##### B. Test Microswitches M23, M24 are not Failed in Locked Position.

(1) Ensure the nose is in lowered position.

(2) Fit the nose actuator jacks locking sleeves:

(a) Electrically isolate the visor and droop nose controls by tripping the associated circuit breakers; fit safety clips.

R

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R

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
VISOR & NOSE CONT.	15-215	M11	F 8
NOSE 7 1/2 ° CONT	1-213	M12	Q16
NOSE/VISOR STBY LOWER SUP	2-213	M13	Q17

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- (b) Placard the pilots' controls warning against operating the visor and droop nose system.
- (c) Fit the locking sleeves to the nose actuator jacks (Ref. Fig. 501 ).
- (3) Disconnect the connector from the microswitch and check that there is no continuity across pins A and F, and C and D.

NOTE: Continuity proves a closed circuit, indicating that the microswitch has failed in the 'locked' position.

- (4) Remove the locking sleeves from the nose actuator jacks.
- (5) Refit the access panel.
- (6) Reset the circuit breakers.
- (7) Remove the warning placard.

### C. Test Microswitches M23, M24 for Continuity

- (1) Ensure the nose is fully down.
- (2) Depressurize the green and the yellow hydraulic systems (Ref. 29-00-00, Servicing). Display a placard warning personnel not to pressurize the system.
- (3) Remove access panel 113CB.
- (4) Remove the screwed plugs from the sling attachment bracket point and fit the bracket. Attach the checking sling complete with spring balance.

NOTE: The weight on the checking sling must not exceed 1500 lb (680 kg).

- (5) Make available ground electrical power (Ref. 24-41-00).
- (6) Set the nose selector switch to "UP".
- (7) Check continuity of microswitches M23, M24:
  - (a) Raise the nose, using the sling, enough to make the nose magnetic indicator show cross-hatch and the red caption illuminate.

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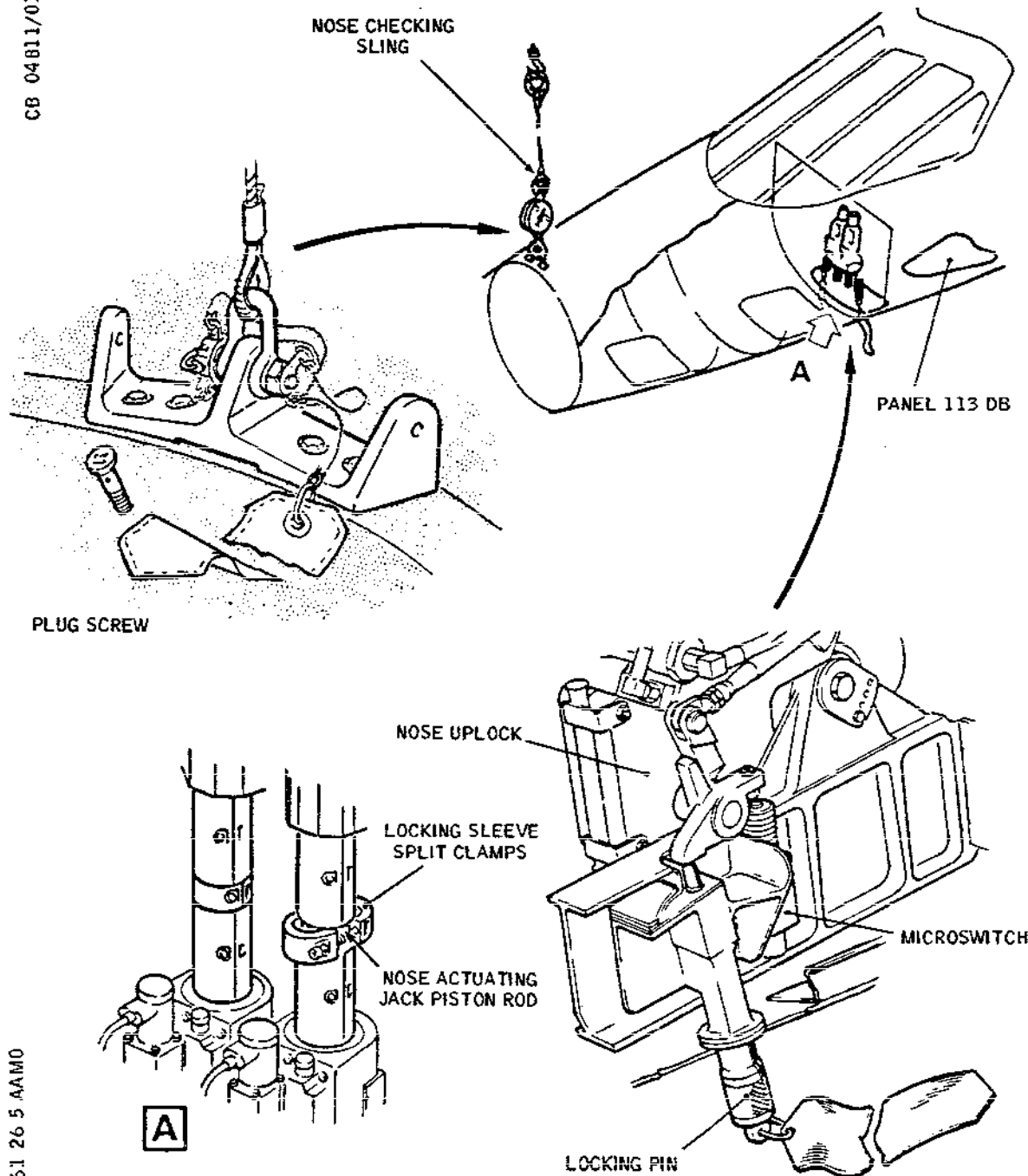
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## MAINTENANCE MANUAL

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Ground Equipment  
Figure 501

R

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- (b) Manually depress microswitch M23 and check that red caption remains illuminated. Using a steel rule or similar object capable of magnetic attraction, check that the nose actuator jacks 5 deg solenoids are energized.

NOTE: The steel rule will cling to an energised solenoid.

- (c) Manually depress both microswitches M23 and M24 and check that the red light extinguishes. Check that the 5 deg solenoids are de-energized.
- (d) Release microswitch M23 and with M24 still depressed, check that the red caption illuminates and that the 5 deg. solenoids are energized.
- (e) Release microswitch M24 and check that the red caption is illuminated and the 5 deg solenoids are energized.

R

- (8) Return the nose to the fully lowered position, using the sling, and check that the red caption extinguishes.

R

- (9) Remove the checking sling and bracket and refit the screwed plugs.

- (10) Move the nose selector switch to "DOWN".

- (11) Pressurize the green and the yellow hydraulic systems using the aircraft's ground hydraulic checkout system (Ref.29-00-00, Servicing).

- (12) Set the nose selector switch to "5°" then through "VIS/0°" to "UP". Check the satisfactory operation of the nose and visor as detailed in the operational test in 27-61-00, Adjustment/Test.

- (13) Set the ground hydraulic check out switch to "OFF".

- (14) Disconnect ground electrical power (Ref.24-41-00).

- (15) Refit the access panel.

### 3. Test - Microswitches M25, M26

#### A. Equipment and Materials

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### DESCRIPTION

### PART NO.

---

Safety clips, circuit breakers	-
Locking pins (2), droop nose	E925045031

---

#### B. Test Microswitch M25, M26 for Continuity

- (1) Raise the droop nose to the UP position.
  - (a) Make available ground electrical power (Ref.24-41-00).
  - (b) Pressurize the green and the yellow hydraulic systems using the aircraft's ground hydraulic check-out system (Ref. 29-00-00, Servicing).
  - (c) Fully raise the nose by setting the visor and droop nose normal selector switch to "VIS 0°" (nose up, visor down).
- (2) Set the ground hydraulic check-out switches to "OFF". Display a placard warning personnel not to pressurize systems.
- (3) Trip the circuit breakers (Ref.para.B.(2)).
- (4) Fit the droop nose locking pins.
- (5) Check that microswitch M25 has made when the nose is up:
  - (a) Remove the electrical plug from microswitch M26.
  - (b) Reset the circuit breakers previously tripped.
  - (c) With no hydraulic power on, set the visor and droop nose selector switch to "5°".
  - (d) Ensure ground electrical power is on and with a steel rule or similar object capable of magnetic attraction check that the solenoid of the LH 5 deg cylinder selector valve (M46) on the nose actuator jacks is energized.

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NOTE: The steel rule will cling to an energized solenoid.

- (e) Trip the circuit breakers (Ref. para. B(2)).
  - (f) Reconnect the electrical plug to the microswitch M26.
- (6) Check that microswitch M26 has 'made' when the nose is up:
- (a) Remove the electrical plug from the microswitch M25.
  - (b) Reset the circuit breakers previously tripped.
  - (c) With no hydraulic power on and the selector switch still at "5°", check the solenoid of the 5 deg cylinder selector valve with a steel rule as in (5) (d).
  - (d) Trip the circuit breakers (Ref. para. B(2)).
  - (e) Reconnect the electrical plug to microswitch M25.
- (7) Set the visor and droop nose normal selector switch to "VIS 0°" to agree with the position of the nose and visor.
- (8) Check that the electrical plug on microswitch M25 has been replaced correctly:
- (a) Pressurize the green and the yellow hydraulic systems using the aircraft's ground hydraulic check-out system (Ref. 29-00-00, Servicing).
  - (b) Remove the nose uplock pins.
  - (c) Reset the circuit breakers previously tripped.
  - (d) Lower the nose to "5°" using the visor and droop nose normal selector switch.
  - (e) Display a placard on the dash panel, warning that the droop nose controls must not be operated.
  - (f) Switch off hydraulic power by setting the ground hydraulic check-out switches to "OFF".

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- (g) Operate microswitch M25 manually and with a steel rule check that the LH 5 deg cylinder selector valve (M46) on the nose actuator jacks is energized.
- (9) Refit the access panels.
- (10) Disconnect ground electrical power.
- (11) Remove the placard.

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# Concorde

## MAINTENANCE MANUAL

### VARIABLE DROOP NOSE - REMOVAL/INSTALLATION

**WARNING:** OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DETAILED IN 24-00-00.  
OBSERVE THE HYDRAULIC SAFETY PRECAUTIONS DETAILED IN 29-00-00, SERVICING.

#### 1. General

The variable droop nose comprises the nose fairing complete with visor and radome. It may be removed with or without the radome or visor.

The nose fairing is secured to the fuselage by hinge pins, side load links and guide rail carriages, and the actuator jacks. Systems serving the droop nose are routed beneath the flight compartment pressure floor where disconnection is made for nose removal.

The optimum position of the nose to give maximum clearance during removal and installation, is 5 deg drooped. Instructions are given only for removal and installation of the same nose fairing.

During this procedure use is made of the mechanical emergency nose/visor uplocks release lever to release the nose from its uplocks. After being operated the lever is prevented from returning to its original position by a latch integral with the lever shaft. A plunger in the end of the shaft must be depressed to release the latch when resetting the lever.

#### 2. Variable Droop Nose

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Safety clips, circuit breaker	-
Sling, droop nose	D935060000
Attachment bracket, forward, sling	D935063000
Attachment bracket, aft, sling, (2)	D935064000 and 001
Checking sling, droop nose	D935085000
Spring balance (2 ton)	-

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	DESCRIPTION	PART NO.
	Locking sleeve, visor jack	D925157001
R	Safety pin (2), nose uplocks	E925045031
	Extractor, side load links	D925168000
	Extractor, nose fairing hinge pins	D925012001
	Screwjack, droop nose	D925158002
	Alignment bullet (2 off), droop nose hinge pins	D925159000
	Cradle, droop nose	D935090000
	Rigging pin, droop nose indicator unit	D925187000
	Locking sleeve, nose actuator jacks	E925091000
	Dummy bobbin (6)	Hispano-Suiza
	Blanking plate (2)	D925196000
	Lifting equipment (S.W.L. 2000 lb)	-
R	Corrosion resistant steel wire, 0.28 in (0.7 mm) dia	-
R	Torque spanner 0-600 lbf in (0 to 6.78 mdaN) range	-
R	Hydraulic ground generation rig	-

### B. Remove Droop Nose

**NOTE:** The visor and the nose fairing must be fully raised (Ref. 27-61-00).

- (1) Remove the nose fairing actuator jacks (Ref. 27-62-17).

**NOTE:** After removing the actuators the nose will still be in the fully raised position with the nose locking pins fitted and supported by the

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## MAINTENANCE MANUAL

- R checking sling.
- R (2) Fit the droop nose sling to the nose fairing  
R (Ref. Fig. 401 ).
- R (a) Remove the screwed plugs from the sling attach-  
R ment points at the sides of the nose fairing and  
R fit the sling attachment brackets.
- R (b) Remove the checking sling and fit the droop nose  
R sling. Lightly tension the sling cables.
- R NOTE: Two sets of cables are fitted to the  
R droop nose sling, one set of which can be  
R used for lifting the visor locating  
R equipment. The cables fitted to the  
R extremities of the arms are used for  
R lifting the nose fairing.
- R (c) Remove the nose locking pins and release the  
R nose from its uplocks by operating the EMERGENCY  
R NOSE/VISOR UPLOCK RELEASE handle at the RH side  
R of the centre console.
- R (d) Lower the nose to 5 deg of droop by using the  
R the handwheel on the sling in accordance with  
R with the instructions on the label.
- R (e) Return the emergency release lever after use.
- (3) Disconnect the side load link assemblies  
(Ref. Fig. 402 ).
- (a) Disconnect the bonding leads connecting the  
upper and lower links.
- (b) Remove the nut and lock-washer securing the  
centre pin.
- (c) Remove the centre pin using the extractor tool.  
Note the number and thickness of shims fitted  
between the links for reassembly.
- (4) Remove the safety locking pin from each of the nose  
fairing uplocks and release the uplocks by operating  
the emergency manual release lever on the right-hand  
side of the pilots' centre console in the flight  
compartment.
- R (5) Lower the droop nose to the fully down position (12  
1/2 deg) by operating the handwheel on the sling

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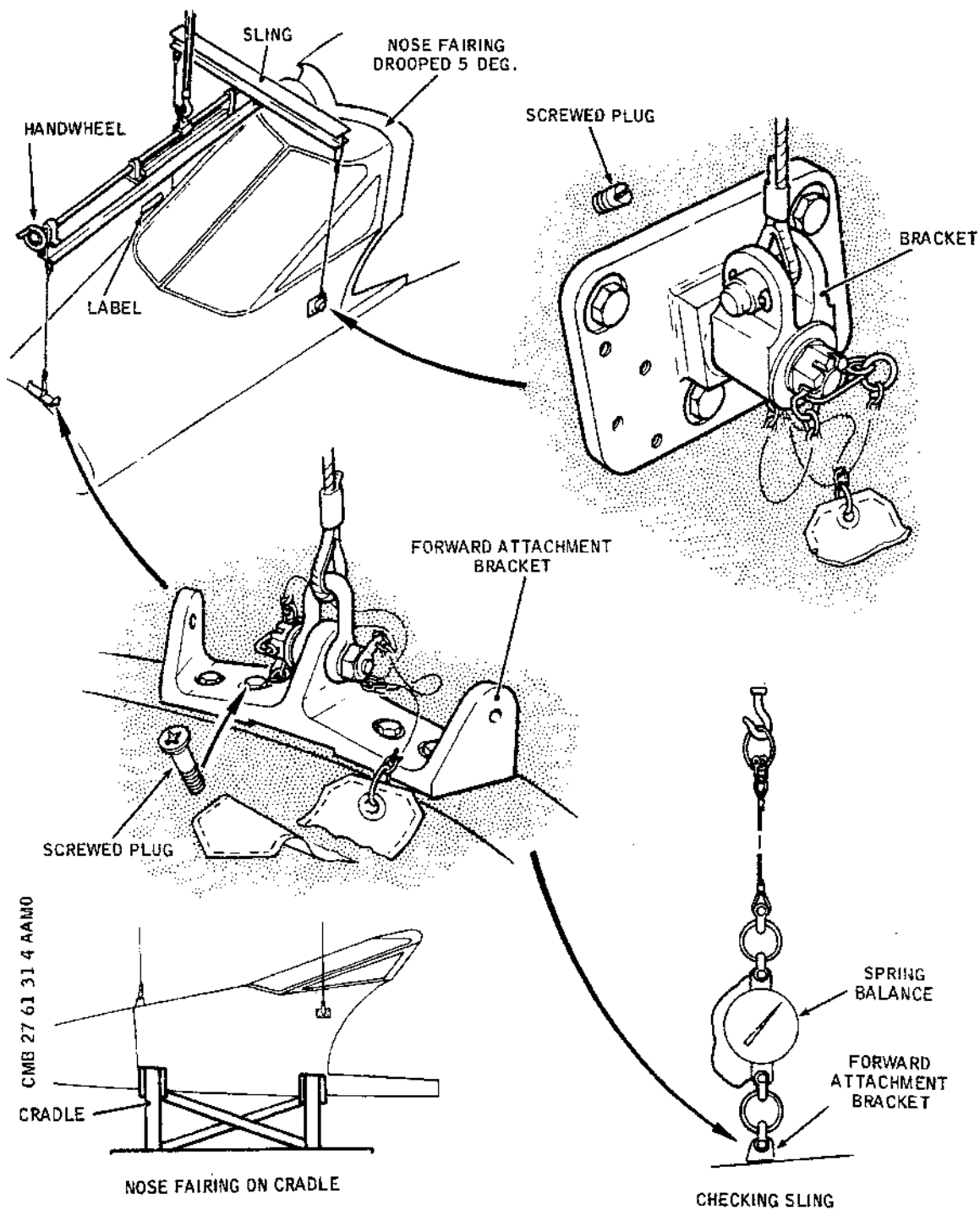
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## MAINTENANCE MANUAL



Variable Droop Nose Slings  
Figure 401

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## MAINTENANCE MANUAL

(Ref. Fig. 401 ).

(6) Disconnect all systems to the droop nose at the break points beneath the flight compartment floor zone 121:

(a) Remove the access panel 113 DB.

(b) Disconnect electrical ground power  
(Ref. 24-41-00).

**NOTE:** Before disconnecting droop nose systems, electrical power to the droop nose must be disconnected. This is most easily done by disconnecting electrical ground power. However, if for any reason it is not desirable to switch off ground power, trip the following circuit breakers and fit safety clips.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
Visor main/curved window de-icing:			
LH FLAT VISOR HTR CONT	15-215	2H222	C15
		1H224	C12
RH FLAT VISOR HRT CONT	15-216	2H222	C15
		2H224	C16
LH FLAT VISOR HTR SUP	14-215	1H221	G5
		1H223	G8
RH FLAT VISOR HTR SUP	13-216	2H221	G13
		2H223	G10
Detachable window:			
LH BOTTOM VISOR HTR SUP	14-215	1H225	E9
RH BOTTOM VISOR HTR SUP	13-216	2H225	B10
ADS 1 PITOT PROBE HTR SUP	2-213	1H3	F22
ADS 1 S/SLIP PROBE HTR SUP	2-213	1H4	F23
ADS 1 A/ATTACK PROBE HTR SUP	2-213	1H5	F25
ADS 2 PITOT PROBE HTR SUP	13-216	2H3	D10
ADS 2 S/SLIP PROBE HTR SUP	13-216	2H4	B9
ADS 2 A/ATTACK PROBE HTR SUP	13-216	2H5	D13
STBY PITOT HTR SUP	2-213	H121	F18
VISOR & NOSE CONT	15-215	M11	F8
NOSE 7 1/2 deg CONT	1-213	M12	Q16
NOSE/VISOR STBY LOWER SUP	1-213	M13	Q17
VISOR SERVICES A SYS CONT	1-213	M14	Q18
VISOR & NOSE IND.	15-215	M15	F9

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
VISOR SERVICES B SYS CONT	15-216	M16	D18
Service LTS supply	10-123	L633	-
No 1 TX RX WEATHER RADAR SUP	13-215	1S30	B4
No 1 WEATHER RADAR IND	13-215	1S32	C4
No 2 TX RX WEATHER RADAR SUP	13-216	2S30	E18
No 2 WEATHER RADAR IND	13-216	2S32	E19
No 1 INPH SUP	1-213	R89	K19
No 2 INPH SUP	3-213	R90	H23
INPH SUP	25-216	R102	D2

- (c) Disconnect the electrical plugs from their receptacles.
- (d) If required, reconnect ground electrical power.
- (e) Disconnect the hydraulics at each swivel unit connecting nose fairing and fuselage (Ref. Fig. 403 ):
  - (e1) Ensure that the green and the yellow hydraulic systems are still depressurized.
  - (e2) Remove the four bolts securing the swivel unit to the upper manifold.
  - (e3) Disengage the unit from the three bobbins and lower it to rest on the nose fairing. Collect fluid draining from the swivel unit ports in a clean container.
  - (e4) Extract the three bobbins from the upper manifold, fit the dummy bobbins and blank-off the manifold using a blanking plate.
  - (e5) Fit blank covers to the ports of the swivel unit.
- (f) Disconnect the pitot-static pipes. Fit blank covers to the pipe ends.
- (g) Disconnect the flexible wave guide by removing the four bolts that secure it to the pressure

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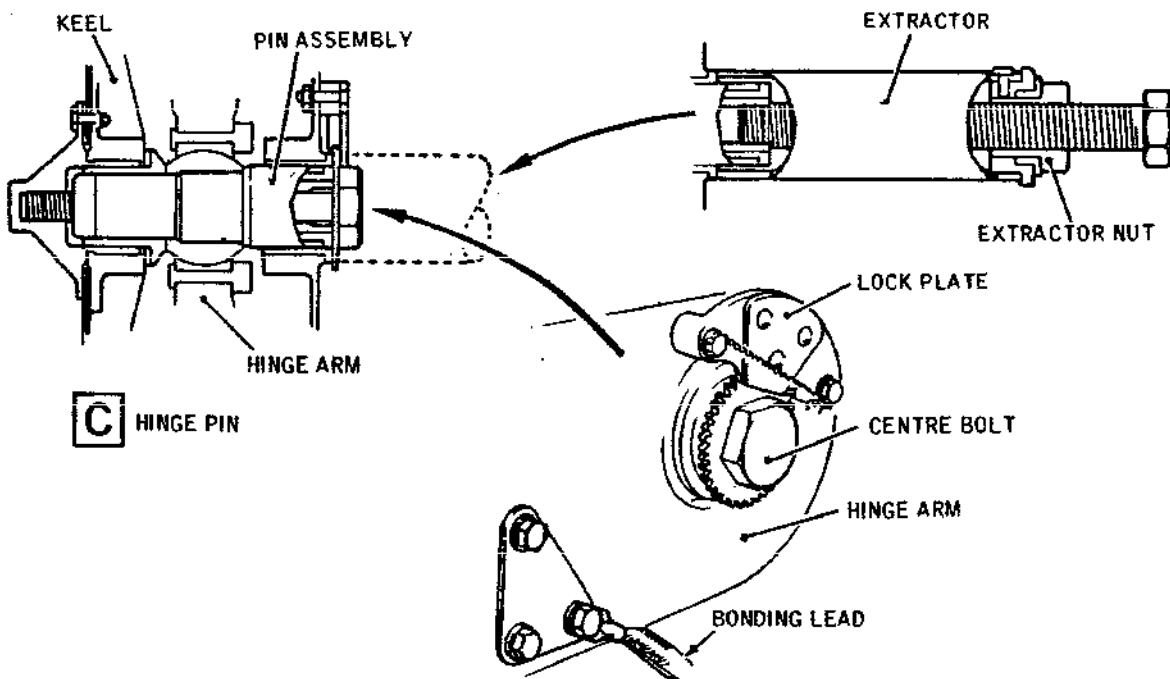
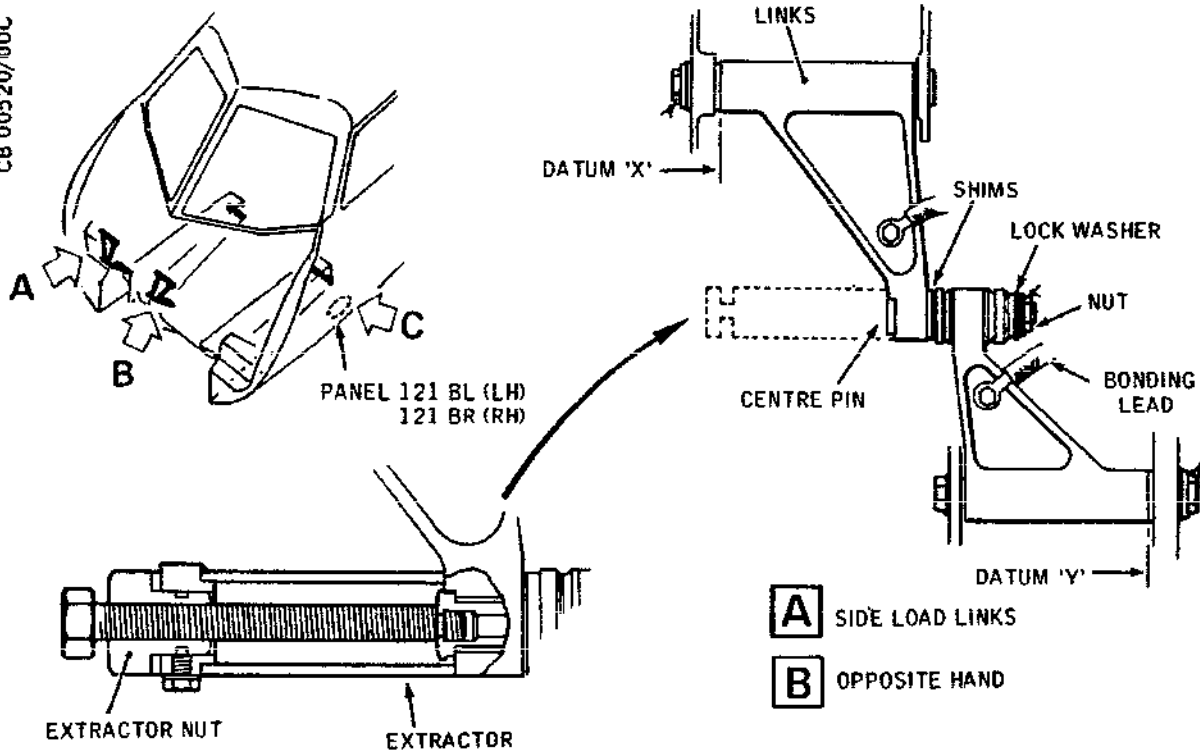
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Variable Droop Nose - Installation  
(Sheet 1 of 2)  
Figure 402

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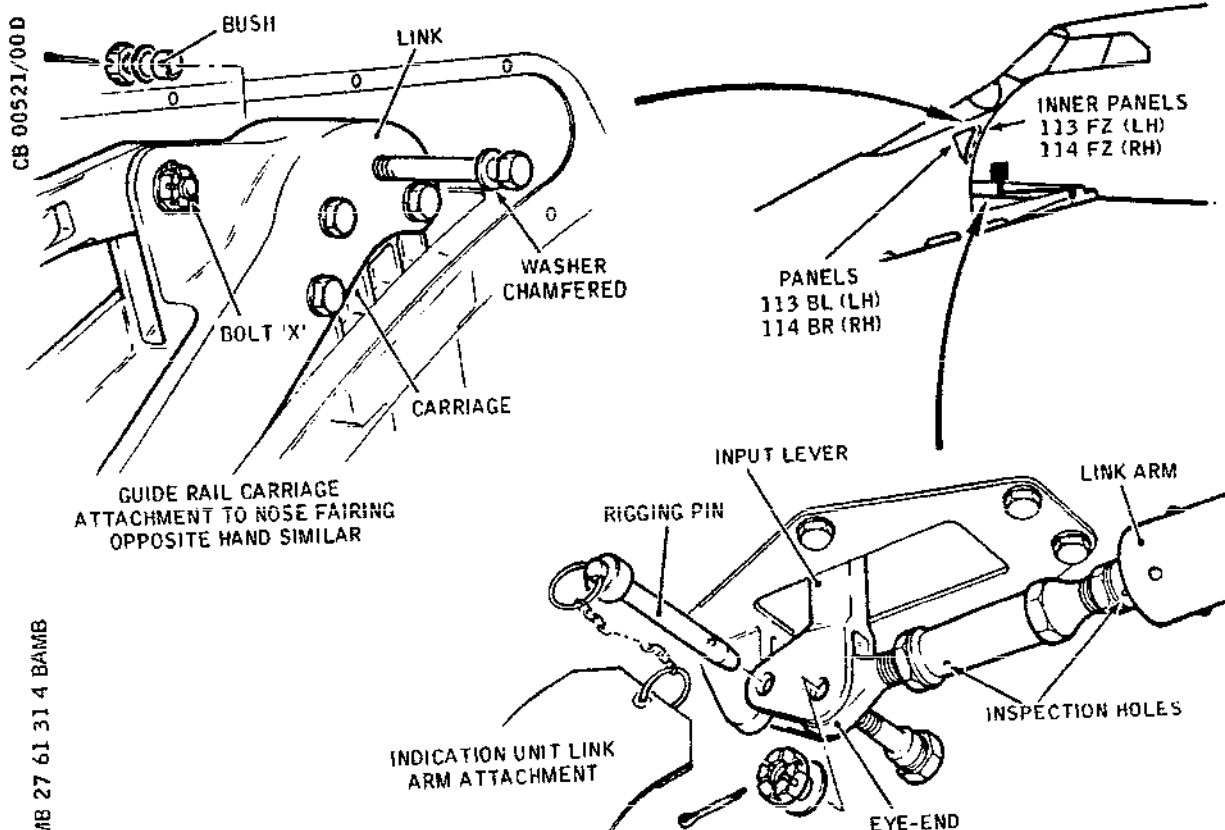
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## MAINTENANCE MANUAL



Variable Droop Nose - Installation  
(Sheet 2 of 2)  
Figure 402

floor.

- (7) Disconnect the link arm from the input lever of the droop nose position transmitter unit (Ref. Fig. 402 ). Secure the arm to the nose fairing with tape to prevent damage.
- (8) Operate the sling handwheel to raise the nose to the 5 deg lower position.
- (9) Fully lower the visor using the manually operated screwjack fitted during the removal of the nose actuator jacks.
- (10) Disconnect the nose fairing from each guide rail carriage (Ref. Fig. 402 ), as follows:-
  - (a) Remove the access panels 113BL, 113FZ, 114BR and 114FZ in the inner and outer surfaces of the nose fairing side-walls to gain access to the bolts securing the guide rail carriages.

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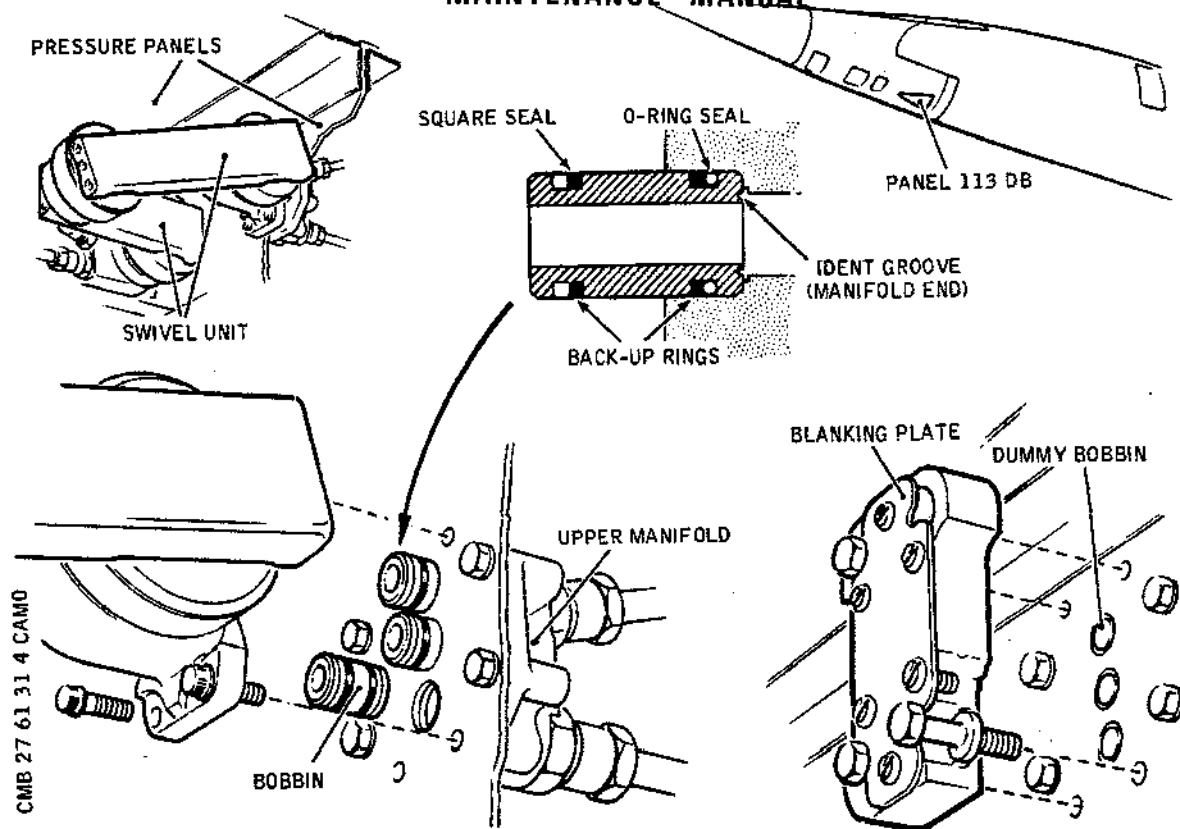
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## MAINTENANCE MANUAL



Hydraulic Connections  
Figure 403

- (b) Remove the bolts securing the carriages to the nose fairing links.
- (11) Remove each of the nose fairing hinge pins (Ref. Fig. 402 ) as follows:-
  - (a) Remove the access panels 121BL and 122BR.
  - (b) Disconnect the bonding leads.
  - (c) Remove the lock plate securing the centre bolt.
  - (d) Remove the centre bolt.
  - (e) Using the extractor withdraw the pin assembly.
- (12) Adjust the lifting equipment so that the nose moves slowly forward and disengages from the guide rail carriages; move the lifting equipment so that the nose is clear of the fuselage.

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- (13) Adjust the sling, using the handwheel, to level the droop nose, and lower the nose on to a cradle. Remove the sling.

### C. Prepare to Install Droop Nose

NOTE: Assemble all bonding leads in accordance with Chapter 20-27-11.

- (1) Check that the spherical bearing in each hinge arm moves freely and that it is secured by the inner and outer ring nuts and split pin (Ref. Fig. 402 ).
- (2) Hoist the sling (Ref. Fig. 401 ) to a position immediately above the nose fairing and secure the sling attachment brackets to the fairing. Adjust the lifting equipment and the sling handwheel to tension the sling cables lightly.
- (3) Ensure that the visor screwjack is fitted and that the visor is in the lowered position.

### D. Install Droop Nose

- (1) Comply with the electrical safety precautions.
- (2) Raise the droop nose clear of the cradle. Adjust the handwheel, as instructed on the label, to give the fairing a position corresponding to 5 deg drooped.
- (3) Secure each hinge arm on the nose fairing to a fuselage keel (Ref. Fig. 402 ), as follows:-
  - (a) Position the fairing so that the hinge bearings align with the holes in the keels, simultaneously engaging the guide rail carriages with the nose fairing top attachment links; fit the alignment bullets to secure temporarily the hinge arms.
  - (b) Remove each alignment bullet in turn, using the hinge pin extractor, and fit a pin assembly. Secure each assembly with a centre bolt, and torque load the bolt to between 550 and 580 lbf in (6.1 and 6.4 mdaN).
  - (c) Secure each centre bolt with a lock plate; lock the plate attachment bolts together with wire.

NOTE: Fit the bolts in accordance with the instructions given in Chapters 20-22-14 and 20-21-13.

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- (d) Connect the bonding leads.
- (4) Install the manually operated droop nose screwjack (Ref. Fig. 404 ). Operate it to support the nose, then remove the droop nose sling.
- (5) Continue to operate the screwjack to raise the droop nose completely.
- (6) Secure each pair of side load links (Ref. Fig. 402 ), as follows:-
  - (a) Position the links, refit the shims (noted during fairing removal), the centre pin, lock washer and nut. Torque load the nut to between 100 and 110 lbf in and lock it to the washer with wire.
  - (b) Reconnect the bonding leads.
  - (c) Check the alignment of the fairing and fuselage profiles. With the links making contact at datums X and Y, check that a clearance of between 0.001 and 0.003 in (0.0254 and 0.0762 mm) exists between the shims and the links. Adjust the thickness of shims to achieve this clearance.
- (7) Secure the nose fairing top attachment links to the guide rail carriages (Ref. Fig. 402 ) with bolts, chamfered washers, bushes, washers and slotted nuts. Torque load each nut to between 150 and 165 lbf in (1.69 and 1.86 mdaN) and secure it with a split-pin.
- (8) Fit the checking sling complete with spring-balance to the nose fairing (Ref. Fig. 401 ). Lower and raise the droop nose using the screwjack in conjunction with the sling, using the sling to take the weight off the screwjack to ensure symmetry when checking. Ensure that throughout its travel the guide rail carriages do not load the rails. Check this by slackening the bolt 'X' (Ref. Fig. 402 ) and ensuring that the bolt can be turned freely during the travel. If necessary, adjust the eccentric pins securing the top and bottom ends of the rail (Ref. 27-61-33). Retighten bolt 'X' and refit the split-pin.

**NOTE:** The weight on the checking sling is not to exceed 1500 lb (680 kg).

- (9) Check that the metal to metal clearance between the nose fairing and the fuselage skin is between 0.15 and 0.25 in (3.81 and 6.35 mm). If necessary, adjust

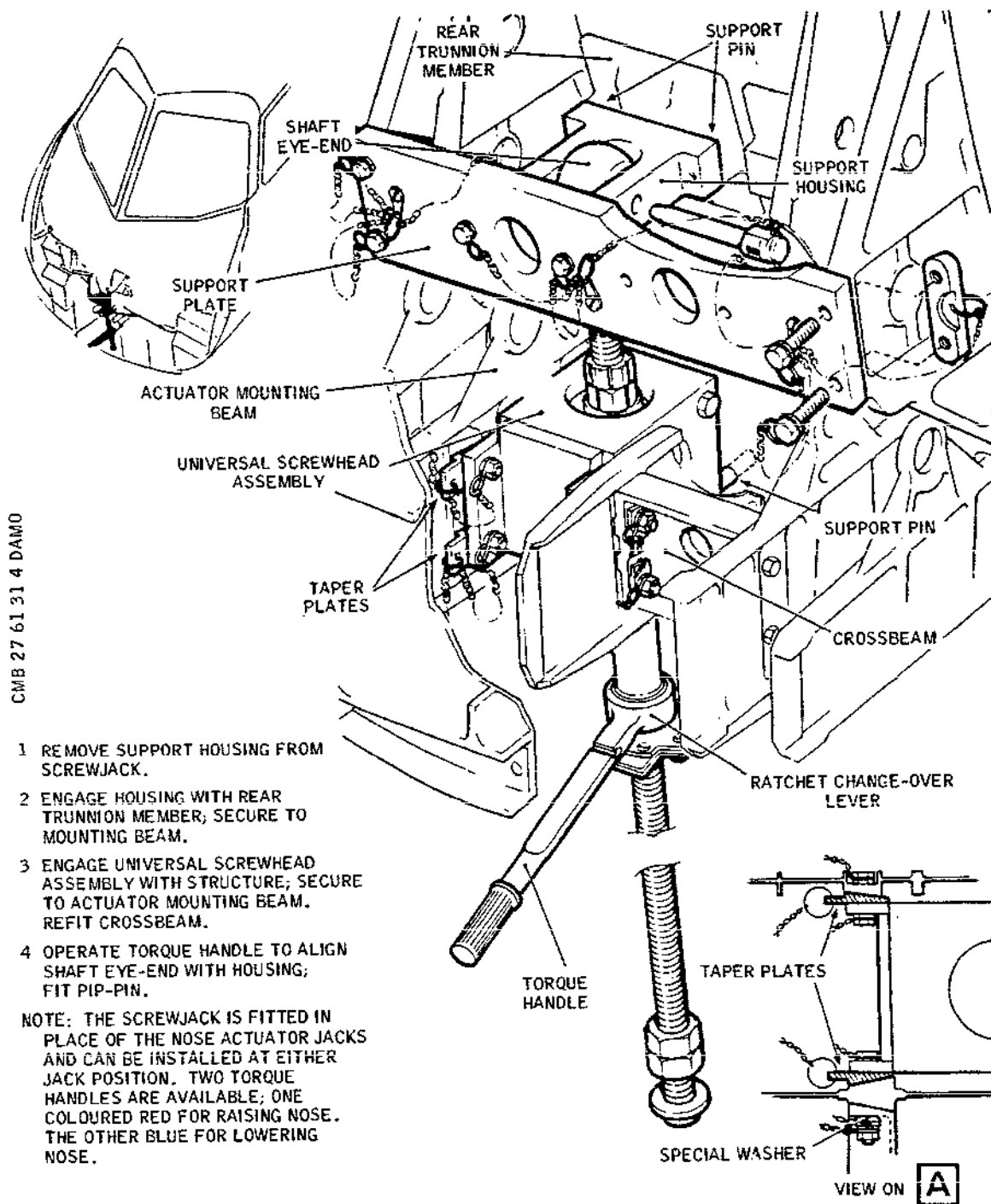
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Nose Screwjack - Installation  
Figure 404

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the eccentric pins that secure the guide rails to relax or compress the seals to achieve the required clearance, but maintaining the requirements of operation (8).

- (10) Raise the visor using the visor manually operated screwjack and check the visor alignment and clearances and its engagement with the visor location fitting and visor uplock. (Ref. 27-61-11).

NOTE: Before operating the visor screwjack, remove the blank covers from the nose fairing hydraulic pipes at the break point beneath the flight compartment floor. This is to permit the transfer of system fluid due to movement of the hydraulic jack. Be prepared to catch displaced fluid in a clean container. Replace the blanks after raising the visor.

- (11) With the nose fairing fully raised, check that each of the fairing uplock pins engages its uplock and that the uplock is fully locked. Ensure that the clearance between the rearmost point on the pin and the uplock hook does not exceed 0.44 in (11.176 mm) and that the clearances between the nose fairing and the fuselage are correct. Adjust the uplock pin as necessary (Ref. 27-61-00, Adjustment/Test - Adjust Nose Uplock Pins).

- (12) Check the visor emergency release mechanism (Ref. Fig. 405 ), as follows:-

NOTE: Refer to 27-61-00, Adjustment/Test for the complete setting up and adjustment procedure.

- (a) With the droop nose fully raised and the rear roller located in the hook on the pressure bulkhead, check that dimension 'Y' between the forward roller and the uplock lever is between 0.065 and 0.075 in (1.651 and 1.905 mm). If necessary, adjust the long strut to achieve this figure, ensuring that the strut ends remain in safety, the locknuts torque tightened to between 30 and 35 lbf in (0.34 and 0.40 mdaN) and bolted with wire.
- (b) Lower the nose to the 5 deg position and check that dimension 'X' between the rear roller and the hook cam is between 0.050 and 0.060 in (1.27 and 1.524 mm).

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- (c) Check that the uplock has released the visor by carefully lowering the visor with the screwjack until the uplock pins are clear of the uplock hooks. Return the visor to the 'up' position.
- (13) Raise the nose with the screwjack and fit the ground safety pins to the nose fairing uplocks. Support the nose with the checking sling in readiness to remove the screwjack.
- (14) Remove the nose fairing screwjack (Ref. Fig. 404 ) and fit the nose fairing hydraulic actuator jacks (Ref. 27-62-17).
- (15) Reconnect the systems to the droop nose beneath the flight compartment floor, zone 121:
  - (a) Ensure that hydraulic pressure is off-loaded.
  - (b) Connect the hydraulic systems at the swivel connections (Ref. Fig. 403 ):-
    - R (b1) Remove the blanking plates and dummy bobbins from the upper manifold. Be prepared to catch draining fluid in a clean container.
    - R (b2) Fit new seals to the system bobbins and insert the bobbins into the manifold ports. Note that the end of the bobbin with the ident groove fits in the manifolds.
    - R (b3) Remove the blank cover from the swivel units and ensure that the units are in lateral alignment with the bobbins. If necessary, slacken the bolts securing the lower mounting bracket and adjust the position of the bracket to achieve alignment. Torque tighten the bolts to between 35 and 40 lbf in (0.39 - 0.45 mdaN).
    - R (b4) Secure the upper swivel mounting, located on the bobbins, to the manifold. Torque tighten the bolts to between 55 and 60 lbf in (0.62 and 0.68 mdaN).
  - (c) Remove the blank covers and connect the pitot/ static pipes; torque load the unions to between

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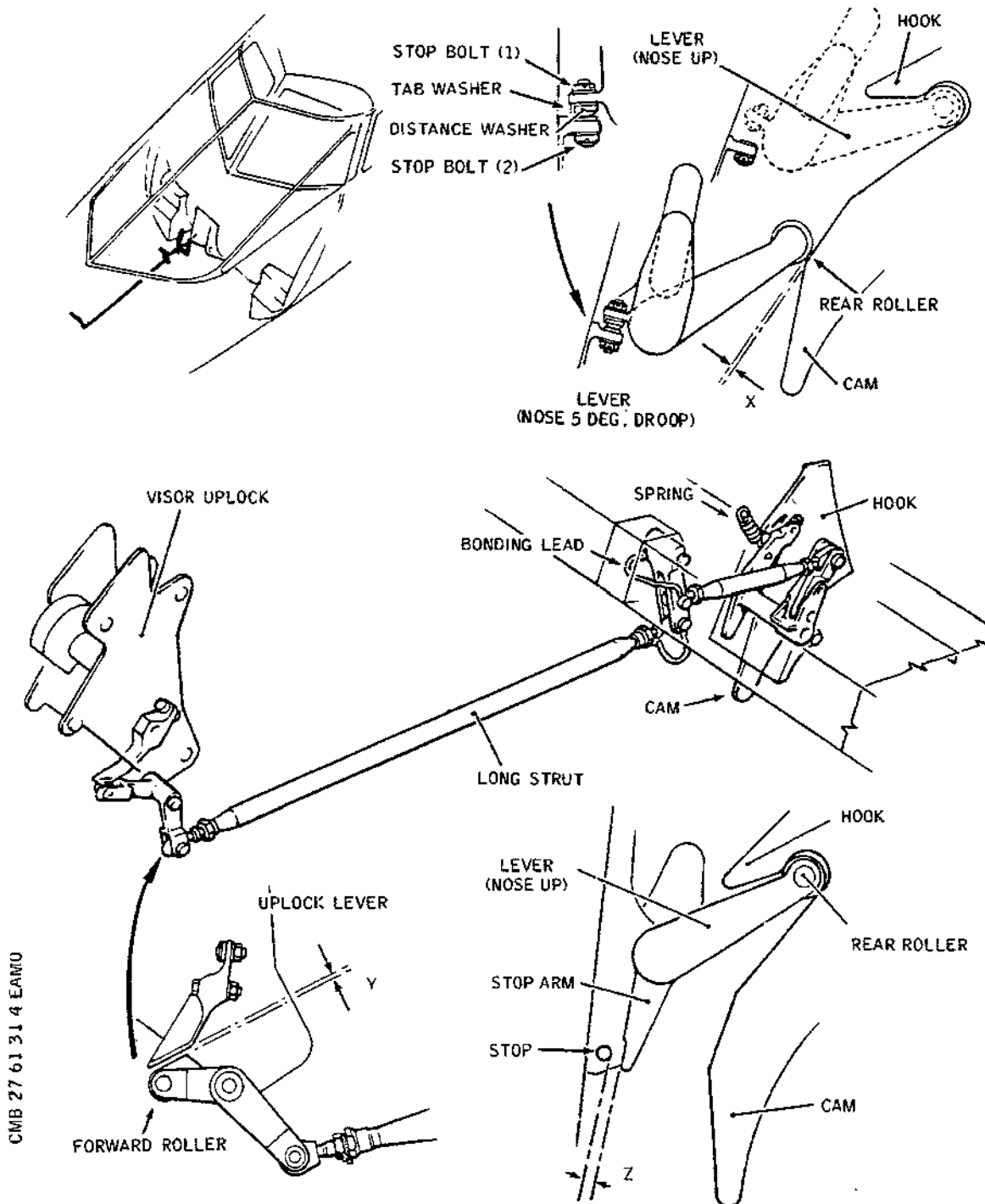
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## MAINTENANCE MANUAL



Visor Emergency Release  
Figure 405

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\*\* and \*\* lbf in.

- (d) Connect the wave guide flexible; lock the bolts together with wire.
- (16) Lower the nose preparatory to fitting the indicator unit and to bleeding the droop nose hydraulic system.

NOTE: After installation of the droop nose fairing actuator jacks the initial functioning of the droop nose must be made from the fully down position to assist in expelling air from the system.

- (a) Ensure that the weight of the nose is taken by the checking sling and remove the ground safety pins from the nose fairing uplocks.

NOTE: The indicated load on the spring-balance must not exceed 1500 lb (680.3 kg) when lowering and raising the droop nose.

- (b) Operate the droop nose emergency manual release lever on the right-hand side of the pilot's centre console to release the fairing from its uplocks then lower the nose to the 5 deg position using the checking sling.
- (c) Release the collet locks in the droop nose actuator jacks, by disconnecting the hydraulic pipe connection 'C' from the standby collet lock selector valve in the forward underfloor equipment bay (Ref. 27-62-00) and applying 120 psi (approx.) using a ground hydraulic supply and adapters connected to the disconnected pipe.

NOTE: Fit a blank cover to the open port on the selector valve.

- (d) Lower the nose with the checking sling to the 12 1/2 deg position, as indicated by the actuating jacks bottoming.
- (e) Disconnect the ground hydraulic supply, remove the blank cover from the selector valve, and reconnect the hydraulic pipe to connection 'C'.
- (17) Fit the ground safety locking sleeves to the droop nose actuators (Ref. Fig. 406 ).
- (18) Remove the checking sling and the three sling fittings

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from the droop nose fairing. Refit the screwed plugs to the sling attachment points.

- (19) Reconnect the electrical services to the droop nose beneath the flight compartment floor, zone 121.
- (a) Disconnect electrical ground power (Ref. 24-41-00), or ensure that the circuit breakers remain tripped.
  - (b) Connect the electrical plugs to their receptacles ensuring that their mating surfaces are clean and undamaged.
  - (c) Reconnect electrical ground power or, if applicable remove the safety clips and reset the circuit breakers.

**WARNING:** FIRST ENSURE THAT THE DROOP NOSE AND VISOR CONTROLS (REF. 27-61-00, ADJUSTMENT/TEST) ARE SET TO CORRESPOND WITH THE NOSE AND VISOR POSITIONS BEFORE SWITCHING ON GROUND POWER.

- (20) Bleed the droop nose and visor hydraulic system as instructed in 27-62-00 Adjustment/Test. Replenish the green and yellow hydraulic reservoirs with hydraulic fluid (Ref. 12-12-29).

- (21) Connect the droop nose transmitter unit to its link arm (Ref. Fig. 402 ), as follows:-

- (a) Determine the position of the input lever by fitting the rigging pin and positioning the lever so that the pin abuts the aft face of the rigging bracket.
- (b) Engage the link arm, adjusting the turnbuckle as necessary, to align the attachment holes; ensure that the turnbuckle is in safety. Secure it with the bolt, washer and nut. Torque load the nut to between 27 and 32 lbf in (0.306 to 0.36 mdaN) and lock it with a split pin.

**NOTE:** The bolt is self retaining and is released by depressing the locking spindle in the bolt head.

- (c) Remove the rigging pin.
- (d) Remove the ground safety locking sleeves from the

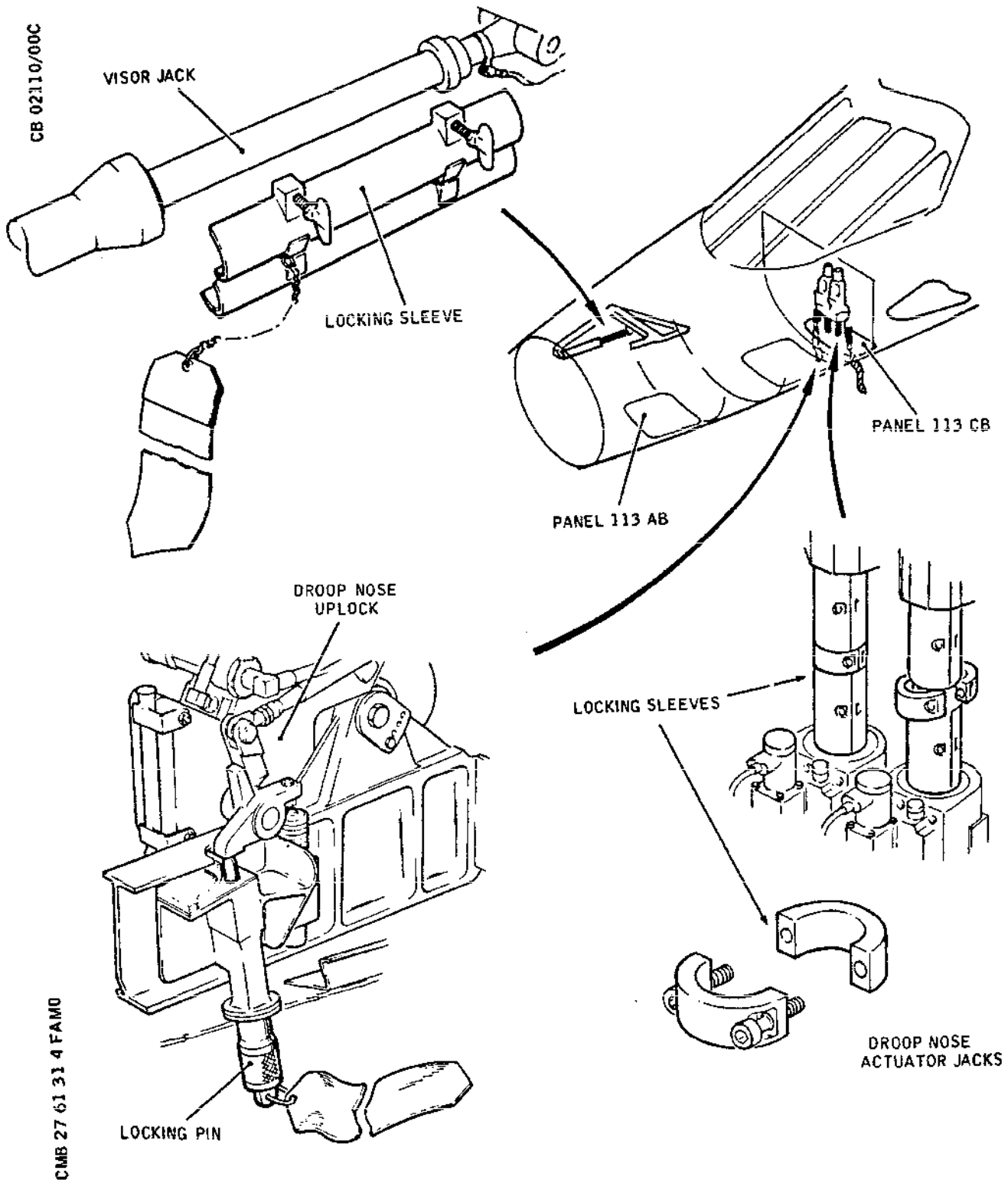
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Ground Safety Equipment  
Figure 406

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droop nose actuator.

- (e) Check the accuracy of the indicator unit and, if necessary, adjust the link arm as detailed in 27-61-00, Adjustment/Test.

NOTE: Accurate adjustment of the link arm is essential.

### E. Conclusion

- (1) Carry out the following tests on the droop nose and its associated systems:-
  - (a) Droop nose and visor operational test (Ref. 27-61-00, Adjustment/Test).
  - (b) Pitot head heating operational test (Ref. 30-31-00, Adjustment/Test).
  - (c) Visor window heating operational test (Ref. 30-41-00, Adjustment/Test).
  - (d) Servicing lamps operational test (Ref. 33-32-00, Adjustment/Test).
  - (e) Pitot static functional test (Ref. 34-11-00, Adjustment/Test)
  - (f) Weather radar functional test (Ref. 34-41-00, Adjustment/Test).
  - (g) DME aerial functional test (Ref. 34-51-00, Adjustment/Test).
  - (h) ADS incidence sensors functional test (Ref. 34-11-00, Adjustment/Test).
  - (i) Droop nose interphone jack operational test (Ref. 23-41-00, Adjustment/Test).
- (2) With the visor and droop nose fully raised, fit the locking sleeve to the visor operating jack and fit a ground safety pin to each of the nose fairing uplocks (Ref. Fig. 406 ). Fit the access panel 113 BZ to the nose fairing bulkhead, then remove the sleeve and safety pins.
- (3) Refit all access panels.

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### DROOP NOSE GUIDE RAIL AND CARRIAGE - REMOVAL/INSTALLATION

R WARNING: OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DETAILED  
R IN 24-00-00.

#### 1. General

The droop nose guide rail and carriage assemblies are located in the sidewalls of the nose fuselage front pressure bulkhead and are accessible from removable side panels. Each carriage has its rollers adjusted and its slipper blocks set to its particular rail. Renewal of either the rail or the carriage entails removal of the assembly from the aircraft, and the new rail or carriage fitted to the associated part prior to reassembly. To facilitate carriage withdrawal from, or insertion into, the nose fairing link fitting, the carriage must be at the bottom of its rail. The nose must therefore be in the down position for removal and installation.

R The procedures given are for a replacement rail and/or replacement carriage. If a rail and carriage assembly are being removed for access or a similar purpose resulting in the same assembly being refitted, no adjustment should be necessary, careful note being made of the positions of eccentric pins and shims so that they are replaced exactly as before.

#### 2. Droop Nose Guide Rail and Carriage

	DESCRIPTION	PART NO.
R	Safety locking sleeves, nose actuator jacks	E925091000
	Extractor, guide rail pins comprising:	D925015000
	Extractor pin sub-assembly	D925015002
	Bolt	D925933100
	Spacer	D925934100
	Screw	D925935100
	Body	D925936000
	Pressure pad	D925937100
	Thrust washer (2)	D925938100
	Knurled nut	D927528100
	Slip gauge No.1	D925931100
	Slip gauge No.2	D925930100
	Slip gauge No.2A	D926018100

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	DESCRIPTION	PART NO.
R	Checking sling, droop nose hinge loading	D935085000
R	Bracket, attachment-front	DP35063000
	Spring balance (2 ton)	-
	Safety clips, circuit breaker	-
	Micrometer dial gauge	-
	Slip gauges	-
R	Torque spanners 0 to 200 lbf in	-
R	(0 to 2.26 mdaN) range	-
R	Wire, locking, corrosion resistant steel, 0.036 in	-
R	(0.91 mm) dia.	-

### B. Prepare to Remove

- (1) Lower the nose to fully down (12 1/2 deg) as instructed in the operational test for droop nose and visor in 27-61-00, Adjustment/Test.
- (2) Electrically isolate the visor and droop nose controls by tripping the following circuit breakers; fit safety clips:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
VISOR & NOSE CONT	15-215	M11	F8
NOSE 7/1/2 DEG CONT	1-213	M12	Q16
NOSE/VISOR STBY LOWER SUP	1-213	M13	Q17

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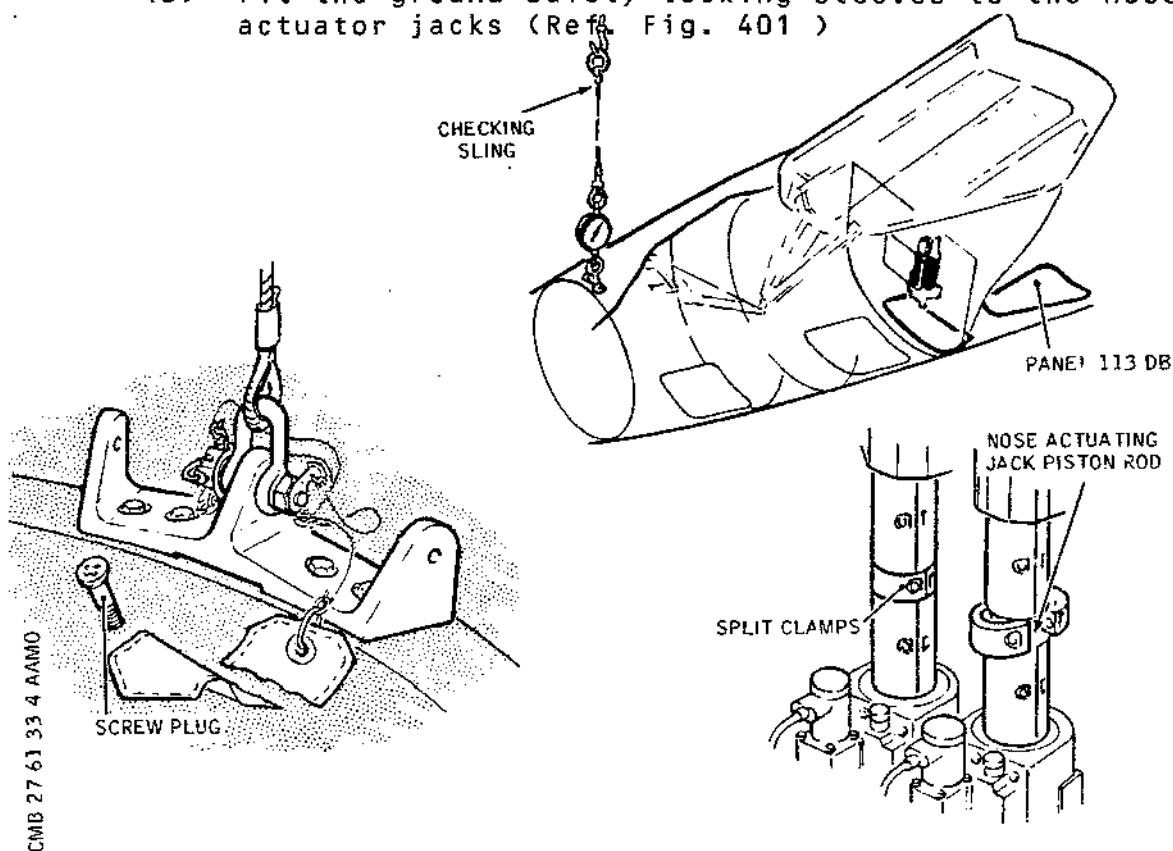
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- (3) Fit the ground safety locking sleeves to the nose actuator jacks (Ref. Fig. 401 )



Ground Equipment  
Figure 401

- (4) If the nose screwjack is not fitted, fit the droop nose checking sling to support the nose when the guide rail(s) and carriage(s) are removed and to provide a means of raising and lowering the nose during the installation checking procedure (Ref. Fig. 401 ).

- (a) Remove the screwed plugs from the sling attachment bracket point and fit the bracket.
- (b) Suspend the checking sling from suitable lifting equipment and secure the sling complete with spring-balance to the bracket.

**NOTE:** The weight on the checking sling must not exceed 1500 lb (680 kg).

C. Remove

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- (1) Remove access panels 113 BL and FZ or 114 BR and FZ in the nose fairing to gain access to the nose fairing link fitting and remove the four bolts that secure the carriage to the link fitting. Ensure that the bush fitted with each bolt is retained (Ref. Fig. 402 ).
- (2) Remove access panels 211 BL and AL or 212 BR and AR in the nose fuselage and disconnect the tensator spring from its mounting bracket on the carriage (Ref. Fig. 403 ). Remove only the split-pin, then unscrew the nut sufficiently to permit the saddle to be eased over the retaining lugs on the mounting bracket. Lightly retighten the nut to retain all parts to the spring.

R  
R

NOTE: The spring tension is approximately 3.15 lbf (1.43 kgf).

- (3) Remove the link securing the guide rail to the structure (Ref. Fig. 404 ).
  - (a) Disconnect the two bonding leads from the link.
  - (b) Remove the bolt from the pin securing the link to the guide rail and withdraw the pin using the extractor tool and slip gauge No.2 or 2A (Ref. Detail C).

R  
R

NOTE: The slip gauge is fitted into the gap between the link and the rail to relieve the pressure exerted on the link forks by the extractor. Because of the possible difference in gap width to the total range of permissible tolerance, two gauges of differing thickness are provided for this position. The appropriate slip gauge being selected as required.

R

R  
R  
R

- (c) Remove the bolt and the locking plate from the eccentric pin securing the link to the structure and withdraw the pin using the extractor tool and slip gauge No.1 (Ref. Detail B).
  - (d) Remove the link together with the two shims (Ref. Detail B) and the washer (Ref. Detail C).

- (4) Disconnect the upper end of the guide rail by removing the locking plate and the bolt that secure the eccentric pin and withdraw the pin by using the extractor tool; (Ref. Detail A). Disengage the carriage from the nose fairing link fitting and remove the

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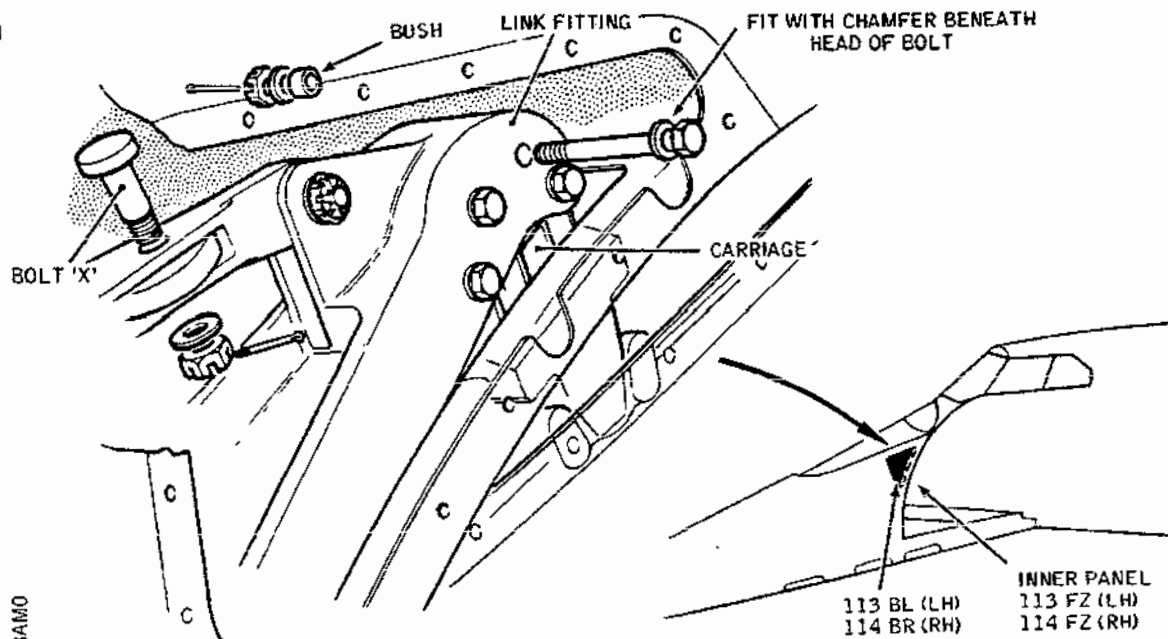
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Attachment of Nose Fairing to  
Guide Rail Carriages  
Figure 402

guide rail and carriage together with the two shims  
(Ref. Detail A).

### D. Dismantle Carriage from Rail (Ref. Fig. 405 )

(1) Remove the two slipper blocks from the carriage.

R (2) Remove the bolt and spacer securing the carriage to the two sideplates and remove the carriage.

R (3) From one sideplate remove the nuts and locking tabs securing the lower rollers, and remove the rollers and sideplates from the rail.

### R E. Prepare to Assemble Carriage to Rail

(1) Determine the highest point on each of the rollers on the inner and outer sideplate, using a dial gauge. Mark these points for reference.

(2) Measure the thickness on the inboard and outboard

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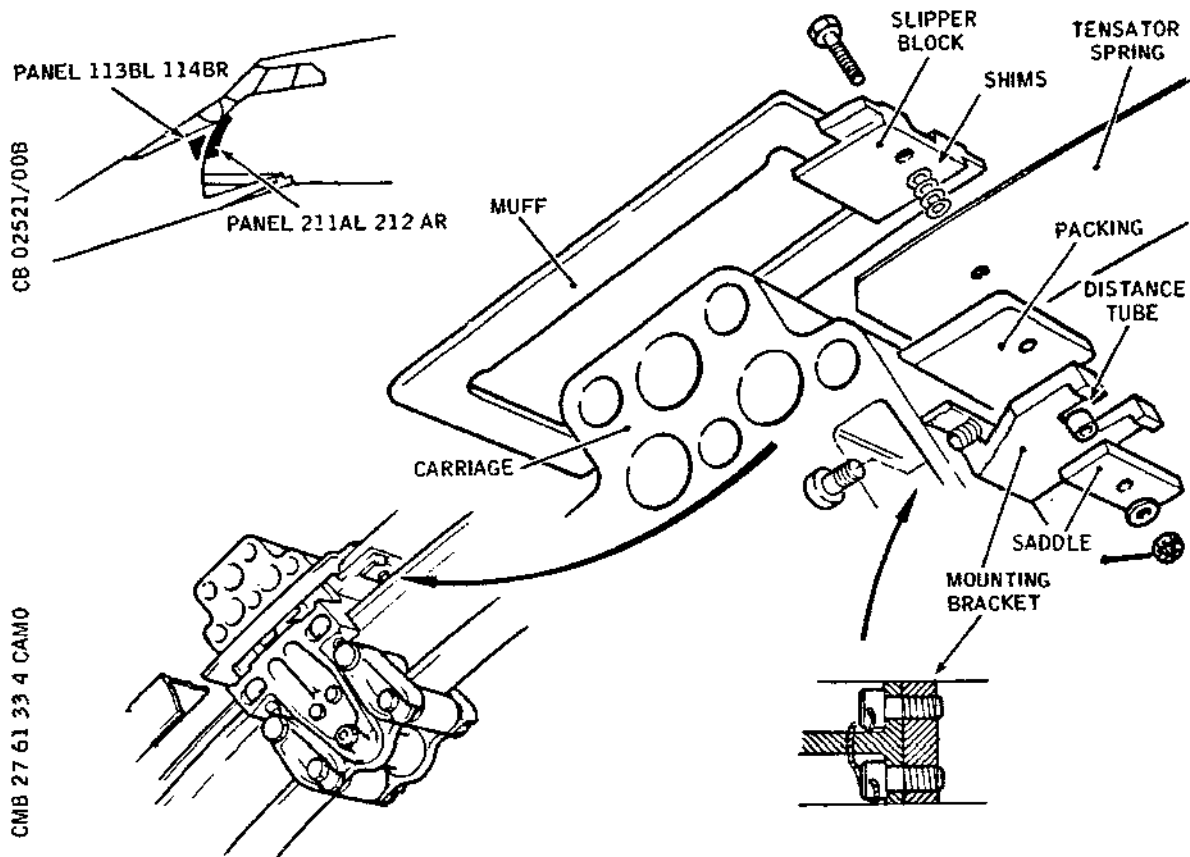
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Attachment of Slot  
Closure Blind to Carriage  
Figure 403

R lower (rear) tracks on the guide rail over its whole length. Record the maximum thickness of each track for reference.

R (3) Mark up which of the sideplates (these are identical in construction) is to be fitted to the inner track and which to the outer track.

### F. Assemble Carriage to Rail (Ref. Fig. 405 )

**NOTE:** Each sideplate has two rollers one of which is 0.006 in (0.15 mm) smaller in diameter than the other. Both sideplates must be marked so that when fitted to the rail and the rail is installed in the aircraft the small rollers are uppermost.

R (1) Adjust the gap between each sideplate assembly upper roller and its corresponding lower roller.

(a) Remove the nut and the serrated and splined washer from the upper roller.

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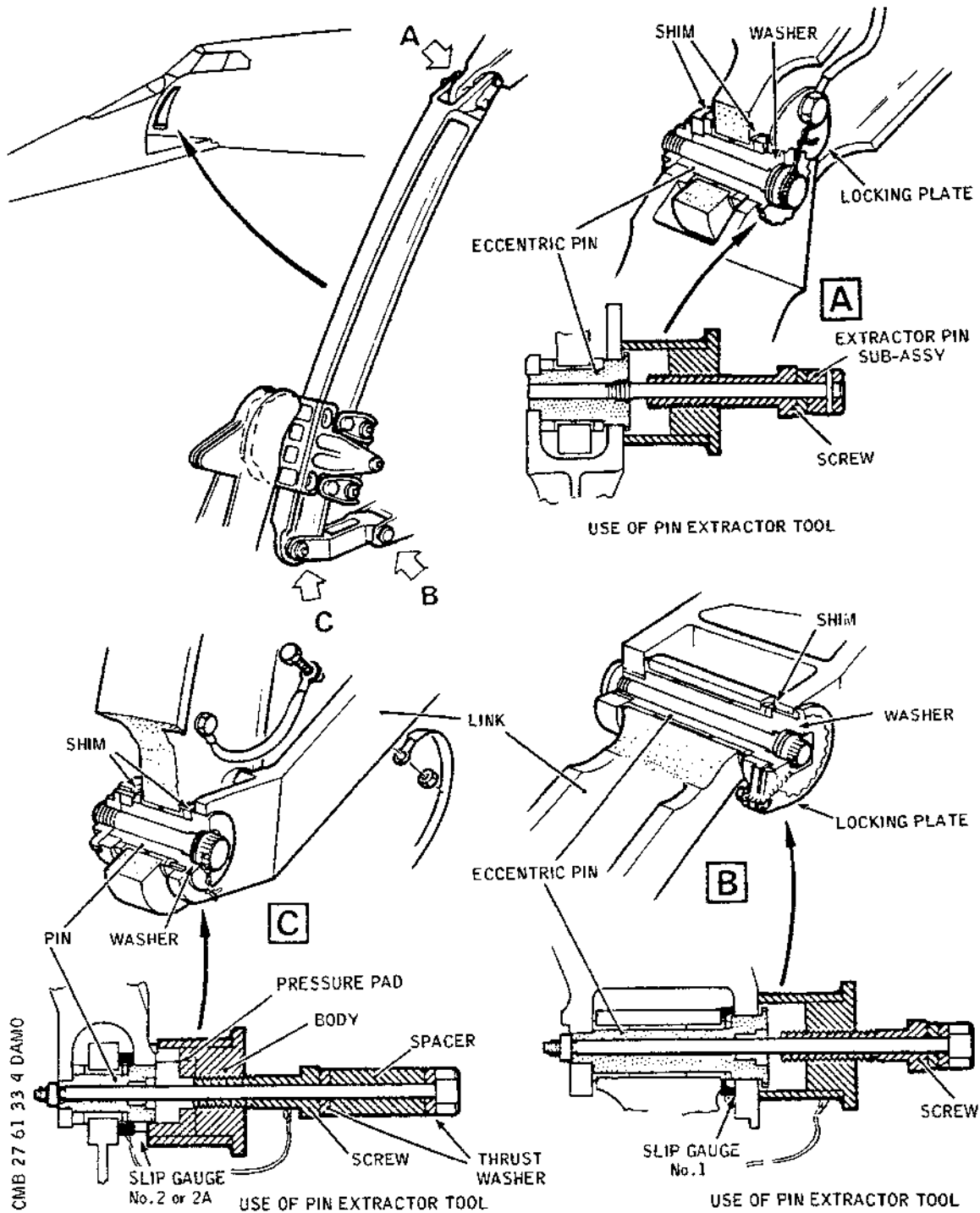
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Droop nose Guide Rails -  
Installation  
Figure 404

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- R (b) Using a slip gauge 0.0015 in (0.0381 mm) less than the maximum thickness of the guide rail flange to which the sideplate assembly is to be fitted, set the gap between the upper and lower rollers by adjusting the upper roller eccentric bush so that when the high spots on the rollers coincide the slip gauge just passes between them.
- R (c) Observe where the centre line through the crest of a spline on the eccentric bush aligns with the centre line of a trough on the serrated washer keyed to the sideplate and mark these for reference.
- R (d) Fit the serrated and splined washer so that its datum mark lies on the centre line passing through the spline and serration marked in operation (c). Secure it with the nut tightened to a torque value of 27 to 32 lbf in (0.3 to 0.36 mdaN).
- NOTE: With 56 serrations and 29 splines, at one position only does a spline and serration coincide on a common centre line. On the serrated and splined washer this centre line is marked by a datum pip.
- R (e) Recheck the gap with the slip gauge and then lock the nut with wire.
- (2) Measure the width of the guide rail lower flange and note its maximum width for reference.
- R (3) Measure the gap between the slipper blocks when fitted to the carriage with no shims; note for reference then remove the blocks.
- (4) Assemble the carriage to the guide rail.
- R (a) Fit the two sideplates to their respective tracks securing them together with the lower roller assemblies. Fit a bonding lead beneath one of the nuts and tighten the nuts to a torque value of 75 to 85 lbf in (0.85 to 0.96 mdaN); lock the nuts with wire.
- R (b) Fit the carriage to the sideplate assemblies with the spacer, bolt, recessed washer and nut. Tighten the nut to a torque value of 140 to 155 lbf in (1.58 to 1.75 mdaN) and lock it with a split pin.

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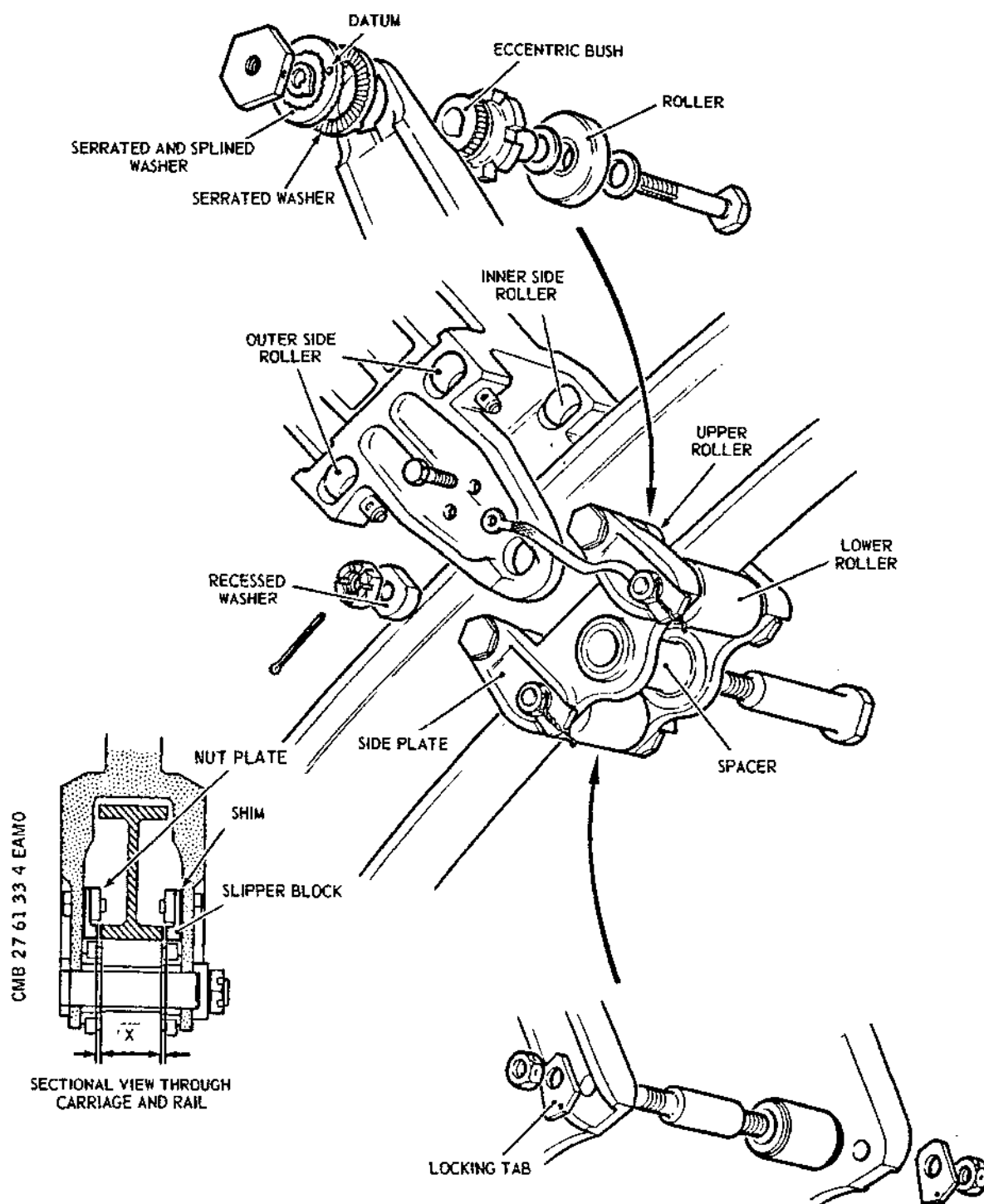
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Assembly of Carriage to  
Guide Rail  
Figure 405

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- (5) Temporarily fit the two slipper blocks with shims of equal thickness fitted behind each to give a width between the blocks 0.010 in (0.25 mm) greater than the maximum width of the rail.
- (6) Determine the total clearance between the inner and outer side rollers and the rail.
- R (7) Centralize the carriage on the rail by equally distributing shim material, equalling in total thickness the clearance determined in Operation (6), between the side rollers and both sides of the guide rail.
- R (8) Measure the clearance between each slipper block and the rail (Ref. Fig. 405 ), (Dimension 'X') and determine the additional shimming required to provide a clearance of 0.0035 to 0.005 in (0.09 to 0.13 mm).
- R (9) Fit the additional shims to the slipper blocks. When refitting the bonding blocks secure the end of the bonding beneath one of the block attachment bolts. Tighten the bolts to a torque value of 27 to 32 lbf in (0.3 to 0.36 mdaN) and lock them with wire.
- R (10) Move the carriage to the top of the rail, centralize the carriage as in Operation (7) and check that the clearances between the slipper blocks and the rail are within limits. Repeat this check with the carriage positioned mid-way and at the bottom of the rail.

### G. Prepare to Install Rail and Carriage Assembly.

NOTE: If the nose ground equipment screwjack has been installed, the nose must be supported by the checking sling to ensure there is no load on the screwjack when the guide rails and carriages are being assembled into the aircraft. This ensures symmetry. Failure to comply with this instruction may result in damage.

- (1) If a replacement carriage is being fitted, remove the tensator spring mounting bracket from the old carriage and fit it to the replacement carriage. Lock the bolts with wire (Ref. Fig. 403 ).
- (2) If a new guide rail is being fitted transfer the bonding lead from the old rail to the replacement rail (Ref. Fig. 404 ).
- (3) Determine the total shim thickness that will be

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required between the guide rail and the links  
(Ref. Fig. 404 ) (Detail C):

- (a) If the same guide rail is being refitted the total shim thickness will be the same as before and can be found by measuring the thickness of the old shims.
- (b) If a new rail is being fitted; temporarily assemble the rail to the link with the eccentric pin, bolt, washer and nut. Tighten the bolt to a torque value of 65 to 75 lbf in (0.73 to 0.85 mdaN). Measure from beneath the head of the pin to the inner face of the opposite fork and from this dimension subtract the width of the rail to determine the total shim thickness required. Record the thickness and dismantle the items.
- (4) Determine and make a note of the total shim thickness that will be required between the upper end of the guide rail and the attachment fitting in a similar manner to that given in Operation (3).

### H. Install

- (1) Place the guide rail and carriage assembly into position inserting the carriage into the nose fairing link fitting. Secure the carriage to the link fitting with the four bolts, bushes, washers (2 per bolt), nuts and split-pins. Tighten the nuts to a torque value of 150 to 165 lbf in (1.70 to 1.86 mdaN) (Ref. Fig. 402 ).
- (2) Fit the link to its attachment bracket on the nose fuselage with the eccentric pin and shim, bolt, washer and nut. Tighten the bolt to a torque value of 65 to 75 lbf in (0.73 to 0.85 mdaN). Check that the clearance between the link and the bracket is 0.001 to 0.003 in (0.02 to 0.08 mm). If necessary, replace the existing shim with a new shim, ground to a thickness that will give the required clearance (Ref. Fig. 404 ) Detail C). Remove the assembly and fit the link eccentric pin and shim only.
- (3) Fit the upper end of the guide rail to its attachment bracket using the eccentric pin; exclude the shims (Ref. Fig. 404 ) (Detail A).
- (4) Temporarily remove the bolt 'X' from the nose fairing link fitting (Ref. Fig. 402 ).

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- (5) Fit lower end of the guide rail to the link with the pin, bolt, washer and nut; exclude the shims (Ref. Fig. 404 ) (Detail C).
- (6) Adjust the position of the guide rail by means of the eccentric pins (Ref., Details A and B) until the holes for the bolt 'X' are realigned and permit the bolt to be slipped easily in and out with no loading on the rail.
- (7) Remove the safety locking sleeves from the nose actuator jacks.
- (8) Slowly raise the nose, at the same time checking that the rail is in an unloaded condition by slipping bolt 'X'. If necessary, adjust the guide rail by means of the eccentric pins to retain the unloaded condition.

NOTE: Ensure that when the nose is in the fully up position the metal to metal clearance between the nose fairing and the nose fuselage is maintained at 0.15 to 0.25 in (3.81 to 6.35 mm). If the clearance is outside the figures given re-adjustment of the eccentric pins must be made.

- (9) Secure bolt 'X' with a washer and nut tightened to a torque value of 240 to 260 lbf in (2.7 to 2.9 mdaN) and lock with a split pin.
- (10) Wrap shim material around the lower end of the guide rail so that when the nose is lowered the side rollers will centralize the carriage on the rail.

NOTE: The thickness of shim used will be as determined in para.2.F.

- (11) Lower the nose fairing to the fully down position and determine the gap between the outboard upper side roller and rail.

NOTE: If the nose is to be lowered on the checking sling, the nose must be released to the 5 deg. down position using the nose emergency release handle, and then released from the collet locks to fully down using ground hydraulic power as detailed in 27-62-17, Removal/Installation.

- (12) Fit the bolts, nut and washers to the two eccentric pins securing the link. Torque tighten the bolts to between 65 and 75 lbf in (0.73 and 0.85 mdaN).

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- (13) Determine the required thickness of the shims fitted between the lower end of the rail and the link:
- (a) Outboard shim. Push the lower end of the rail inboard to take up the flexibility of the nose fairing link fitting and measure the resulting gap. Then pull the rail outboard and measure the gap. Grind the outboard shim to a thickness equal to the mean of the two gaps measured less 0.002 in (0.05 mm).
- (b) Inboard shim. Grind the inboard shim to a thickness equal to the gap determined in para.2.6 (3) (b) less the mean gap obtained in (13) (a).
- (14) Dismantle the eccentric pin assembly and re-assemble with the new shims. Torque tighten the bolts (Ref. Operation (12) and check that the end float is between 0.001 and 0.003 in (0.02 and 0.08 mm).
- (15) Raise the nose to the fully up position.
- (16) Wrap shim material around the upper end of the guide rail just below the carriage lower side rollers so that when the carriage is lowered on to the shim it is centralized about the rail.
- NOTE: The thickness of the shim will be as determined in para 2.G. (4).
- (17) Lower the nose until the carriage lower side rollers engage the wrap around shim and centralize on the rail.
- (18) Mount a dial gauge adjoining the upper attachment bracket to measure lateral displacement of the rail and, with the guide rail in its natural position, set the dial gauge to zero.
- (19) Determine the thickness of the outboard shim by pushing the upper end of the rail inboard as far as the flexibility of the nose fairing link fitting will permit and note the dial gauge reading. Then pull the rail outboard as far as it will go and note the dial reading. Position the rail at the mean of these two readings and measure the gap for the outboard shim. Grind the shim to this thickness less 0.002 in (0.05mm).
- (20) Grind the inboard shim to a thickness equal to the figure obtained in para 2.G.(4) less the mean gap

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- R                   obtained in (19).
- (21) Dismantle the pin assembly and reassemble it with the shims ensuring that the eccentric pin is reassembled to the correct setting. Check that the end float of the rail is between 0.001 and 0.003 in (0.02 and 0.08 mm) and secure the pin with the bolt, washer and nut, torque tightening the bolt to between 65 and 75 lbf in (0.73 and 0.85 mdaN).
- R
- R
- (22) Remove the dial gauge and the wrap around shims.
- (23) Fit the locking plate to the upper eccentric pin head. Secure the plate together with the bonding lead with the bolt tightened to a torque value of 125 to 140 lbf in (1.41 to 1.58 mdaN). Lock the two bolt heads together using 0.036 in (0.91 mm) dia. wire (Ref. Detail A).
- R
- (24) Fit the locking plate to the lower eccentric pin and secure it with a washer and nut tightened to a torque value of 12 to 15 lbf in (0.14 to 0.17 mdaN). Lock the nut to the head of the bolt securing the pin using 0.036 in (0.91 mm) dia. wire.
- R
- R
- (25) Fit the bonding leads between the guide rail and the link and the link and the structure.
- (26) Connect the tensator spring to the mounting bracket on the carriage by slackening of the nut retaining the item to the spring (Ref. para C (2)) and easing the saddle over the mounting bracket. Ensuring that the muff is fitted snugly over the carriage and slipper block and tighten the nut to a torque value of 10 to 15 lbf in (0.11 to 0.17 mdaN). Fit a split-pin (Ref. Fig. 403 ).
- R
- NOTE: Shim washers are fitted beneath the slipper block as necessary to lift it just clear of the surround structure along its full travel. The packing can be reduced in thickness until the tensator spring slides freely in its track; note position of the chamfer, the excess material is removed from the opposite face.
- (27) Lower the nose to the fully down (12 1/2 deg.) position preparatory to power operation.
- (28) Remove the checking sling and bracket from the nose and refit the screwed plugs in the bracket attachment holes in the fuselage.

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- R  
R
- (29) Remove the safety clips and reset the circuit breakers (Ref. para 2B).
  - (30) Carry out the visor and nose functional test (Ref. 27-62-00, Adjustment/Test) and check the satisfactory operation of the nose guide rail and carriage (see note in operation (26)).
  - (31) Refit all access panels.

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### SIDE LOAD LINKS - REMOVAL/INSTALLATION

R WARNING: ENSURE THAT THE GROUND SAFETY LOCKS ARE FITTED  
R BEFORE ENTERING THE DROOP NOSE.

#### 1. General

R The side load links, fitted between the nose fairing rear  
R bulkhead and the fuselage front pressure bulkhead, take the  
R lateral stresses imposed upon the nose fairing. The lower  
R link, secured to the fuselage bulkhead, cannot be removed  
without first removing the adjacent nose actuators.

#### 2. Side Load Links

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Extractor set, side load link pins:	D925168000
Extractor, centre pin	D925940000
Extractor, top and bottom pins	D925168001
Spanner	D926019000
Safety clip, circuit breaker	-
Non-corrodible wire. 0.028 in (0.7 mm) dia.	-
Grease, Aeroshell 16 (Ref. 20-30-00, No.51)	-

##### B. Prepare to Remove

R (1) Remove the nose actuators (Ref. 27-62-17).  
R

R NOTE: Upon completion of removal the nose will  
R be up, supported by the checking sling and  
R secured by the nose locking pins; the visor  
R will be down and secured by the locking  
R link.  
R

R (2) Remove the nose locking pins, release the nose  
R from its uplocks by operating the EMERGENCY NOSE/  
R VISOR UNLOCK RELEASE handle at the side of the  
R centre console and lower the nose on the checking  
R sling. Return the release handle to its normal

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stowed position.

CAUTION: WITH THE ACTUATORS REMOVED THE NOSE CAN BE LOWERED IN EXCESS OF ITS NORMAL TRAVEL TO APPROXIMATELY 18 DEG. TO AVOID THE POSSIBILITY OF DAMAGE CARE MUST BE TAKEN TO PREVENT THE NOSE DROPPING UNCHECKED TO THE LIMIT OF TRAVEL.

### C. Remove (Ref. Fig. 401 )

- (1) Remove the bonding leads from the side load links.
- (2) Remove the centre pin connecting the upper and lower links:
  - (a) Remove the nut and locking washer securing the centre pin.
  - (b) Withdraw the pin using the extractor; retain the shims.
- (3) Remove the upper and/or lower link:
  - (a) Remove the bolt and washer from the end of the pin.
  - (b) Remove the bolt securing the pin to the link.
  - (c) Withdraw the pin using the extractor; remove the link.

### D. Install (Ref. Fig. 401 )

NOTE: New links are complete with pin and loosely fitted bolt. New lower links are also fitted with a loosely assembled spherical bearing assembly for the centre pin. The links are handed only by the bolt which must be fitted with its head on the forward side of the link.

- (1) Before fitting a lower link, secure the bearing assembly by tightening the flanged nut until there is no end play between the spherical bearings and seatings then tighten the locknut to between 100 and 110 lbf in (1.13 and 1.24 mdaN). Check that the breakout torque required to rotate the sleeve within the link is between 2 and 10 lbf in (0.02 and 0.11 mdaN).

EFFECTIVITY: ALL

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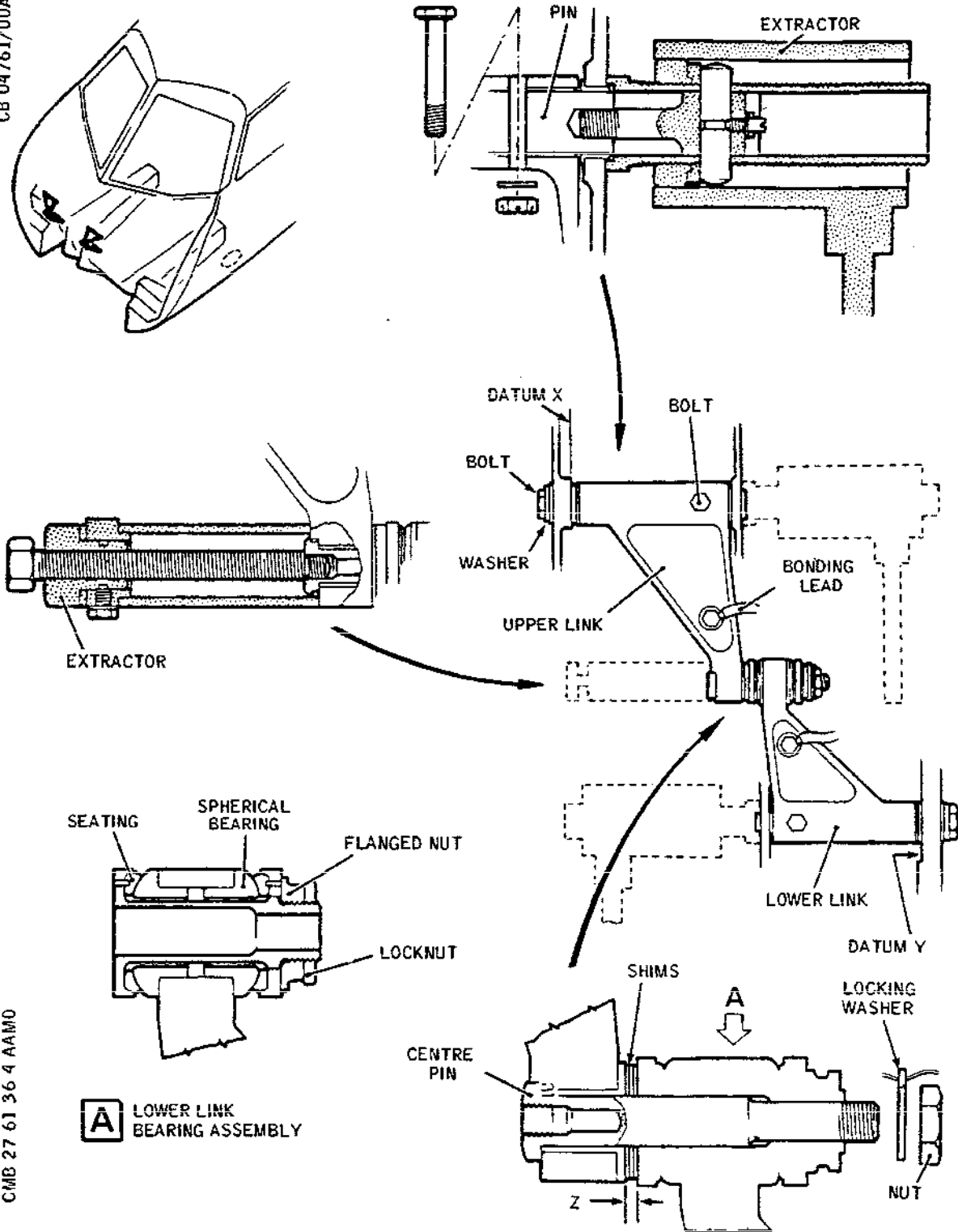
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## MAINTENANCE MANUAL

CB 04761/00A



CMB 27 61 36 4 AAM0

Side Load Links - Installation  
Figure 401

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- (2) Fit each upper and/or lower link:
- (a) Fit the link to the structure with the pin.
  - (b) Secure the pin to the link using the bolt and nut; torque tighten the nut to between 120 and 140 lbf in (1.35 and 1.58 mdaN) and fit a split pin.
  - (c) Fit the bolt and washer to the pin; torque tighten the bolt to between 200 and 215 lbf in (2.25 and 2.6 mdaN) and secure the bolt to the washer with wire.
- (3) Check the width of gap "Z" over the full range of droop nose travel:
- (a) Loosely connect the upper and lower links by inserting the centre pin. Do not fit the shims, nut or washer.
  - (b) With the upper and lower links abutting datums "X" and "Y" note the width of the gap "Z".
  - (c) Raise the nose to the 5 deg. position using the checking sling.
  - (d) Note the width of the gap 'Z'.
  - (e) Raise the nose to the fully up position with the sling and fit the nose locking pins.
  - (f) Note the width of the gap 'Z'.
  - (g) Compare the three gap 'Z' measurements and note the minimum width.
- (4) Fit the side load links centre pin:
- (a) Select shims with a total thickness equivalent to the minimum width of gap "Z" less 0.001 to 0.003 in (0.02 to 0.07 mm).
  - (b) Remove the centre pin, using the extractor, and refit it with the shims selected in (a); secure it with the lockwasher and nut. Torque tighten the nut to between 100 and 110 lbf in (1.13 and 1.24 mdaN).
  - (c) Lock the nut securing the centre pin and the

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locknut securing the spherical bearing assembly to the lockwasher with wire.

(5) Refit the bonding leads to the side load links.

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(6) Refit the nose actuators and function test the system (Ref. 27-62-17, Removal/Installation).

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### DROOP NOSE UPLOCK - REMOVAL/INSTALLATION

**WARNING:** OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS IN 24-00-00.

#### 1. General

There are two nose uplocks, left and right hand. An uplock jack can be unbolted from its uplock without the necessity of disconnecting the hydraulic system. Two microswitches are operated by each uplock. One (M23 (LH), M24 (RH)) is bolted to the adjacent droop nose structure and when a replacement uplock is fitted the microswitch striker arm must be adjusted to suit. The other microswitch (M25 (LH), M26 (RH)) is bolted to the uplock and the uplock is supplied with the switch striker arm pre-set.

#### 2. Droop Nose Uplock

##### A. Equipment and Materials

	DESCRIPTION	PART NO.
R	Locking sleeves, nose actuator jacks	E925091000
R	Locking link, visor 'down'	D925468000
R	Rigging pin	D925188001
R	Checking sling, droop nose	D935625000
R	Attachment bracket, sling	D935063000
R	Spring balance, 0-1200 lbf	-
R	(0-500 kg)	
R	Safety clip, circuit breaker	-
R	Locking wire, non-corrodible steel,	-
R	0.028 in (0.7 mm) dia	
R		

##### B. Prepare to Remove

(1) If the nose and visor are not in the fully lowered position:

(a) Make available electrical ground power (Ref.

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24-41-00).

- (b) Connect a ground hydraulic test rig to the aircraft hydraulic system (Ref. 29-00-00) and pressurize the green and the yellow hydraulic systems.
  - (c) Operate the VISOR/NOSE normal control lever on the co-pilot's dash panel as necessary to fully lower the nose and visor.
- (2) Trip the droop nose and visor control circuit breakers; fit safety clips.

	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
R	VISOR & NOSE CONT	15-215	M11	F 8
R	NOSE 7 1/2° CONT	1-213	M12	Q16
R	NOSE/VISOR STBY			
R	LOWER SUP.	1-213	M13	Q17

- (3) Fit the visor 'down' locking link (Ref. Fig. 401 ).
- (4) Fit the nose actuator locking sleeves.
- C. Remove Uplock (Ref. Fig. 402 )
- (1) Disconnect the spring from the uplock hook.
  - (2) Disconnect the nose emergency release mechanism:
    - (a) Remove the wire securing the locknuts at each end of the rod connecting the mechanism to the uplock.
    - (b) Slacken the locknuts and unscrew the rod from the rod ends.
  - (3) Disconnect the electrical supply plug from the microswitch M25 (LH) or M26 (RH) and remove the microswitch from the uplock.
  - (4) Disconnect the electrical conduit from the uplock.
  - (5) Remove the two bolts securing the hydraulic jack to

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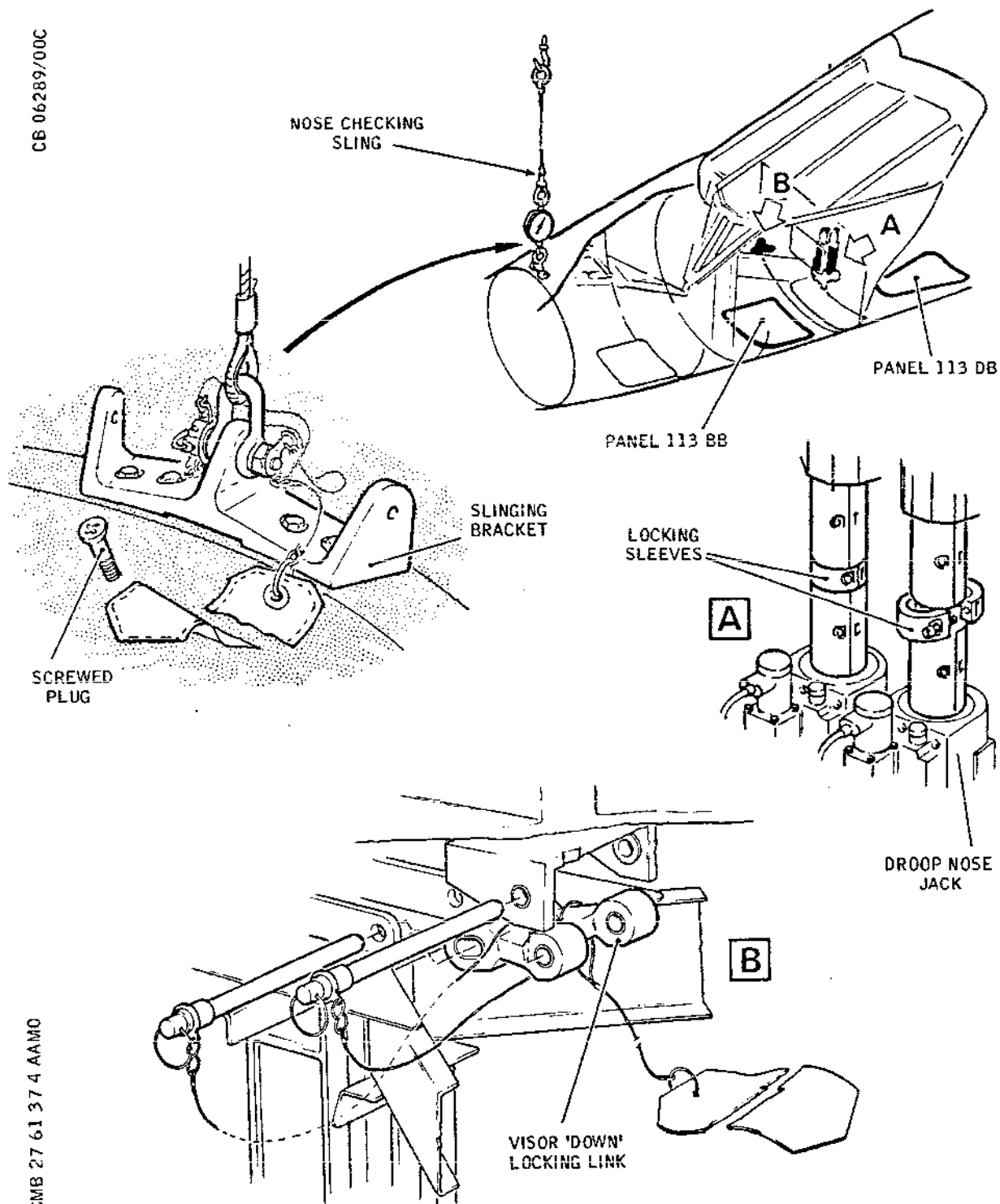
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Ground Equipment  
Figure 401

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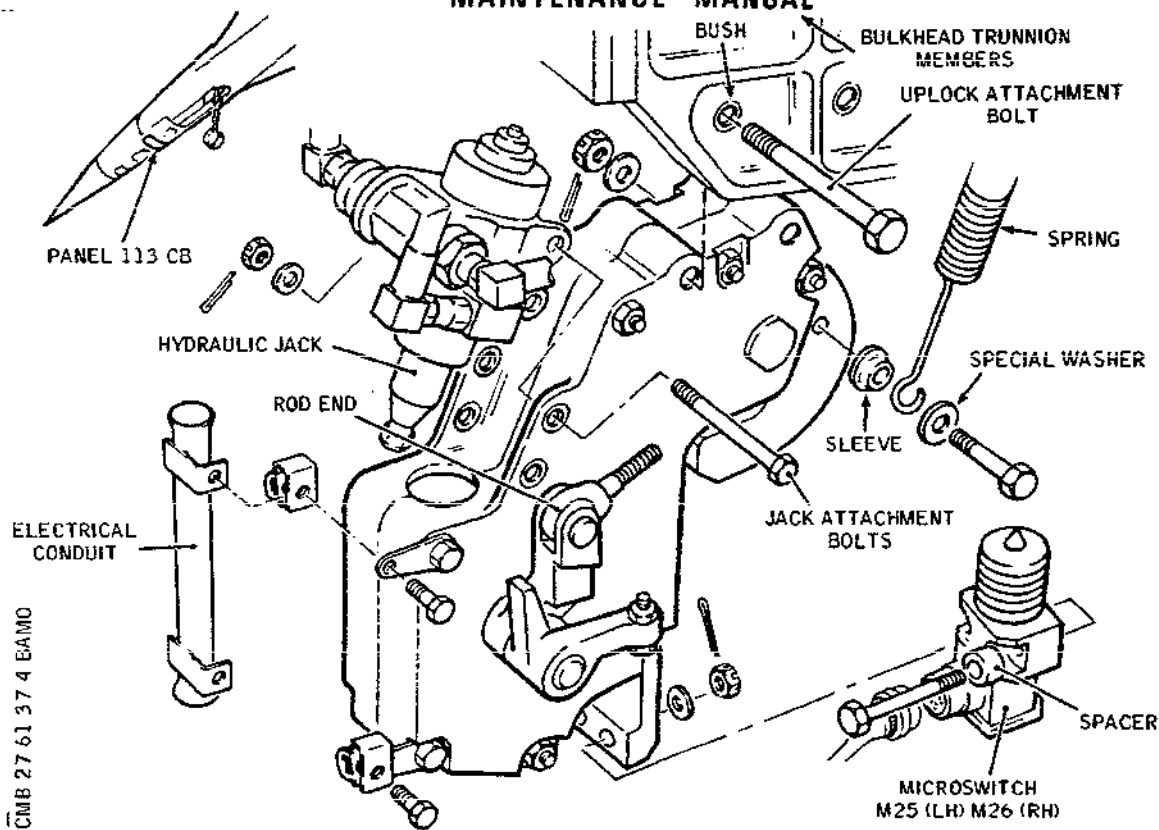
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Nose Uplock - Installation  
Figure 402

the uplock.

- (6) Remove the two bolts securing the uplock to the bulkhead trunnion members and remove the uplock.

### D. Install Uplock (Ref. Fig. 402 )

**NOTE:** The following procedure is for a new uplock supplied less microswitches but with the striker bolt for microswitch M25 (LH) or M26 (RH) already pre-set.

- (1) Ensure that the electrical safety precautions are still applied.
- (2) Fit microswitch M25 or M26 to the uplock and secure it with two bolts, spacers, washers and nuts. Tighten the nuts to a torque value of 12 to 15 lbf in (0.13 to 0.165 mdaN) and fit split pins.
- (3) Fit the uplock to the trunnion members with the two bolts, bushes and nut plates. Tighten the bolts to a torque value of 350 to 375 lbf in (3.9 to 4.15 mdaN)

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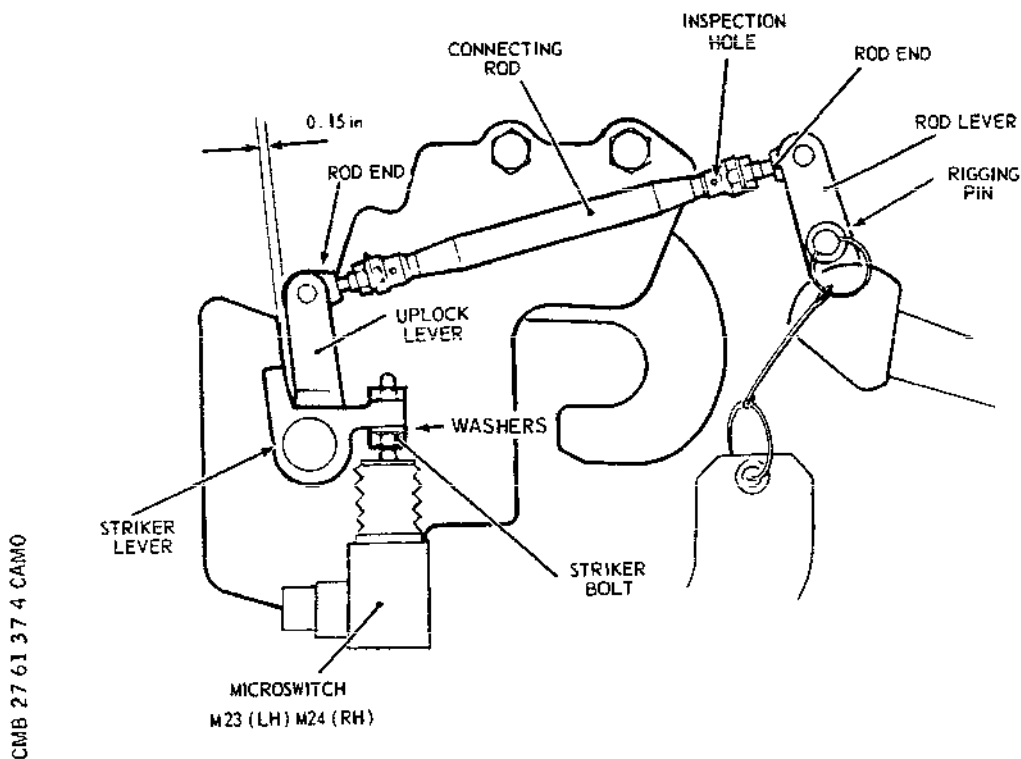
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## MAINTENANCE MANUAL

and lock them with wire.

- (4) Secure the hydraulic jack to the uplock with two bolts washers and nuts. Tighten each nut to a torque value of 25 to 30 lbf in (0.27 to 0.33 mdaN) and secure it with a split pin.
- (5) Fit the electrical conduit to the uplock with the two bolts and nut clips.
- (6) Secure the spring to the uplock hook with bolt, sleeve special washer, washer and nut. Tighten the nut to a torque value of 12 to 15 lbf in (0.13 to 0.16 mdaN) and fit a split pin.
- (7) Connect the nose emergency release mechanism to the uplock (Ref. Fig. 403 ):



Nose Uplocks Adjustment  
Figure 403

- (a) Fit the rigging pin to the rod lever.
- (b) Fit the connecting rod to the rod ends and adjust

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the rod to give a gap of 0.15 in (3,80 mm) between the uplock lever and the striker lever.

(c) Check that the rod ends are in-safety i.e. extend past the inspection hole, and that the wire-locking tabs on the washers are positioned on the outboard side of the rod then tighten the lock-nuts to a torque value of 30 to 35 lbf in (0.33 to 0.39 mdaN) and secure them with wire.

(d) Remove the rigging pin.

(8) Remove the screwed plugs from the sling attachment point and fit the bracket. Attach the checking sling, complete with spring balance, and connect it to suitable lifting equipment.

NOTE: The weight on the checking sling must not exceed 1070 lbf (485 kg).

(9) Remove the visor 'down' locking link.

(10) Remove the locking sleeves from the nose actuator jacks.

(11) Depressurize the green and the yellow hydraulic systems.

(12) Adjust the nose uplock pins as detailed in 27-61-00, Adjustment/Test, but using the checking sling in place of the screwjack to raise the nose.

(13) With the nose in its correct up position in the uplocks adjust the uplock lever striker bolt for indication circuit microswitch M23 (LH) or M24 (RH) (Ref. Fig. 403 ):

(a) Operate the nose emergency release lever on the centre console to release the uplocks, then lower the nose with the checking sling just sufficiently to permit the striker bolt to be removed.

(b) Remove the washers from beneath the head of the bolt and replace the bolt finger tight only.

(c) Return the nose to the fully up position.

(d) Screw out the bolt until it just operates the microswitch then screw out a further two turns.

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## MAINTENANCE MANUAL

- (e) Measure the gap between the underside of the bolthead and the striker lever then select sufficient washers removed at (b) to just enter the gap. Add one extra washer to the pack.
  - (f) Lower the nose and refit the bolt, washer pack and nut. Fit the remaining washers beneath the nut. Tighten the nut to a torque value of 27 to 32 lbf in (0.3 to 9.35 mdaN) and lock it with wire.
  - (g) Return the nose to the fully-up position.
- (14) Remove the checking sling and bracket from the droop nose and refit the screwed plugs to the bracket attachment holes.
- (15) Carry out the visor and droop nose operational test (Ref. 27-61-00, Adjustment/Test).

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**END OF THIS  
SECTION**

**NEXT**

# Concorde

## MAINTENANCE MANUAL

### NOSE POSITION TRANSMITTER UNIT - REMOVAL/INSTALLATION

#### 1. General

The nose position transmitter unit is bolted to the floor on the left hand side of the fuselage forward equipment bay (zone 121). The unit input lever extends through the floor of the equipment bay and is connected to a link rod on the droop nose hinge arm. To facilitate disconnection of the input lever from the link rod the nose is fully lowered to give access over the droop nose hinge arm. The unit is also electrically connected for the ADC potentiometers, weather radar synchros and nose position indication microswitches that it contains. The unit input lever is spring-loaded to the up (0 deg) position so that in the event of link rod fracture, high incidence signals are prevented; the link rod will be contained by a fail safe box.

#### 2. Nose Position Transmitter Unit

**CAUTION:** DURING REMOVAL AND INSTALLATION OF THE TRANSMITTER UNIT AVOID RAPID MOVEMENT OF THE INPUT LEVER AND RESTRAIN THE SPRING-LOADED LEVER FROM RETURNING SUDDENLY TO THE NOSE UP POSITION. A HEAVY IMPACT AT THE END OF TRAVEL COULD DAMAGE THE TRANSMITTER. WHEN THE UNIT IS NOT INSTALLED IN THE AIRCRAFT THE INPUT LEVER MUST BE SECURED TO THE UNIT CASING WITH A LOCKING PIN.

R \*\*ON A/C 001-006,

B **NOTE:** It is preferable that the link rod adjust turn-  
B buckle setting is not disturbed.

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Rigging pin assembly, nose indication unit	D925187001
Locking sleeves, nose actuator jacks	E925091000
Safety clip, circuit breaker	-
Hydraulic ground rig	-

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## MAINTENANCE MANUAL

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### DESCRIPTION

### PART NO.

---

Non-corrodible steel locking wire -  
0.028 in (0.7 mm) dia

---

#### B. Prepare to Remove Transmitter Unit

- (1) If the nose is not already in the fully lowered (drooped) position, lower it:
  - (a) Make available electrical ground power (Ref. 24-41-00).
  - (b) Connect ground hydraulic power and pressurize the green hydraulic system.
  - (c) Progressively set the VISOR/NOSE normal system control lever on the co-pilot's dash panel to DOWN to fully lower the droop nose and visor.
- (2) Electrically isolate the unit and the droop nose normal and standby control by tripping the associated circuit breakers; fit safety clips.

---

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
<hr/>			
NOSE 7 1/2 DEG CONT	1-213	M12	Q16
NOSE/VISOR STBY			
LOWER SUP		M13	Q17
ADC 1 28V SUP		1F74	P12
ADC 1 115V SUP	2-213	1F73	F 3
1ST PLT ADC INST		1F75	A 1
SUP			
ADC 1 26V SUP		1F78	A 2
1ST PLT ALT AS1			
STBY IND		1F88	B 1
1ST PLT VS1 SUP		1F97	A 3
2ND PLT ALT AS1			
STBY IND		2F88	B 2
FLT DATA REC SUP		R205	G19
ADC 2 28V SUP	5-213	2F74	F12
NO 1 TX RX WEATHER			
RADAR SUP		1S30	B 4
NO 1 WEATHER RADAR		1S32	C 4

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IND			
VISOR & NOSE CONT	15-215	M11	F 8
3CM STN RH LT TEST			
SUP		L1006	D14
NO 2 TX RX WEATHER	13-216	2S30	E18
RADAR SUP			
NO 2 WEATHER RADAR		2S32	E19
IND			
ADC 2 115V SUP		2F73	F15
2ND PLT ADC INST			
SUP		2F75	A14
ADC 2 26V SUP		2F78	A15
2ND PLT VS1 SUP		2F97	B13
3CM ADC TEMP INST		F105	F14
SUP			

- 
- (3) Fit the ground locking sleeves to the droop nose actuator jacks (Ref. Fig. 401 ).
  - (4) Remove access panels 113DB and 121AB from the droop nose and nose fuselage respectively to gain access within the equipment bay.

### C. Remove Transmitter Unit (Ref. Fig. 402 )

- (1) Disconnect the two electrical plugs from the transmitter unit.
- (2) Cut the locking wire and remove the two bolts securing the hinged side of the fail-safe box around the end of the link rod.
- (3) Disconnect the link rod from the input lever.

NOTE: A self retaining bolt is fitted; this is released by depressing the locking spindle in the bolt head.

- (4) Remove the six attachment bolts and carefully remove the transmitter unit from the equipment bay. Secure the input lever with a locking pin.

NOTE: Removal is facilitated by first lifting the unit so that the input lever clears the aperture, then turning the unit on its side with the lever facing forward.

### D. Install Transmitter Unit (Ref. Fig. 402 )

- (1) Prior to fitting the transmitter unit check that the

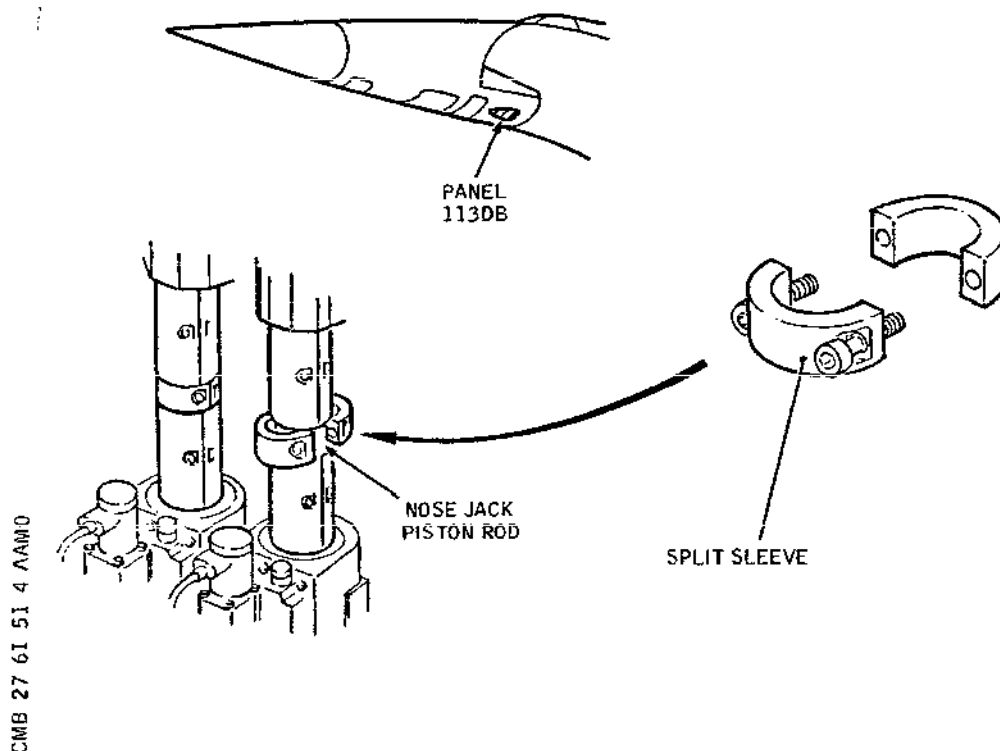
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Ground Locking Sleeves - Nose Actuator Jacks  
Figure 401

force required to move the input lever from the 'up' to the 'down' position is between 5 1/2 and 9 1/2 lb (2.1 and 4.3 Kg) when applied at the bolt hole and at 90 deg to the centre. The lever must spring return to the up (0 deg) position. Do not allow the lever to return to the 'up' position without restraining the spring loading (Ref. Para.2, CAUTION).

- (2) Remove the bench locking pin securing the input lever and place the unit in position in the equipment bay.
- (3) Secure the transmitter unit to the equipment bay floor with the six attachment bolts. Torque load each bolt to between 27 and 32 lbf in (0.30 and 0.36 mdaN) and secure them with locking wire.
- (4) Carry out a duplicate inspection to ensure that the input lever returns to the 'up' position.
- (5) Connect the transmitter unit to the link rod:
  - (a) Set the unit input lever to the rigging

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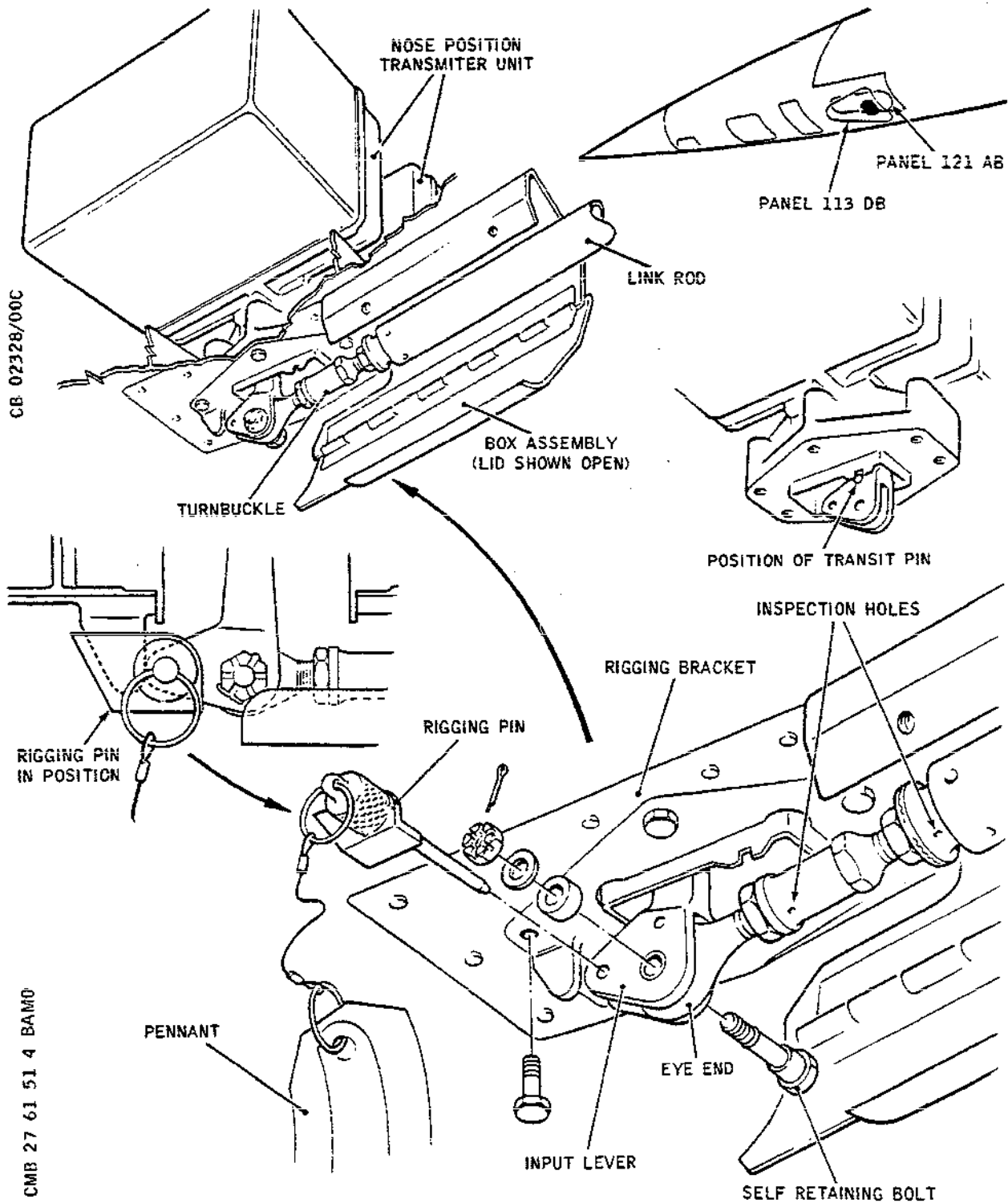
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Nose Position Transmitter Unit - Installation  
Figure 402

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position using the rigging pin assembly by inserting the pin into the rigging hole in the input lever and locating the rigging bracket in the recess in the pin assembly (Ref. Fig. 402 ).

NOTE: The pin should abutt the aft face of the brackets.

- (b) Engage the link rod with the input lever, adjusting the turnbuckle as necessary to align the attachment holes; secure it with the self retaining bolt, washer, spacer washer and nut. Torque load the nut to between 27 and 32 lbf in (0.30 and 0.36 mdaN) and lock it with a split pin.
  - (c) Check that the rigging pin just touches the aft face of the rigging bracket; Tighten the turnbuckle locknuts, but do not lock with wire at this stage.
  - (d) Remove the rigging pin assembly.
- (6) Raise the droop nose:
- (a) Remove the ground locking sleeves from the actuator jacks.
  - (b) Reset the circuit breakers previously tripped.
  - (c) Raise the nose and visor by progressively setting the VISOR/NOSE normal control lever to UP.
- (7) Check and adjust the setting of the nose transmitter unit link rod and complete the installation as instructed in 27-61-00, Adjustment/Test.

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## MAINTENANCE MANUAL

### NOSE POSITION TRANSMITTER UNIT - ADJUSTMENT/TEST

#### 1. General

The droop nose transmitter unit, located within the forward equipment bay near the droop nose hinge, is electrically connected to navigation and landing gear systems. These tests must be carried out to prove the satisfactory operation of the droop nose transmitter unit following the installation procedure. All the tests must be carried out in sequence.

#### 2. Tests to Prove Operation of Transmitter Unit

##### A. Equipment and Materials

---

DESCRIPTION	PART NO.
Ground electrical power unit	-

---

##### B. Operational Test

- (1) Carry out an operational test of the visor and droop nose as detailed in 27-61-00, Adjustment/Test.

##### C. Test ADC System

- (1) Carry out an ADC system test (Simulation of a super-sonic flight condition and overspeed warning check):

- (a) Position the droop nose at 12.5 deg (Ref.27-61-00, Adjustment/Test).

NOTE: The overspeed warning (warbler aural warning), sounds which during this operation can be cancelled by pressing the blue TEST indicator light on the ADC control panel.

- (b) ADC start Up

NOTE: As ADC 1 and ADC 2 systems are similar, a common test is described. If differences occur, the system concerned will be mentioned.

- (b1) On centre console 9-211 ADC control panel,

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place ADC 1 (ADC 2) ON-OFF switch in ON position.

- (b2) After some seconds, press and release amber ADC 1 (ADC 2) warning light, which remains extinguished.
- (b3) On Captain (First Officer) instrument panel, make certain that warning flags on the following instruments are not visible:
  - Airspeed indicator
  - Machmeter
  - Altimeter
  - Angle of attack indicator
  - Temperature indicator
  - Vertical speed indicator
- (b4) On panel 4-214 on Flight Engineer panel, make certain that warning flag is not visible on :
  - Digital machmeter (for ADC 1)
  - Digital altimeter (for ADC 2)
- (c) On the centre console 9-211 ADC control panel, place test selector switch of System 1 to TEST 2: some ADC warnings will be actioned.
- (d) After approximately 30 seconds the blue TEST indicator light illuminates on the ADC control panel and overspeed aural warning (warbler, duration 2 seconds on, 1 second off) sounds.
- (e) On the centre console 9-211 ADC control panel, press and release the amber ADC 1 warning light which extinguishes. The other ADC warnings also disappear.
- (f) Cancel the overspeed warning (warbler aural warning) by pressing blue TEST indicator light on ADC control panel.
- (g) Set the switch on the ADC control panel to "NORM". Some ADC warnings will be actioned.
- (h) When the ADC instruments are steady, repress the ADC 1 warning light.
- (j) Repeat operations (b) to (h) for System 2.

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### D. Test Angle of Attack Sensor

- (1) Carry out the angle of attack sensor tests given in 34-11-31, Removal/Installation.

### E. Test Landing Gear and Doors Indication

- (1) Carry out the landing gear and doors indication operational test for aural warning:
  - (a) On the First Officer's instrument panel, place the landing gear normal control lever to "NEUTRAL".
  - (b) Place the throttle control levers to 'idle'.
  - (c) Ensure that the droop nose is not in the DOWN position (Ref.27-62-00, Servicing).
  - (d) On the centre console, press the "GRND TEST - L/G HORN" push button and simultaneously place the ADC 2 switch to "ON", an aural warning horn sounds. Continue to press the L/G HORN push button.
  - (e) On the pilots overhead panel, momentarily press Captain's AUDIO CANCEL push button; the aural warning stops.
  - (f) Place the ADC2 switch to "OFF" then "ON"; the aural warning (horn) sounds.
  - (g) On the pilots overhead panel, momentarily press First Officer's AUDIO CANCEL push button; the aural warning stops.
  - (h) Place the droop nose in the DOWN position (Ref. 27-62-00, Servicing); an aural warning (horn) sounds.
  - (j) On the pilots overhead panel, momentarily press Captain's then the First Officer's AUDIO CANCEL push button; the aural warning continues to sound.
  - (k) Release the GRND TEST - L/G HORN push button; the aural warning stops.
  - (l) Place ADC2 ON-OFF switch to "OFF".

### F. Test Weather Radar

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**NOTE:** This test can be carried out inside or outside a hangar, but only the OFF-STBY-TEST push buttons are to be used.  
The use of the NORM-CONT-MAP push buttons is expressly forbidden.

- (1) On the radar indicators located on panels 1-211 and 1-212 ensure that :
  - (a) The IND OFF-LEFT-AHEAD-RIGHT selector switch is at IND OFF.
  - (b) The RANGE MARKS potentiometer is positioned at the counterclockwise stop.
  - (c) The INT potentiometer is positioned at the counterclockwise stop.
  - (d) The scale selector switch 30-100-300 is placed at 100.
  - (e) The filter control is positioned at extreme left.
- (2) On the centre console panel 9-211 ensure that:
  - (a) The OFF push button is engaged while keys STBY-NORM-CONT-MAP-TEST are disengaged.
  - (b) The GAIN control is locked at AUTO.
  - (c) The SYSTEM 1-2 switch is placed at position 1.
  - (d) The TILT control is placed at 15 deg UP.
- (3) Make available electrical ground power as detailed in (Ref.24-41-00 Servicing).
- (4) Switch on the electronics rack ventilation system (Ref.21-21-00).
- (5) Ensure that the following circuit breakers are set:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
ATT-INS 1ST PLT SW SUP	1-213	1F 13	G16
ADI 1ST PLT INS1 SUP & IND	2-213	1F 15	B 7
INS1 HTR SUP		1F 14	E 6

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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
INS1 SUP		1F 20	F 6
No.1 TXRX WEATHER RADAR SUP	13-215	1S 30	B 4
No.1 WEATHER RADAR IND		1S 32	C 4
PLT'S LT TEST SUP	15-215	L1001	E14
ADI 2ND PLT INS2 SUP & IND	13-215	2F 15	C13
INS2 SUP		2F 20	G15
No.2 TXRX WEATHER RADAR SUP		2S 30	E18
No.2 WEATHER RADAR IND		2S 32	E19
INS2 HTR SUP		2F 14	D14
CTR CONSOLE INST LTS SUP	14-216	L 405	B 8
ATT INS 2ND PLT SW SUP	15-216	2F 13	D21
FLT CONT & NAV BUS 14XS	2-213	X 355	H 2
NAV INST BUS 13XS	13-216	X 345	G 4

- (6) On panel 4-211, place the CENTRE CONSOLE PANEL switch in the mid position causing illumination of the control panel and the two radar indicators.
- (7) On panel 2-211, ensure that the ATT.INS1/ATT.INS3 switch is at ATT.INS1.
- (8) On panel 2-212, ensure that ATT.INS2/ATT.INS3 switch is ATT.INS2.
- (9) Operate the INS1 and INS2 systems (Ref.34-45-00, Adjustment/Test).
- (10) Stabilization check:
  - (a) On the control panel:
    - (a1) Engage the STBY push button, which illuminates, the TEST button releases.
    - (a2) Place SYSTEM 1-2 switch at "1".
  - (b) Extend the radome forward along its rails (Ref.

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## MAINTENANCE MANUAL

53-51-11, Servicing), then position the cable to retain the open radome in order to prevent the antenna from contacting with the radome mountings.

(c) On control panel:

(c1) Engage TEST push button, which illuminates, the STBY button releases.

(c2) Place the TILT control at "0 deg".

(11) On the antenna, lift the cover on the antenna support and place the scan disable switch in the 'up' position.

(12) Test radar systems 1 and 2:

(a) Place the droop nose in the 0 deg position (Ref. 27-61-00, Adjustment/Test) and check that the antenna is at 0 deg (antenna horizontal). Manually position antenna at 0 deg azimuth position (straight ahead).

(b) Place droop nose in the 12.5 deg position and check that the antenna is still horizontal and that the angle read on the graduated scale is 12.5 deg  $\pm$  2.5 deg.

(13) On the antenna, place the scan disable switch in the 'down' position and lower the cover.

(14) On the 3CM panel 8-214, place the MSU selector switch (INS 1 and INS 2 systems) at "OFF".

(15) On panel 4-211, place the CENTRE CONSOLE PANEL switch at "OFF"; illumination of control panel and two radar indicators extinguishes.

(16) Trip the following circuit breakers:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
FLT CONT & NAV BUS 14XS	2-213	X 355	H 2
NAV INST BUS 13XS	13-216	X 345	G 4

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- (17) Switch-off the electronics rack ventilation system  
(Ref.21-21-00).
- (18) Switch-off and disconnect electrical ground power  
(Ref.24-41-00, Servicing).

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## MAINTENANCE MANUAL

### VISOR AND DROOP NOSE SELECTOR SWITCH -

#### REMOVAL/INSTALLATION

**WARNING:** OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DETAILED IN 24-00-00.

#### 1. General

The selector switch, for operating the visor and droop nose, is located in the top LH corner of the co-pilot's dash panel.

The switch must be removed from or installed on the panel with the droop nose lever in the fully raised or the fully lowered position.

The 5V caption filaments and 28V specific green filaments cannot be removed or installed individually. They may be changed by removal of the lamp housing with the switch in situ.

#### 2. Visor and Droop Nose Selector Switch

##### A. Equipment and Materials

R

R

R

R

R

R

R

DESCRIPTION

PART NO.

Circuit breaker safety clips

-

Droop nose locking pins (2)

E925045031

Droop nose locking sleeves

E925091000

##### B. Prepare to Remove Selector Switch

(1) If the droop nose is in the lowered position, fit the locking sleeves to the nose actuator jacks; if it is fully raised, fit two locking pins in panel 113CB.

(2) Electrically isolate the switch by tripping the associated circuit breakers. Fit circuit breaker safety clips.

SERVICE

PANEL

CIRCUIT BREAKER MAP REF.

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NOSE 7 1/2 DEG CONT	1-213	M12	Q16
VISOR & NOSE CONT	15-215	M11	F 8
RH DASH INST LTS SUP	13-216	L371	E 9

---

### C. Remove Selector Switch

- (1) Remove the four pan head bolts securing the switch to the panel.
- (2) Withdraw the switch sufficiently to obtain access to the two bayonet lock connectors on the rear; remove the bayonet lock connectors.

### D. Install Selector Switch

- (1) Comply with the electrical safety precautions.
- (2) Ensure that either the locking sleeves are fitted to the nose actuator jacks, or the locking pins are fitted in the nose fairing, as appropriate.
- (3) Ensure that the mating surfaces of the rear connectors are clean and undamaged.
- (4) Connect and lock the bayonet lock connectors to their respective connectors, A and B, on the rear of the switch.
- (5) Position the switch on the panel with UP to the top.
- (6) Refit and secure the switch with four pan head bolts.

### E. Conclusion

- (1) Place the switch control lever to the position, UP or DOWN, whichever corresponds to the droop nose position.
- (2) Remove the safety clips and reset the circuit breakers tripped before removal.
- (3) Remove the locking pins from the nose fairing, or the locking sleeves from the nose actuator jacks.
- (4) Operationally test the droop nose and visor system as detailed in 27-61-00, Adjustment/Test.

EFFECTIVITY: ALL

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## MAINTENANCE MANUAL

### 3. Lamp Housing

#### A. Equipment and Materials

R  
R  
R  
R  
R  
R  
R

DESCRIPTION	PART NO.
Circuit breaker safety clips	-
Droop nose locking pins (2)	E925045031
Droop nose locking sleeves	E925091000

#### B. Prepare to Remove Lamp Housing

- (1) If the droop nose is in the lowered position, fit the locking sleeves to the nose actuator jacks; if it is fully raised, fit two locking pins in panel 113CB.
- (2) Electrically isolate the switch by tripping the associated circuit breakers. Fit circuit breaker safety clips.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
NOSE 7 1/2 DEG CONT	1-213	M12	Q16
VISOR & NOSE CONT	15-215	M11	F 8
RH DASH INST LTS SUP	13-216	L371	E 9

#### C. Remove Lamp Housing

- (1) Lever off the spring loaded caption shroud using the slots at the top and bottom.
- (2) Remove the two pan head screws securing the lamp housing holding the defective filament.

#### D. Install Lamp Housing

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- (1) Comply with the electrical safety precautions.
- (2) Ensure that either the locking sleeves are fitted to the nose actuator jacks, or the locking pins are fitted to the nose fairing, as appropriate.
- (3) Secure the lamp housing by means of its two pan head securing screws.
- (4) Snap on the spring loaded caption shroud.

### E. Conclusion

- (1) Place the switch control lever to the position, UP or DOWN, whichever corresponds to the droop nose position.
- (2) Remove the safety clips and reset the circuit breakers tripped before removal.
- (3) Remove the locking pins from the droop nose fairing, or the locking sleeves from the nose actuator jacks.
- (4) Operationally test the droop nose and visor system as detailed in 27-61-00, Adjustment/Test.

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## MAINTENANCE MANUAL

### HYDRAULIC SYSTEM (VISOR AND DROOP NOSE) - DESCRIPTION AND OPERATION

#### 1. General

R The aircraft hydraulic system provides the power for raising or lowering the visor and droop nose. Movement is obtained by a system of selector valves, jacks and locks (Ref. Fig.001 and 002) using the green circuit for normal operations and the yellow circuit for standby operations. In the event of both normal and standby systems failing, the nose uplocks can be manually released to allow free fall of the nose to the 5 deg. position, which automatically releases the visor uplock. The visor then free falls aided by a spring assister mechanism. During free fall the hydraulic fluid is vented to return via orifices which control the rate of lowering. Control of the normal system is from the co-pilot's dash panel (Ref. 27-60-00).

Two interconnected groups of components are arranged to provide normal and standby sequenced operation of the visor and droop nose. The visor group consists of a shut-off valve, normal and standby selector valves, an uplock and the visor actuating jack. The uplock and jack are mounted in the droop nose and the selector and shut-off valves in the forward equipment compartment.

The nose group consists of an actuator made up of two side by side mounted jacks, twin uplock units and lock selector valves. The actuator is secured to the fuselage front pressure bulkhead and to the droop nose structure in gimbals. The uplocks are mounted on the forward fuselage and the lock selector valves in the forward underfloor equipment compartment.

Hydraulic supplies to the visor jack and the droop nose actuator are finally directed through flexible hoses to allow for visor and nose movement. All other pipes are rigid. Two swivel units secured to the lower part of the fuselage front bulkhead connect the hydraulic pipes in the fixed fuselage to the pipes and components in the droop nose fairing.

R Access to the hydraulic components and pipelines is provided by six panels (Ref. Fig. 002 ). Four are situated in the undersurface of the nose structure to provide access to the components situated in the nose. The other two permit access to components and pipelines in the forward equipment compartment.

Normal raising and lowering of the visor is effected by the green hydraulic circuit after the appropriate solenoid

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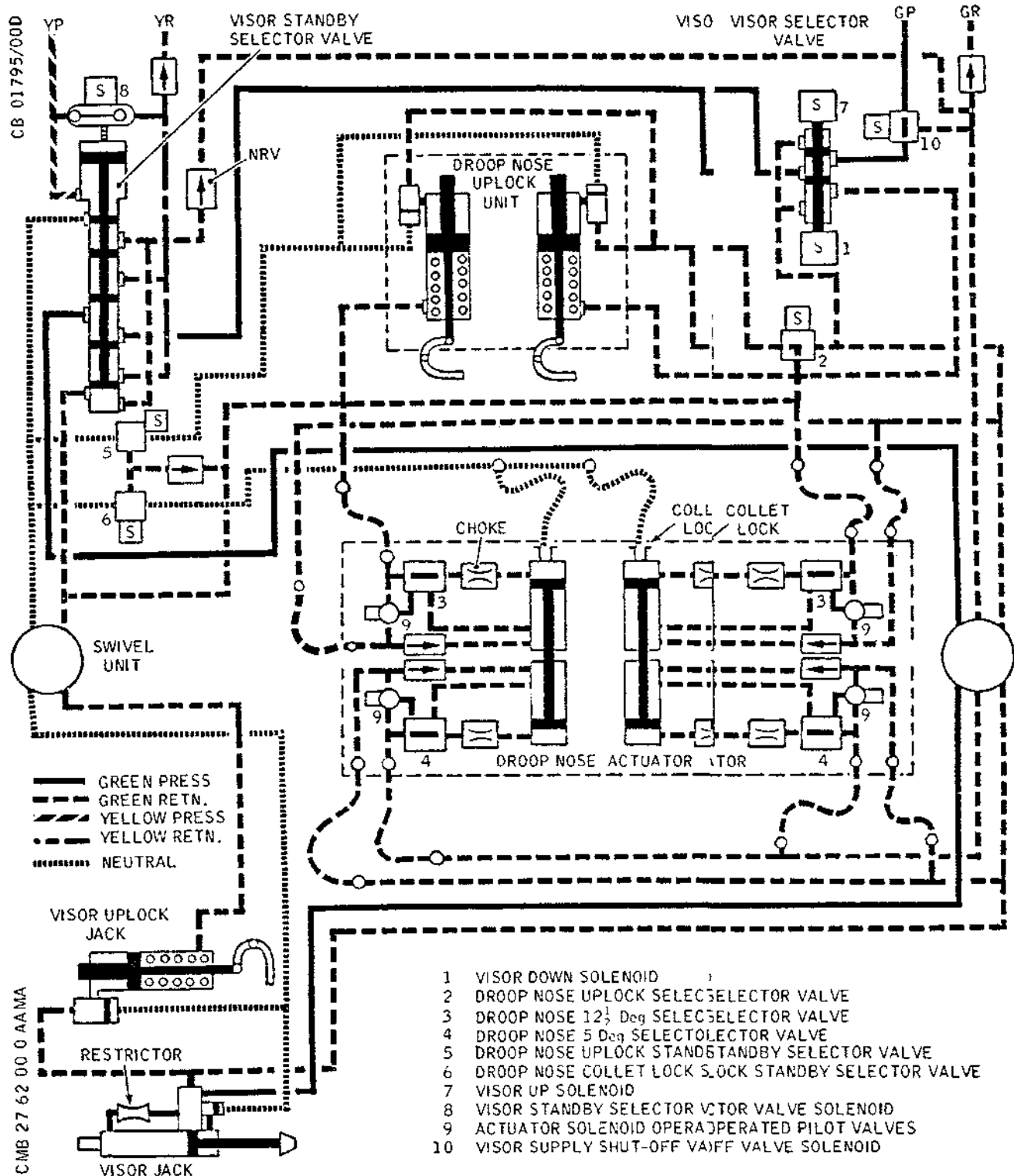
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Visor and Droop Nose Hydraulic System Diagram,  
Green System, Visor Selected Up (Sheet 1 of 3)  
Figure 001

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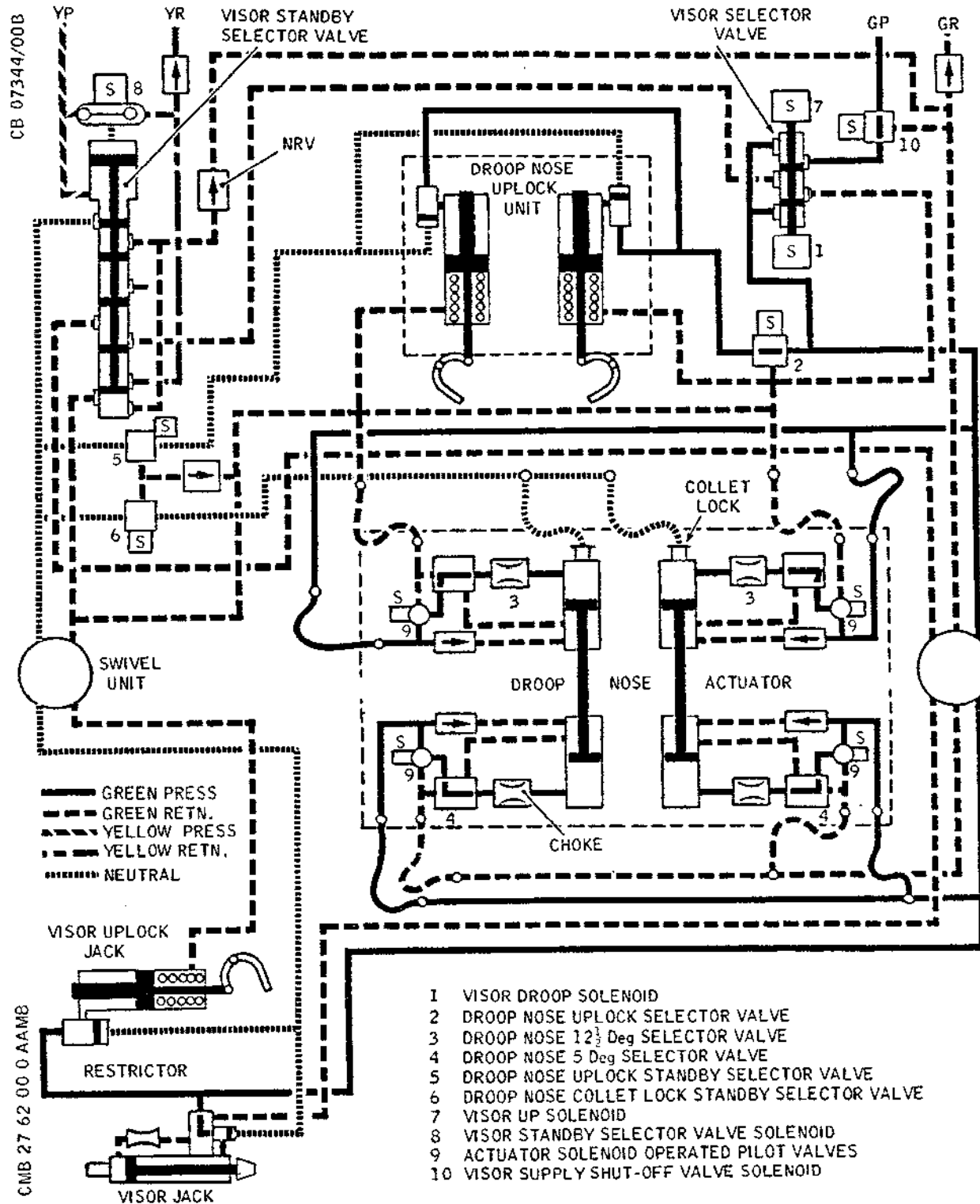
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Visor and Droop Nose Hydraulic System Diagram,  
Green System, Visor and Nose Down (Sheet 2 of 3)  
Figure 001

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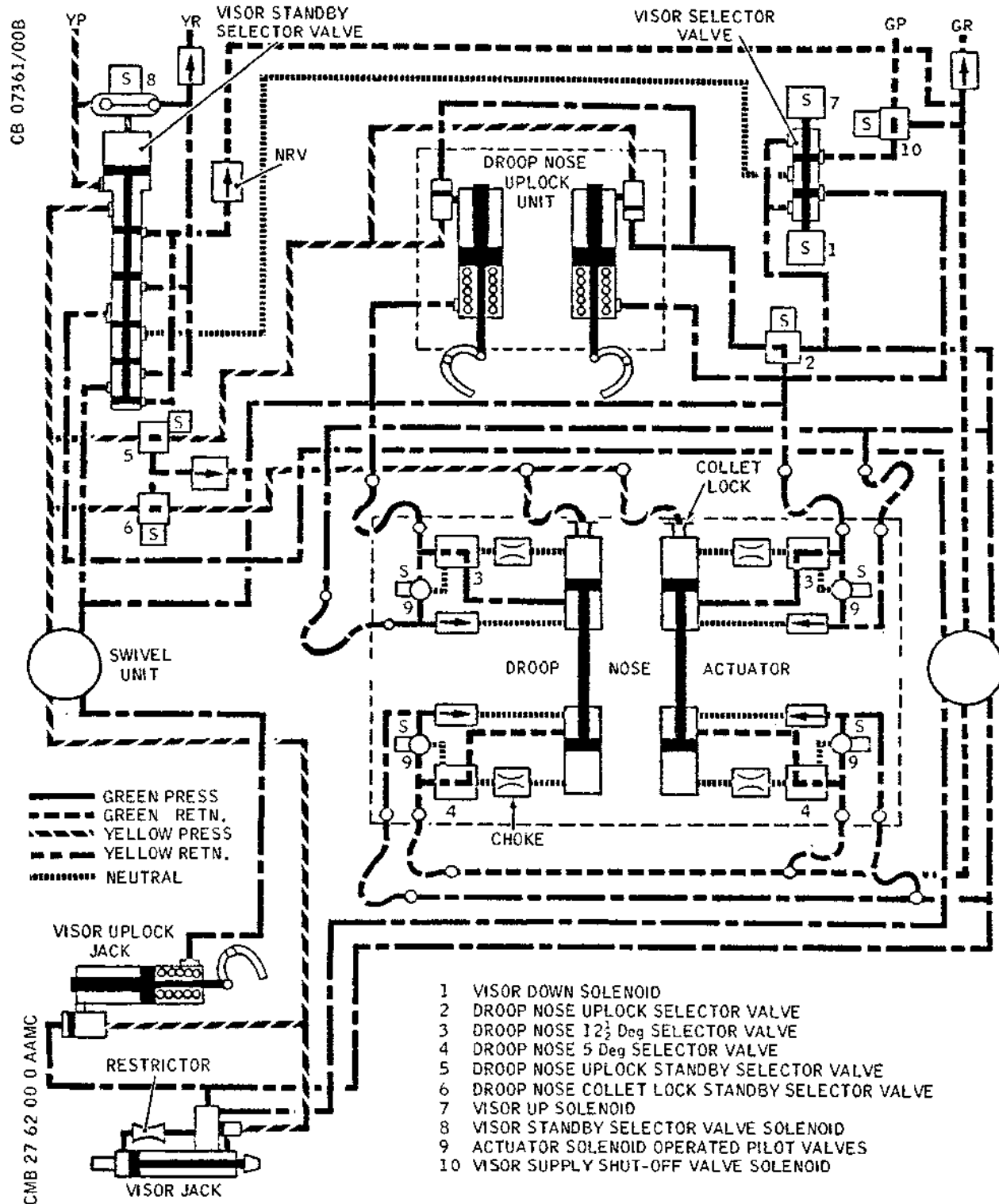
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Visor and Droop Nose Hydraulic System Diagram,  
Yellow System, Visor and Nose Down (Sheet 3 of 3)  
Figure 001

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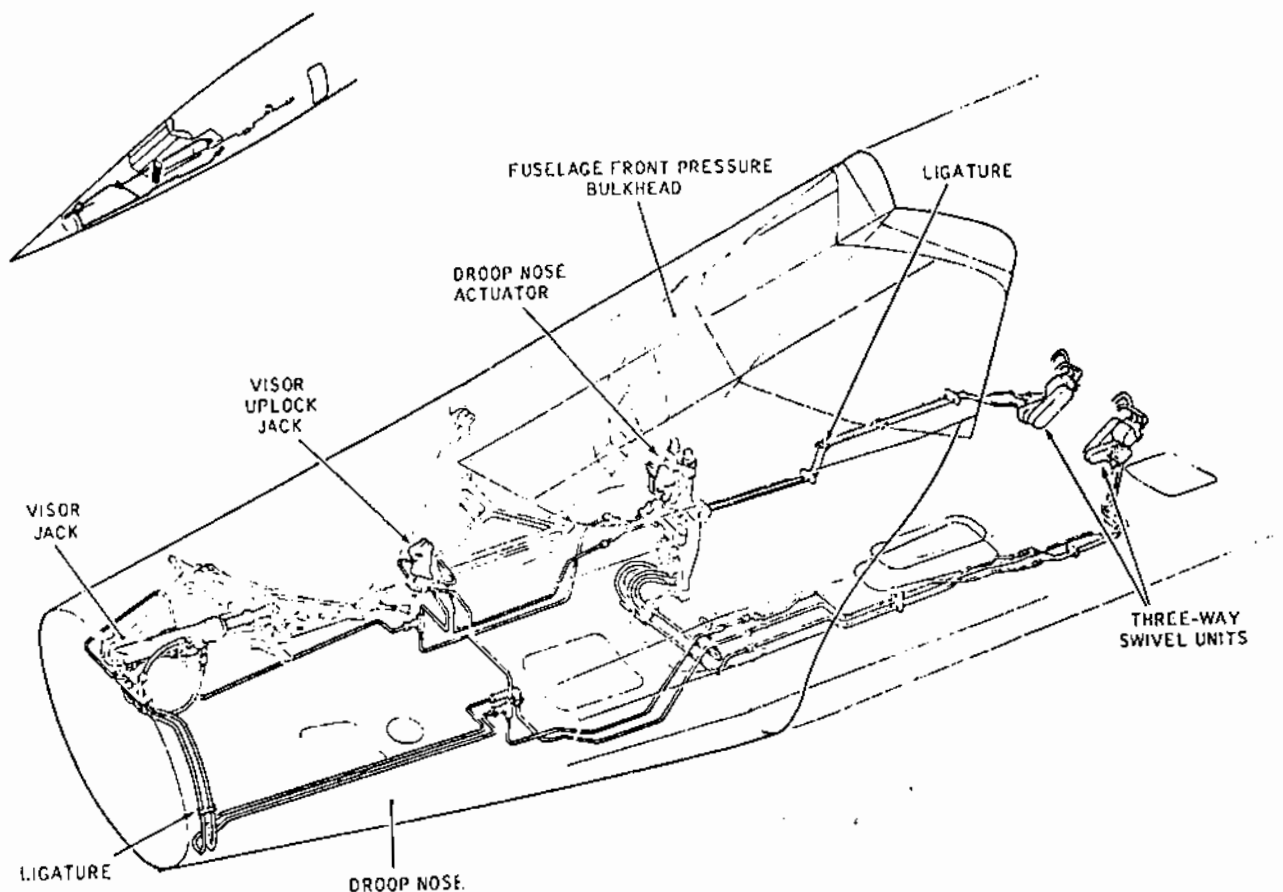
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Visor and Droop Nose Hydraulic System  
(Sheet 1 of 2)  
Figure 002

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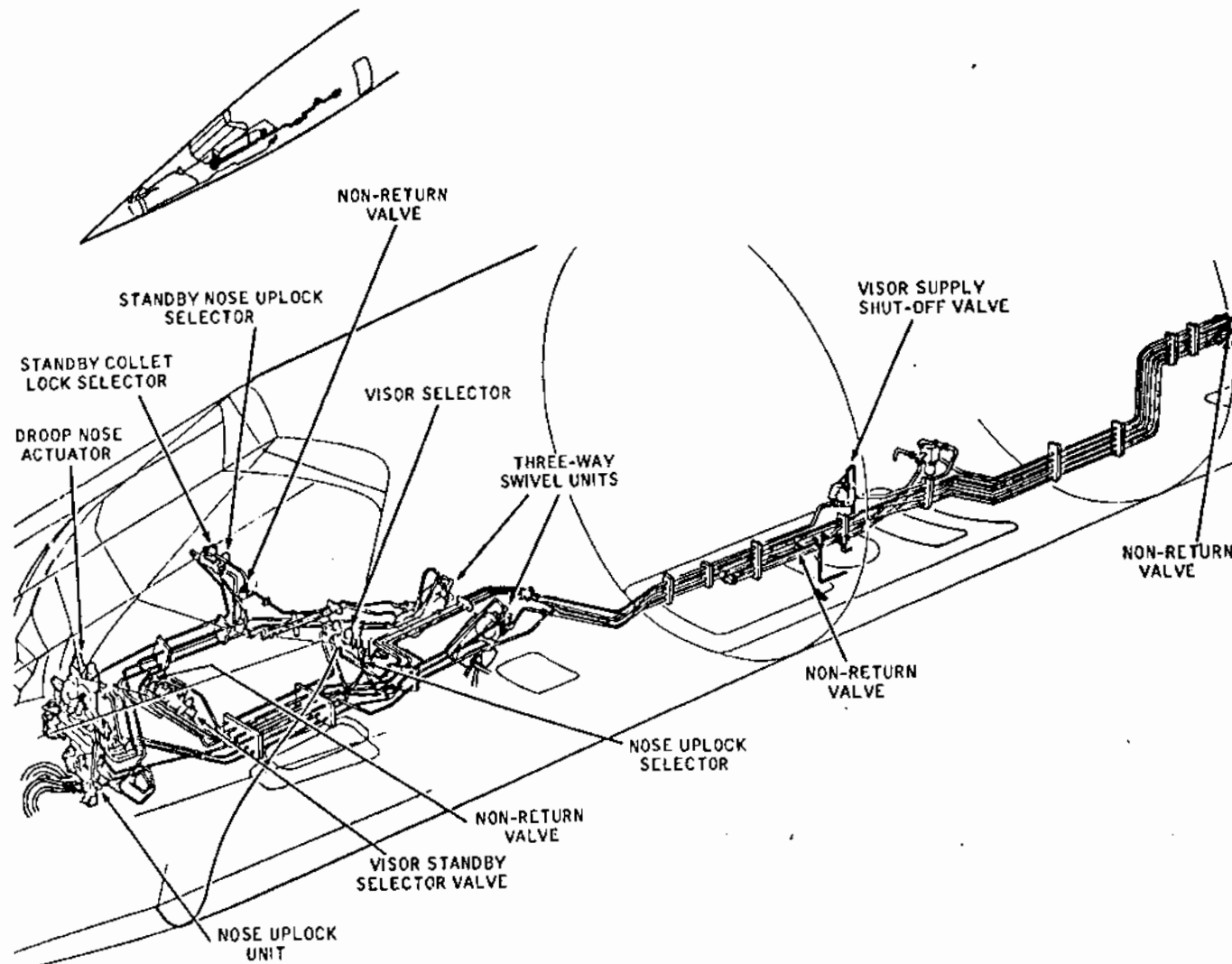
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Visor and Droop Nose Hydraulic System  
(Sheet 2 of 2)  
Figure 002

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of the visor selector valve is energized. Hydraulic supply to the droop nose actuator is taken from the visor down line. When visor down is selected, the selector valve directs pressure to the visor uplock jack and visor jack (to unlock and lower the visor), also to the nose actuator and to the nose lock selector valve ready for a subsequent droop nose down selection. On selection of visor up, pressure is applied to the visor jack to raise the visor.

The standby system of lowering the visor and nose is through a visor standby selector valve. Yellow system pressure can be selected to lower the visor and release the nose uplocks and actuator collet locks for free fall to intermediate and fully down positions.

Hydraulic components are engraved at each port with an identification letter for pipe connection identification. Hydraulic circuit pipelines are identified by a digital code in addition to the standard colour code of a blue and yellow band. The code includes the chapter reference of the ATA 100 specification, the component index number, the port to which the particular pipe is connected and the pipe circuit identification. The complete pipeline code is as follows:-

Standard colour code, 27 0478 E V8 where V is the visor and droop nose pipe function code, and 8 the visor and nose hydraulic sub-system code. This code is printed on glass-fibre PTFE tape for use on flexible hoses and electro-etched on the surface of rigid pipes. It is placed at regular intervals along the pipe length but in some instances the digits referring to the component and port are omitted from the coding in the middle of the pipe.

### 2. Droop Nose Actuator (Ref. Fig. 003 )

The droop nose actuator comprises two jacks, each having two cylinders, one at each end of a piston rod. The jacks are mounted in parallel with their upper cylinders individually gimbal mounted to support members on the fuselage front pressure bulkhead. The lower cylinders are similarly secured to the droop nose. Stroke equivalents to droop nose angle are 5 deg. for the lower cylinders and 7 1/2 deg. for the upper cylinders to give a total 12 1/2 deg. when both cylinders are fully extended.

Solenoid operated selector valves mounted on the jacks control each cylinder. These solenoids are energized to contract the jacks and determine the droop nose position as follows:-

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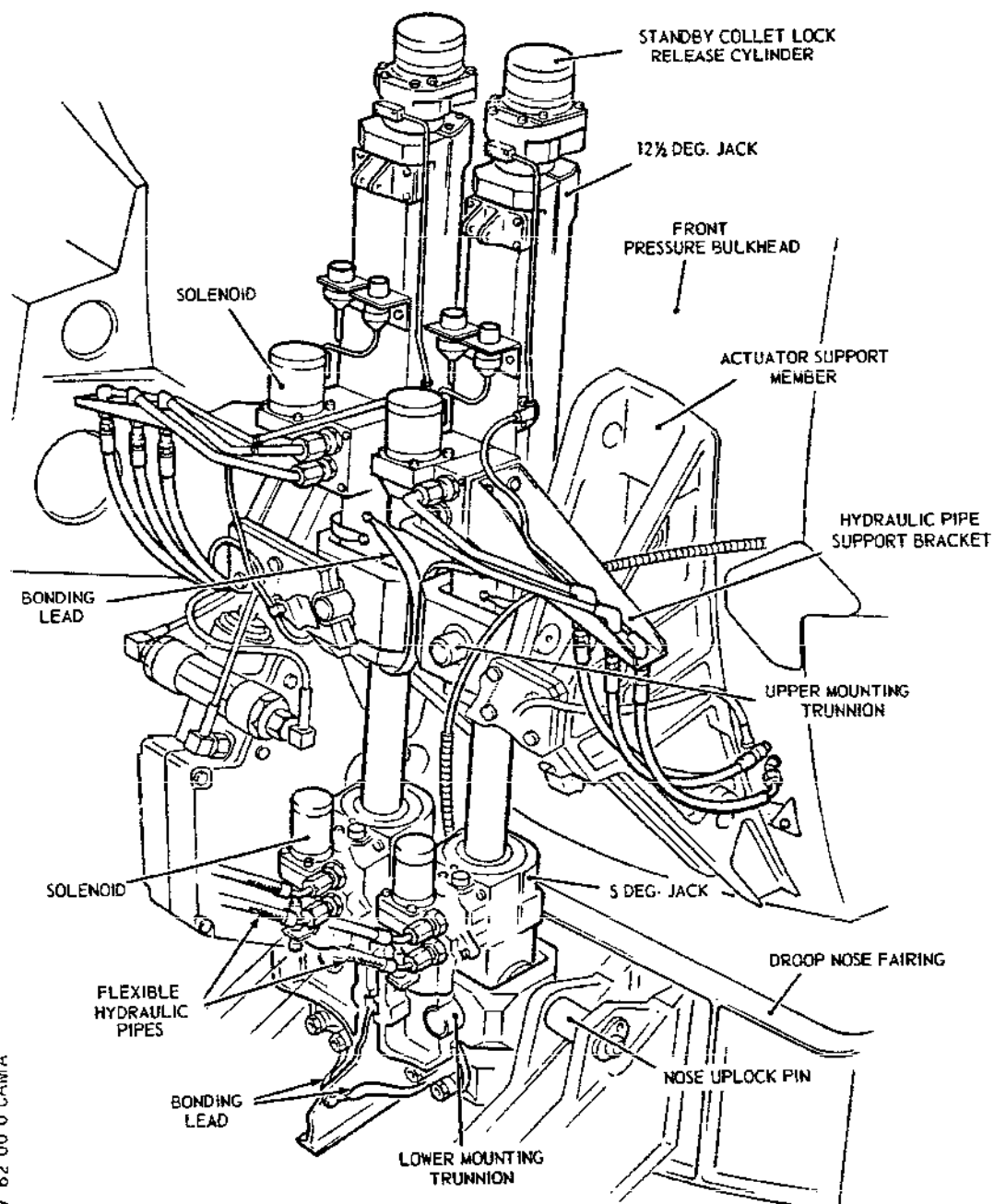
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Droop Nose Actuator (Sheet 1 of 2)  
Figure 003

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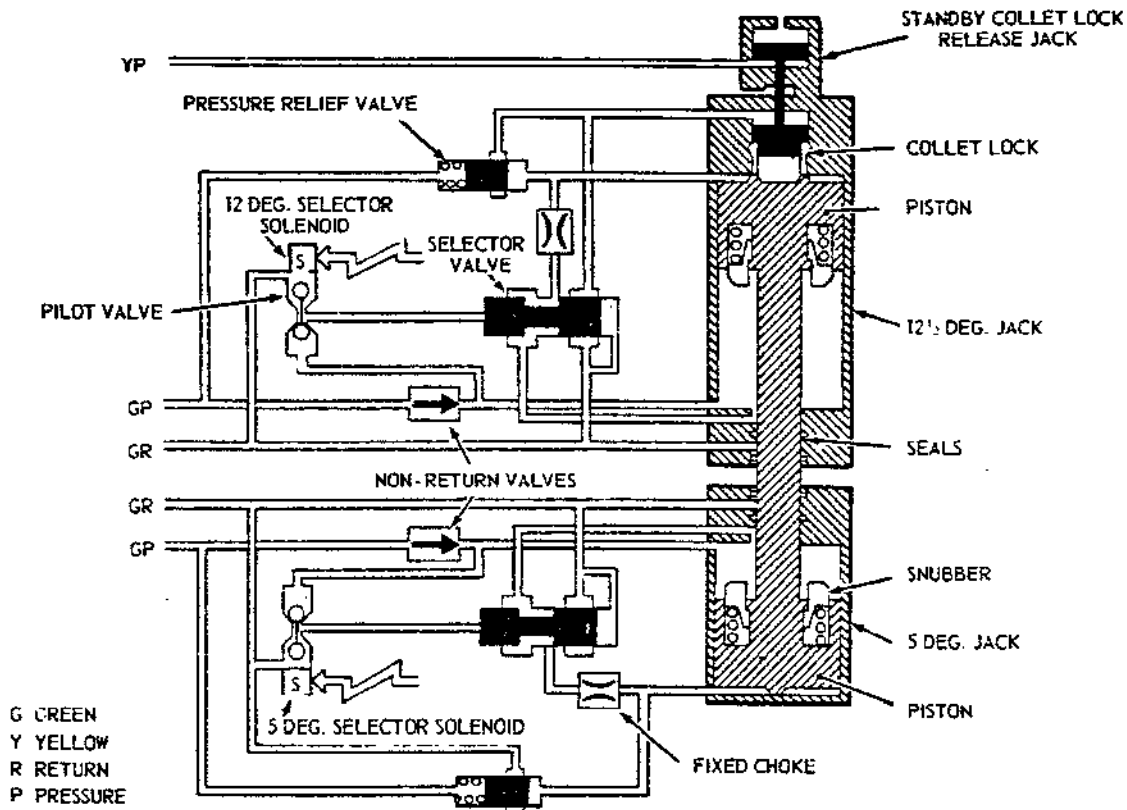
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Droop Nose Actuator (Sheet 2 of 2)  
Figure 003

- 0 deg. - all solenoids energized
- 5 deg. - both 5 deg. selector solenoids de-energized  
- both 12 1/2 deg. selector solenoids energized
- 12 1/2 deg. - all solenoids de-energized

In addition, each 12 1/2 deg. cylinder incorporates a collet lock which engages automatically when the cylinder is retracted. The collet locks prevent the nose lowering below 5 deg. and are hydraulically released when the 12 1/2 deg. solenoids are de-energized to select 12 1/2 deg. droop. Alternatively, each lock may be released by applying pressure to a standby release jack mounted on top of the 12 1/2 deg. cylinder.

The inlet port on each 5 and 12 1/2 deg. jack is connected via a non-return valve to the annular piston chamber allowing it to become pressurized whenever pressure is applied to the jack. The two-position selector valve is supplied from the chamber. It is spring and pressure loaded into down selection and in this position connects the piston chambers to provide

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pressure to both sides of the piston. The piston rod is extended by pressure which is effective on the rod area.

Energizing the selector solenoid (Ref. Fig. 003 ) operates the pilot valve to allow pressure to be applied to the selector valve, moving it into the up position. In this position the full jack chamber connects to return and the piston rod is retracted by pressure on the annular piston area. A small bleed hole drilled through the valve ensures that fluid can escape from the jack in the event of the selector valve sticking in the up position.

Pressure relief valves fitted to each cylinder prevent over-pressurization of the cylinders occurring in the event of a malfunction. They allow fluid in the full jack chamber to escape to return if the pressure exceeds the supply pressure by a pre-determined amount.

The rate of operation of the nose actuator is governed by fixed chokes which control the flow in and out of each jack chamber. In addition, the nose is decelerated during lowering as it approaches the intermediate and fully down position by spring-loaded snubbers in each cylinder. These reduce pressure in the full jack chamber by closing the supply to the selector valve just before the jack piston reaches full travel.

### 3. Nose Uplock Units

Small hydraulic jacks are incorporated in the droop nose uplock units (Ref. 27-61-00) to provide normal release of the uplocks. The jacks are single acting, the piston being returned by the combination of an internal spring and return line pressure. This arrangement ensures that return line transient pressures cannot release the lock. A shuttle valve incorporated in each jack allows for operation of the yellow standby system.

### 4. Visor Jack (Ref. Fig. 004 )

The visor jack is mounted in the droop nose fairing and extends to raise the visor by means of a swinging A-frame as shown in (Ref. Fig. 002 ). In the visor down position the jack bottoms against an internal stop and normally remains pressurized down. In the up position it automatically stalls without bottoming to load the visor into an uplock which off-loads the system by a microswitch operation of the visor selector valve.

A transfer valve, a restrictor valve and a shuttle valve are mounted on the jack body to direct normal and standby

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pressure, as appropriate, to the piston. To extend the jack, pressure from port A is directed by the transfer valve to both sides of the piston, it is then effective on the larger area only. For retraction the valve directs pressure from port B to the annular piston area only and port A becomes the return line. In both the retraction and the extension movements the restrictor valve provides a 4 - 8 second operating time.

Standby jack retraction is achieved by the shuttle valve directing yellow system pressure from port C to the annular chamber. Fluid from the full jack chamber returns via port A.

### 5. Visor Uplock Jack

The visor uplock jack is bolted between the side plates of a twin hook uplock (Ref. 27-61-00), mounted on the front face of the nose fairing mid bulkhead. The jack plunger is retained in the retracted position by the combined action of an internal spring and return line pressure. In the extended position the plunger releases the uplock.

### 6. Visor Selector Valve (Ref. Fig. 005 )

The normal selector valve for visor and droop nose operation is a three position electrically operated valve mounted in the equipment bay (zone 121) beneath the flight compartment pressure floor. It is operated to direct green system fluid to one of two services (raise visor and lower visor) and simultaneously to open the return line from the other service. The main flow of hydraulic fluid is controlled by a slide valve positioned by fluid pressure from two solenoid operated pilot valves.

In the normal de-energized position, pressurized fluid supplied to port A flows to the slide valve and to each of the slide valve centralizing pistons. Equal pressure on each piston centralizes the slide valve and allows return fluid from the service ports C and D to flow past the valve to the return port B.

When one of the solenoids is energized, the relevant pilot valve cuts off the pressure supply to its associated pistons and simultaneously provides pressure relief through return port B. Fluid pressure on the opposing actuating piston moves the slide valve to align the supply port A and the selected service port C. At the same time the slide valve allows return fluid from service port D to pass through port B to return.

When the solenoid is again de-energized, equal supply pressure

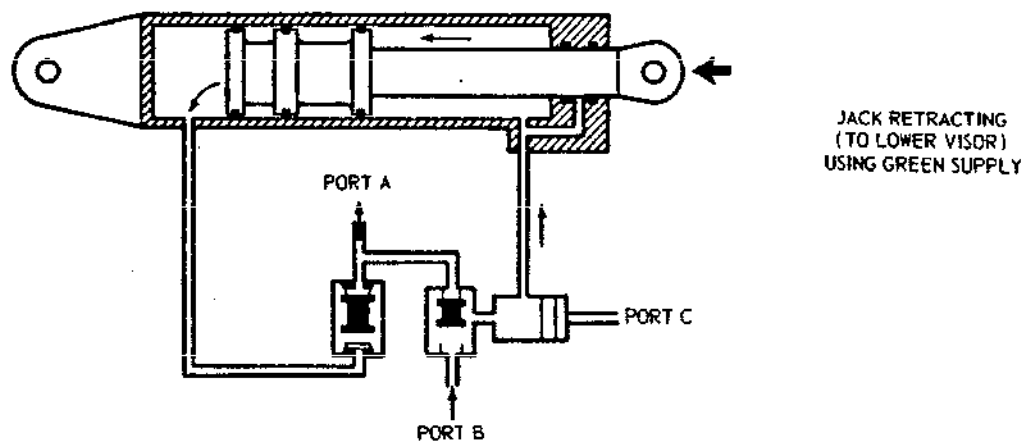
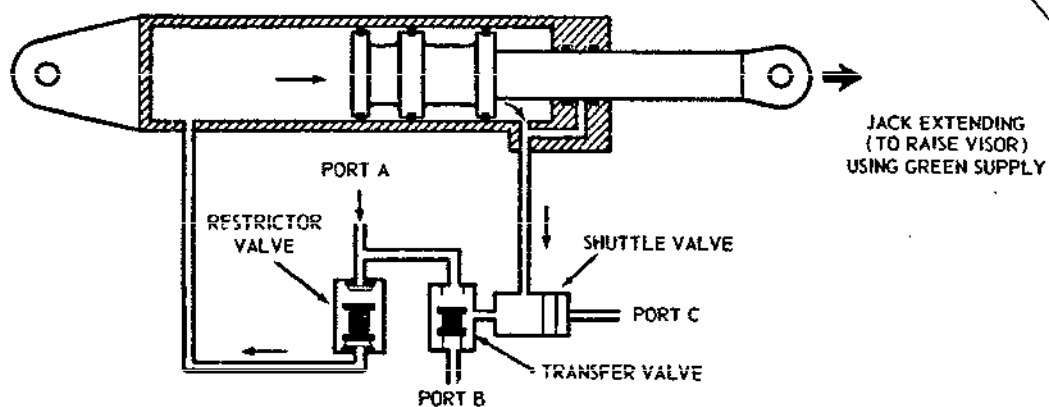
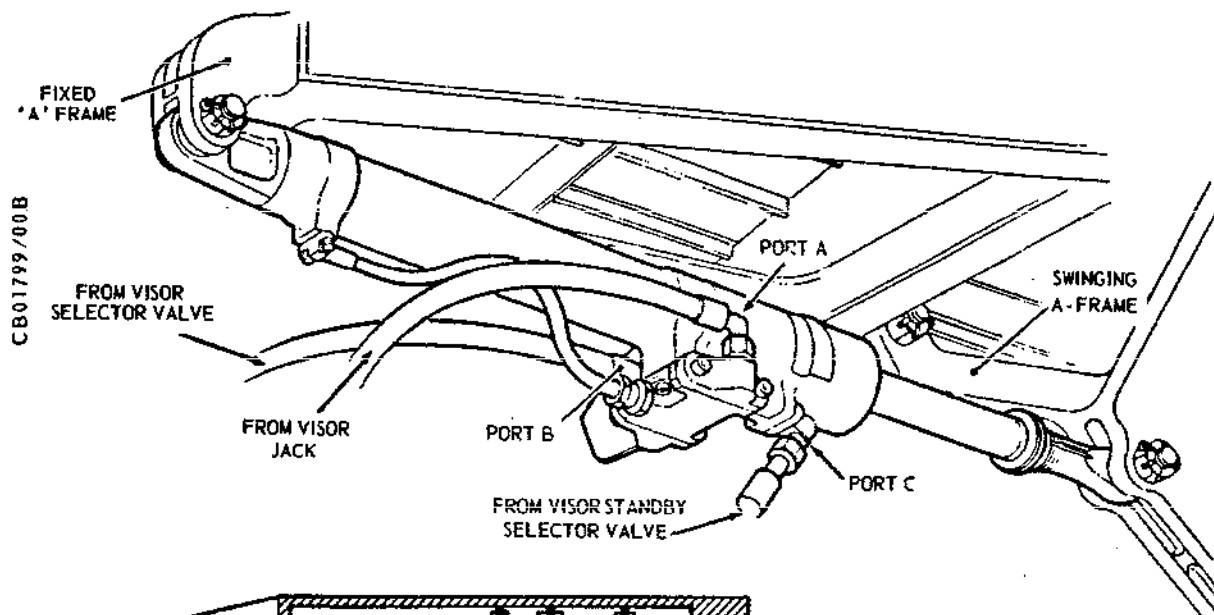
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Visor Jack  
Figure 004

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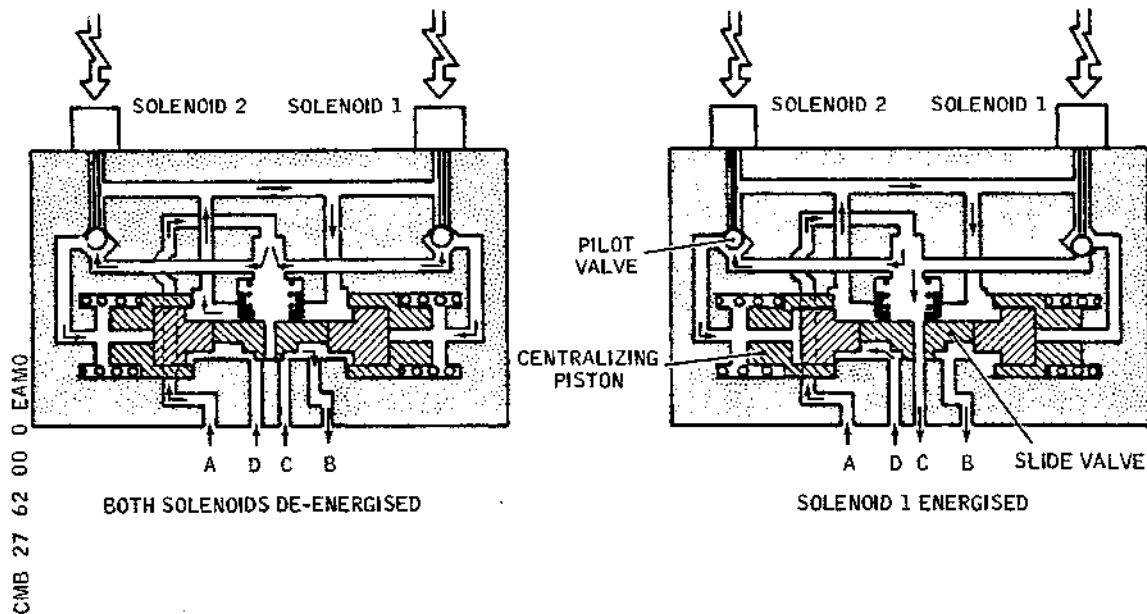
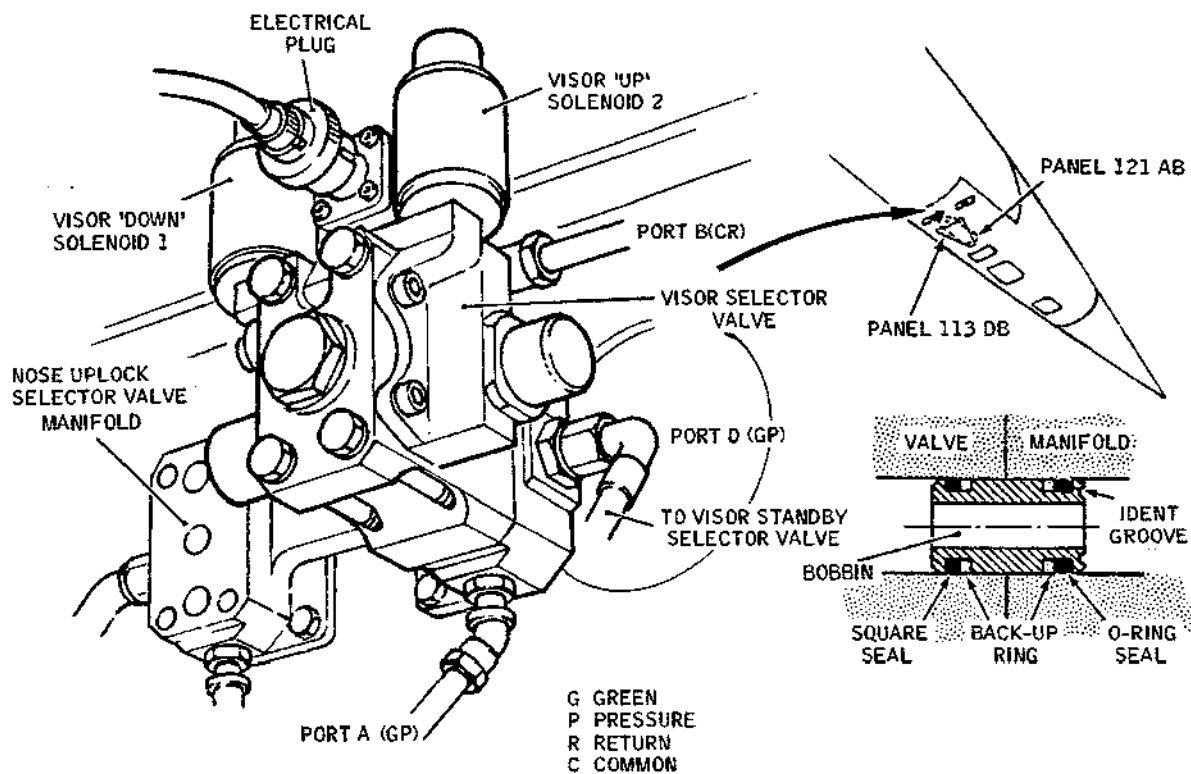
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Visor Selector Valve  
Figure 005

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is applied to both pairs of pistons and the differential loading between the actuating and centralizing piston areas moves the pistons and slide valve back to the central position.

### 7. Visor Standby Selector Valve (Ref. Fig. 006 )

R The visor standby selector valve is a solenoid operated two position valve mounted in the equipment bay (zone 121) beneath the flight compartment pressure floor (Ref. Fig. 002 ). It has seven ports, and it functions by yellow system pressure via a pilot valve to control the standby lowering of the visor and droop nose.

Normally the solenoid is de-energized with the pilot valve directing pressure from port E to the rear of the piston and relieving pressure from the piston head through port C. In this position the spool ducts allow full flow between ports A to B and ports F to H, and restricted flow between ports D and F with all other ports closed.

When the visor standby switch is operated the solenoid is energized to position the pilot valve so that both sides of the piston become pressurized from port E. The differential loading moves the piston and spool to line up ducts for full flow between ports B, C and H, and ports D and E.

When the system controls are returned to normal the pilot valve returns to the de-energized position. In both normal and standby positions the valve returns any leakage, which may occur past the visor jack and visor uplock jack shuttle valves, to the appropriate reservoir.

### 8. Lock Selector Valves (Ref. Fig. 007 )

R Three identical solenoid operated two-position selector valves direct green hydraulic pressure to provide normal release of the droop nose uplocks and yellow pressure to provide standby release of the nose uplocks and 5 deg. collet locks. All three valves are situated in the equipment bay (zone 121) beneath the flight compartment pressure floor (Ref. Fig. 002 ).

The normal uplock selector valve is supplied by the green system from the visor down line, which is pressurized when the visor is selected down and depressurized when the visor is selected up. The two standby lock selector valves are both supplied by the yellow system from the visor standby selector valve. The return ports of all three valves are piped to the common return port of the visor standby selector valve.

The main flow from the lock selector valves is controlled

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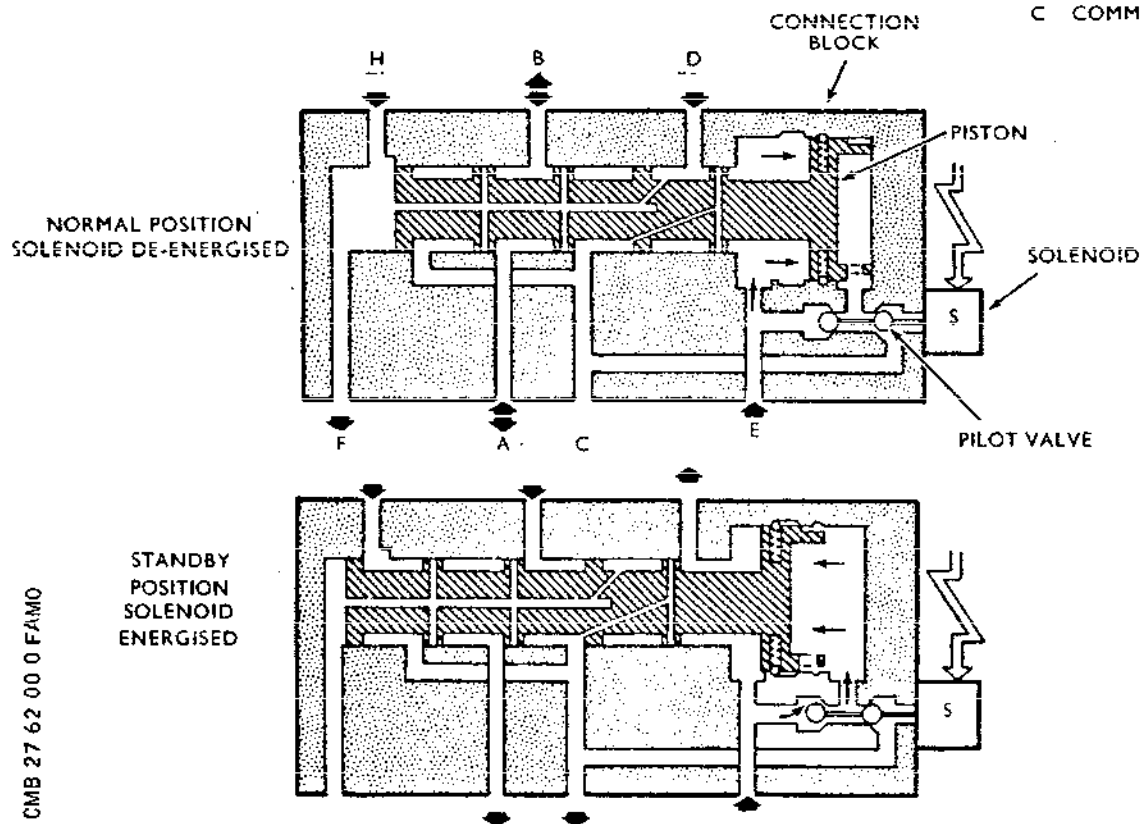
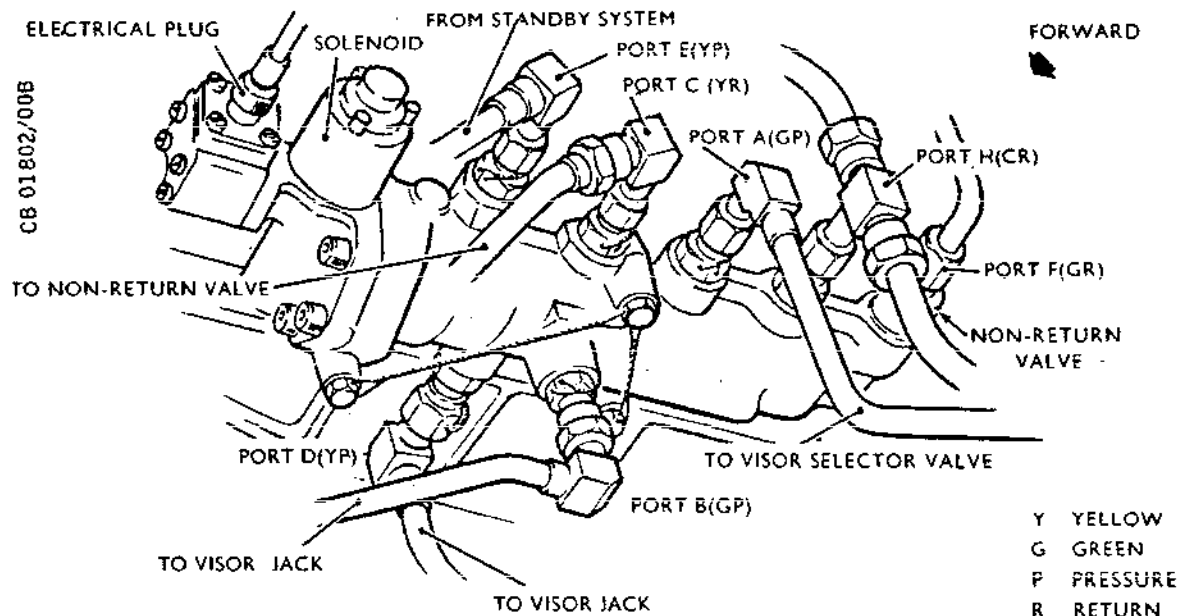
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Visor Standby Selector Valve  
Figure 006

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by a slide valve actuated by fluid pressure via a solenoid operated pilot valve, and two opposing pistons of different diameters. In the normal position the solenoid is de-energized and fluid from supply port A is applied to both pistons. Area differential between the two pistons results in the larger piston being retained at the limit of its stroke. In this condition the slide valve cuts off the flow from port A to service port C and allows any return fluid entering the valve to pass to return port B.

When the solenoid is energized the pilot valve operates to relieve the large cylinder pressure via return port B and directs supply pressure solely to the small opposing piston. In this condition the pressure acting on the smaller piston moves the slide valve to connect supply A to serve C and close off return B.

### 9. Non-return Valves

R Four spring-loaded non-return valves are incorporated in the  
R return lines of the hydraulic system. One valve is situated  
R beneath the forward vestibule floor, (Zone 123), and the  
R other three are beneath the flight compartment floor (Zone-  
R 121). Three of the valves ensure minimum fluid loss in the  
R event of system failure, one being fitted to the standby  
R selector valve green return connection (Ref. Fig. 006 ) and one  
R in each of the green and the yellow return lines  
R (Ref. Fig. 002 ). A fourth valve is fitted in the return pipe-  
R line from the standby collet locks and standby nose uplock  
R selector manifold (Ref. Fig. 002 ) to prevent pressure pulses  
R displacing the shuttle of the nose uplock jacks.

### 10. Visor Supply Shut-off Valve

A solenoid operated two-position selector valve is fitted in the green hydraulic system supply line and is controlled by the visor and droop nose normal selector switch to shut-off the hydraulic supply to the visor and droop nose system when the visor and nose are up.

The valve (ident No.5116) is mounted on a manifold in the forward equipment bay beneath the flight compartment floor and is similar to the lock selector valves (Ref. Fig. 006 ). Three hydraulic pipes connected to the manifold are for green system supply to the valve (port A), the delivery from the valve to the visor and droop nose system (port C) and the system return (port B).

When the valve solenoid is de-energized the pilot valve is open. Fluid enters port A and passes to both ends of the

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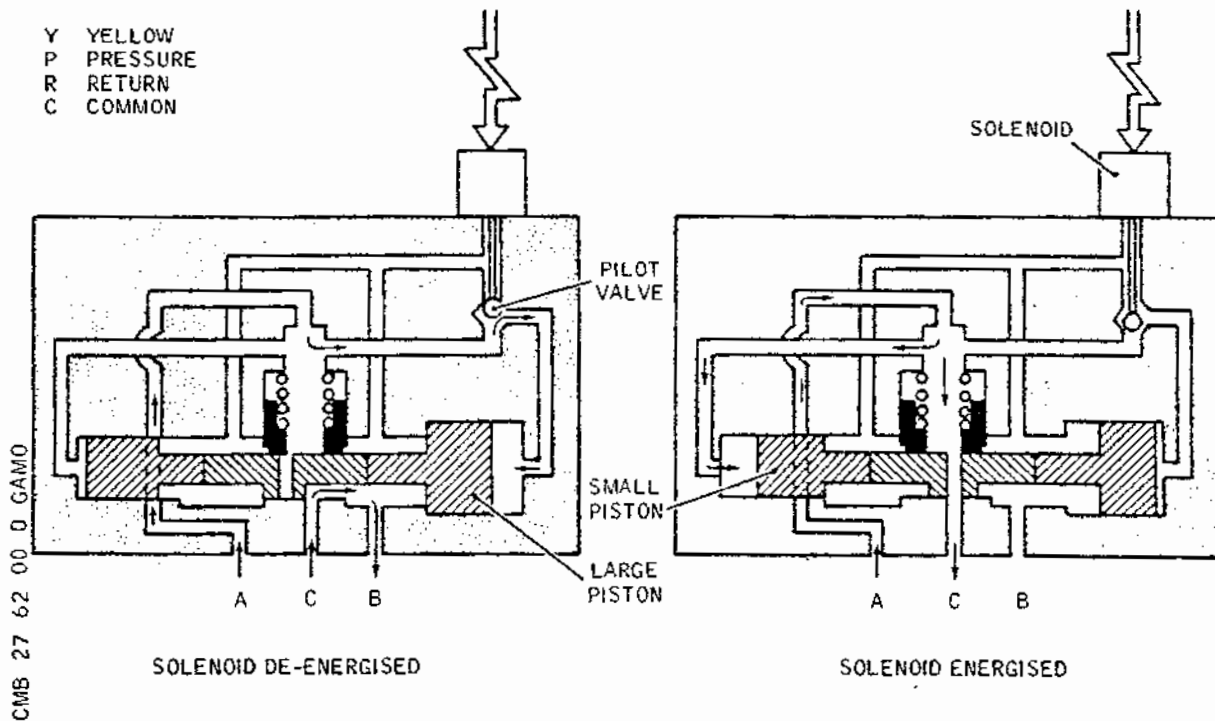
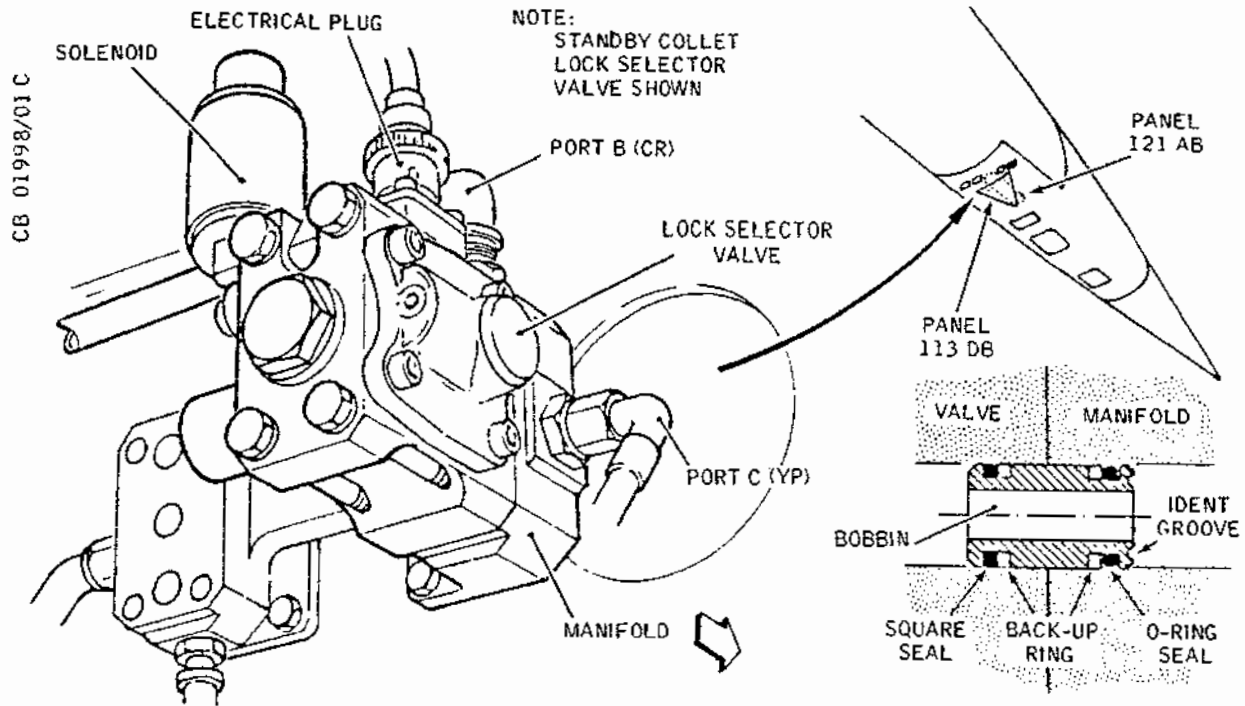
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Lock Selector Valve  
Figure 007

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piston. The pressure differential on the larger end of the piston overcoming the pressure on the small end moves the piston to close delivery port C, but fluid from port C may return via port B.

When the valve solenoid is energized the pilot valve is closed. Fluid entering port A is directed to the small end of the piston which moves to permit the supply entering port A to pass out of port C. Fluid displaced by the large piston returns via the pilot valve to port B.

### 11. Hydraulic Swivel Units

The hydraulic supplies to the visor and droop nose system are carried from the fixed fuselage pipelines to the droop nose fairing pipes and components through two manifold mounted swivel units. These are mounted on the lower part of the fuselage front bulkhead, one on the left and one on the right-hand side just forward of the nose fairing hinge (Ref. Fig. 002 ). The manifolds are attached to the aft face and the swivel units to the forward face of the bulkhead. Hydraulic sealing between the manifolds and the swivels is effected by the use of sliding bobbins fitted with seals.

Each unit consists of two pivoting arms having three fluid ducts. One of the ducts in the right-hand unit is not used and is blanked off.

### 12. Operation (Ref. Fig. 001 )

The visor and droop nose hydraulic circuits are interconnected and sequenced to provide four possible selections:-

Visor up, nose up

Visor down, nose up

Visor down, nose intermediate (5 deg. down)

Visor down, nose down (12 1/2 deg.)

With the visor and droop nose locked up, all solenoids are de-energized, the visor shut-off valve has closed the green pressure supply line, and the entire circuit is connected to green return through the visor normal and standby selector valves. When the visor is selected down, solenoids (1), (3), (4) and (10) shown in (Ref. Fig. 001 ) are energized, the shut-off valve opens and the green system pressure is applied to the nose lock selector valve (2) and to all four cylinders of the droop nose actuator. This causes the actuator jacks to retract pulling the nose into the uplocks. The visor uplock is

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released and the visor lowers.

Selection of 5 deg. nose down causes the nose lock selector valve (2) to be energized and green system pressure to operate the uplock jacks. The 5 deg. selector solenoids remain energized until both uplocks have released and are then de-energized to lower the nose. Selection of nose fully down causes the 12 1/2 deg. selector solenoids to be de-energized, the actuator collet locks released and the nose to be lowered to 12 1/2 deg. Raising the nose is achieved by energizing the 12 1/2 deg. selector solenoids for the 5 deg. position and the 5 deg. solenoids for the 0 deg. position. Both collet locks and uplocks engage automatically.

Selection of visor up de-energizes the 5 deg. selector solenoids (4) and the down solenoid (1) and energizes the visor up solenoid (7) in the selector valve to apply pressure to the visor jack. Pressure is applied to both areas of the jack by means of a transfer valve and the jack extends to raise the visor. Operation of an uplock microswitch de-energizes solenoids (3), (7) and (10) to off-load the nose 12 1/2 deg. jacks and the visor selector valve and to close the visor supply shut-off valve.

The yellow hydraulic system provides power for lowering the visor and droop nose in the event of normal system malfunction. Selection of the system isolates the normal selector valve and directs pressure through the visor standby selector valve (8) to the visor uplock, visor jack, nose standby uplock selector (5) and the standby collet lock selector (6). The applied pressure releases and lowers the visor and unlocks the nose for free-fall lowering to a selected 5 deg. or 12 1/2 deg. position. During standby lowering of the visor a volume of fluid corresponding to the visor jack rod volume is transferred from the green to the yellow system. The fluid levels of the hydraulic reservoirs must therefore be checked after each standby lowering and corrected if necessary.

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## MAINTENANCE MANUAL

### HYDRAULIC SYSTEM (VISOR AND DROOP NOSE) - REMOVAL/INSTALLATION

**WARNING:** OBSERVE THE HYDRAULIC SAFETY PRECAUTIONS DETAILED IN CHAPTER 29.  
BEFORE ENTERING THE DROOP NOSE FAIRING FIT THE GROUND SAFETY LOCKING DEVICES (Ref. Fig. 401).

#### 1. General

Hydraulic piping in the forward underfloor equipment bay and the droop nose comprises rigid pipes and, where necessary to permit mechanical movement, flexible hoses. All piping carries system identification. Rigid pipes are clamped to the structure between component and bulkhead unions and, where necessary are ligatured to prevent vibration (Ref. Fig. 402).

#### 2. Hydraulic Piping

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit breaker safety clips	-
*Locking pins (2), droop nose (up)	E925045031
*Locking pins (2), visor (up)	E925045030
*Locking sleeves, nose actuator jacks (down)	E925091000
*Nomex cord (polyamide fibre) spec. CM346/CM142 (Ref. 20-30-00, No.163)	-
*Silastic RTV731, self-curing silicone adhesive (Ref. 20-30-00, No.364)	-

\*To be used only if required.

##### B. Prepare to Remove Pipe

- (1) Gain access in the rear underfloor equipment bay and depressurize the Green and the Yellow hydraulic systems by operating the manual pressure relief units in zone 151 and the pressure relief valves on the base of the relevant hydraulic reservoirs (zone 153).

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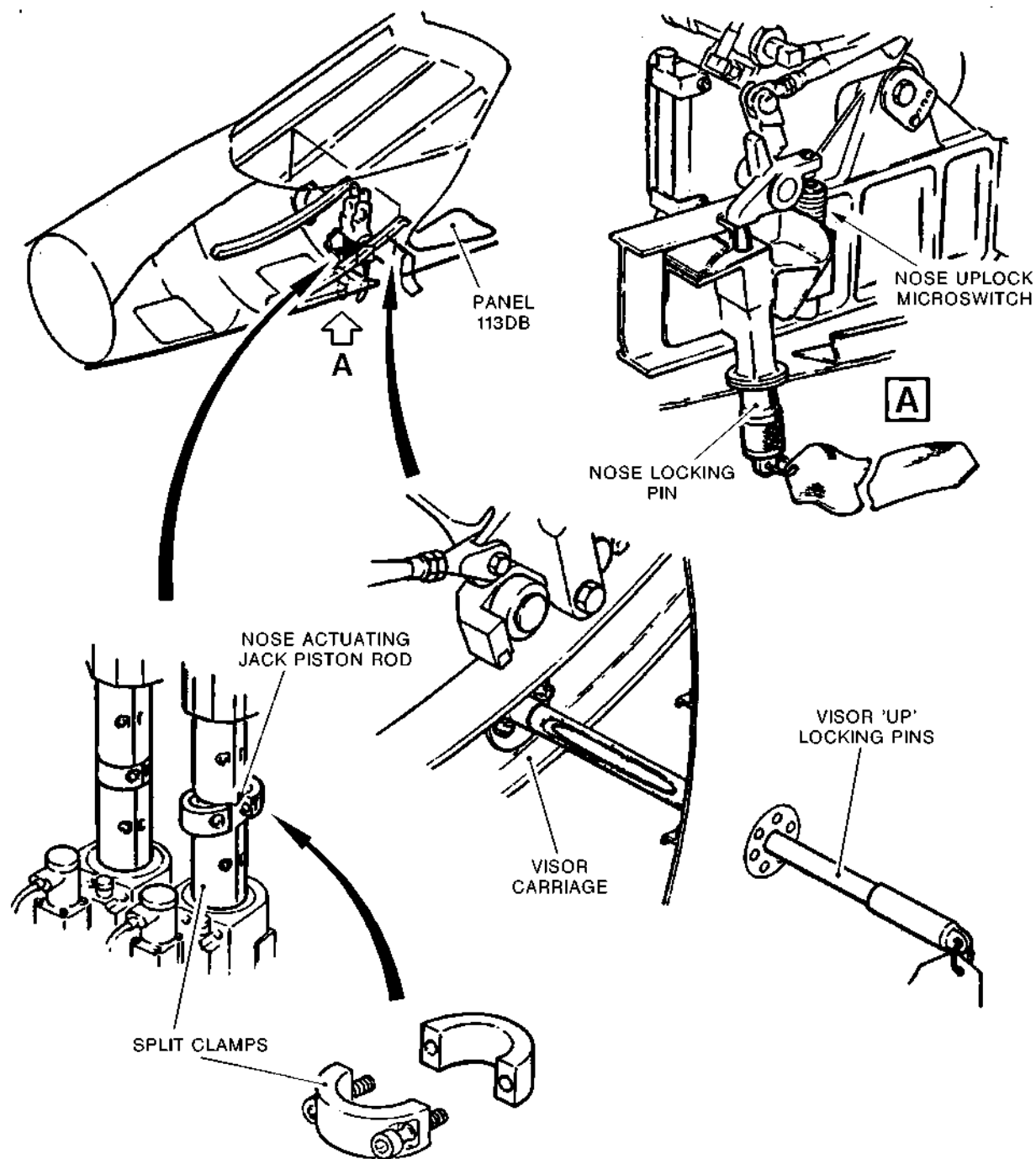
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## MAINTENANCE MANUAL



Ground Safety Equipment  
Figure 401

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- R (2) Trip, safety and tag the following circuit breakers to  
R electrically isolate the visor and nose normal and standby  
R controls.

R					
R		SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
R		NOSE 7 1/2 DEG CONT	1-213	M 12	Q16
R		NOSE/VISOR STBY LOWER SUP		M 13	Q17
R		VISOR & NOSE CONT	15-215	M 11	F 8

- (3) Fit ground equipment to prevent operation of the visor and droop nose (Ref. Fig. 402):
- (a) Fit a visor up locking pin in each side of the nose if the visor is raised.
  - (b) Fit the droop nose up locking pins in the nose uplocks if the visor is down and the nose up.
  - (c) Fit the locking sleeves to the nose actuator jacks if the nose is down.

### C. Remove Pipe

- (1) Release the pipe(s) at the clamp block(s).
- (2) Cut away any ligatures securing the pipes together. Note their position for re-assembly.
- (3) Unscrew the pipe end coupling nuts. Be prepared with a clean receptacle to catch hydraulic fluid spilling from the pipe ends and remove the pipes. Fit blanks to the open pipe ends and unions.

### D. Prepare to install

- (1) Ensure that the safety precautions instituted in para. B are still in application.
- (2) If a new pipe is to be fitted ensure that:
  - (a) It is flushed through as instructed in 20-23-13, before assembly into the aircraft.
  - (b) All system identification labels are fitted and intact (Ref. Chapter 29).
  - (c) The pipe is clean and undamaged.

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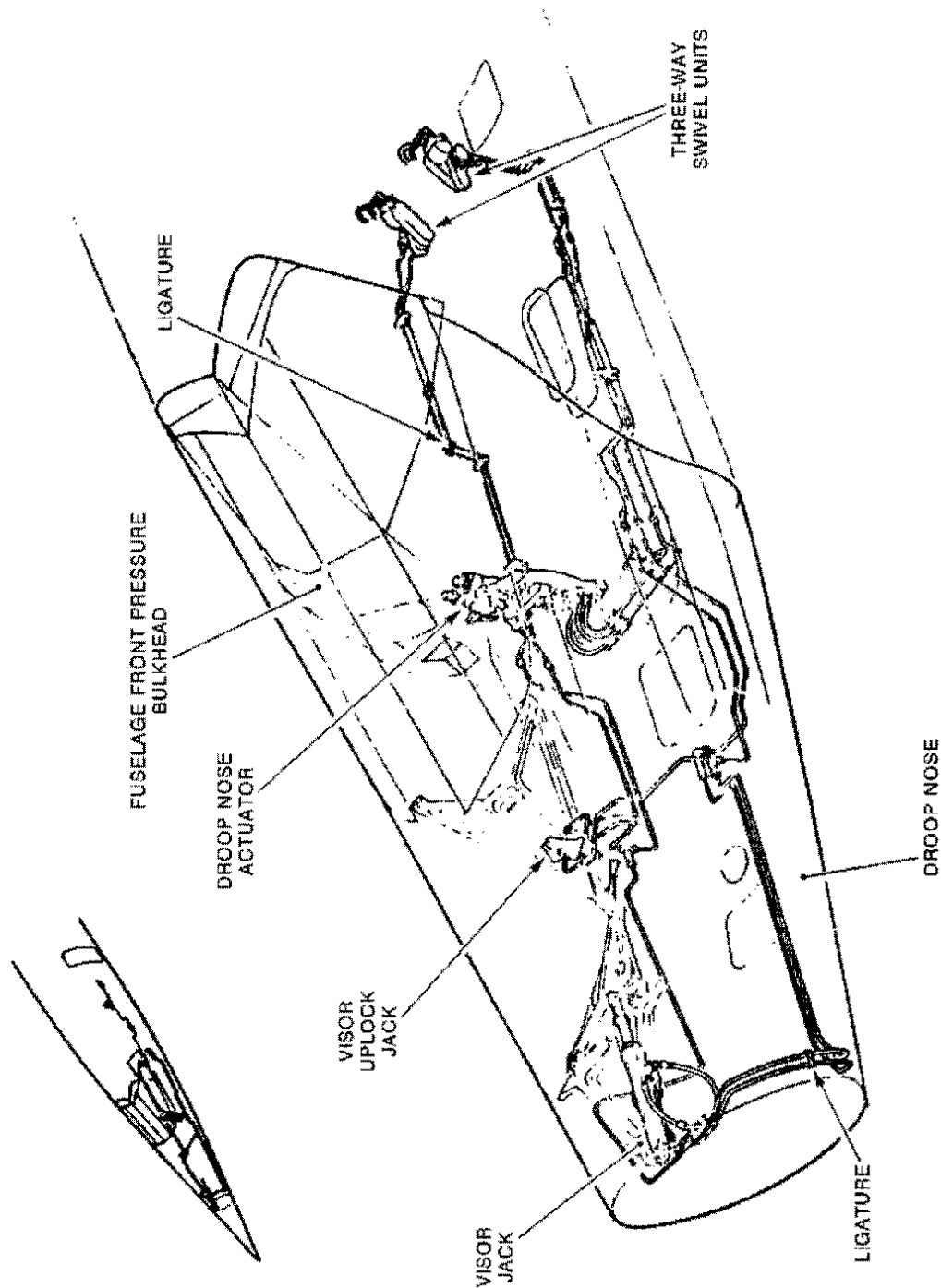
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Hydraulic Piping - Visor and Droop Nose  
System (Sheet 1 of 2)  
Figure 402

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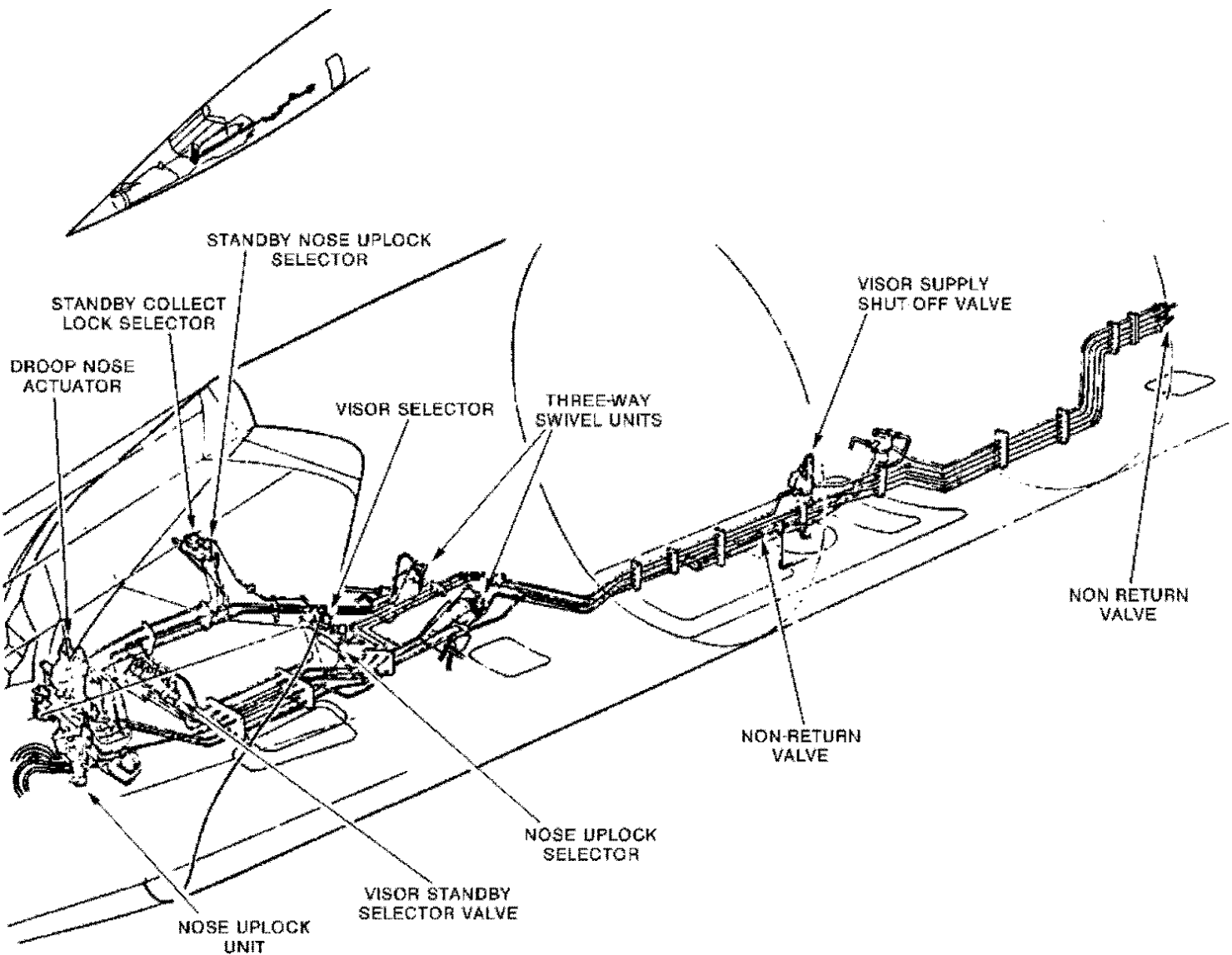
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Hydraulic Piping - Visor and Droop Nose  
System (Sheet 2 of 2)  
Figure 402

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### E. Install Pipe

- (1) Fit the pipe into the aircraft ensuring that it is correctly located in the clamp(s) and connect the pipe coupling nuts to the unions. Torque tighten the nuts in accordance with 20-23-12, as follows: on 0.25 in (6.35 mm) dia. pipes to between 95 and 115 lbf in (1.08 and 1.30 mdaN) and on 0.375 in (9.52 mm) dia. pipes to between 160 and 180 lbf in (1.80 and 2.04 mdaN).
- (2) Fit the top half of the clamp assembly (Ref. 20-21-21) ensuring that all spacers are correctly fitted. Tighten the clamp nuts to a torque value of 17 lb in (0.2 mdaN).
- (3) If the pipes are to be secured with ligatures secure them in accordance with 20-23-14 and seal the knot and cord ends with Silastic as instructed in 20-25-12.

R

### F. Conclusion

- (1) Reset the circuit breakers previously tripped.
- (2) Remove the ground safety locks previously fitted.
- (3) Carry out the appropriate operational test of the visor and droop nose (Ref. 27-61-00, Adjustment/Test) and check the pipe for leaks.

NOTE: The visor and droop nose hydraulic system is self-bleeding but, if difficulty is experienced in clearing the system of air, it may be necessary to bleed in certain locations as instructed in the bleeding procedure given in 27-62-00, Adjustment/Test.

- (4) Refit access panels.

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### HYDRAULIC SYSTEM (VISOR AND DROOP NOSE) - ADJUSTMENT/TEST

**WARNING:** OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS IN 24-00-00.  
OBSERVE THE HYDRAULIC SAFETY PRECAUTIONS IN CHAPTER 29.  
BEFORE ENTERING THE DROOP NOSE FAIRING FIT THE GROUND  
SAFETY LOCKING DEVICES (Ref. Fig. 501 ).

#### 1. General

An air bleeding procedure and a function test for the visor and droop nose hydraulic systems using a ground hydraulic rig and ground electrics are given for use as stipulated after the replacement of system hydraulic components. Also included is a function test for the emergency release system and a separate function test for the visor for use when it is necessary to test only visor components. For complete visor and droop nose system indication refer to the operational test given in 27-61-00, Adjustment/Test.

#### 2. Air Bleeding (Ref. Fig. 503 )

##### A. General

R The visor and droop nose hydraulic system is self-  
R bleeding but following replacement of the system  
R complete or where trouble shooting of a fault indicates  
R that air could be the cause of the problem, then the  
R following procedure (Ref. para. 2D) may be used.

R All bleeding in these procedures is carried out using  
R the ground hydraulic rig with the pressure and flow  
R reduced to the minimum necessary to ensure bleeding.  
R Where bleeding is being carried out as the result of  
R fault diagnosis it will not be necessary to bleed the  
R whole system but only the affected sub-system.

The procedures for the nose and visor commence from the visor down nose down positions in case the bleeding has to follow the use of the visor and/or nose ground equipment screwjacks after which the visor and/or nose must be left in the down position. If left in the raised position the actuating jacks may not be filled with fluid and if lowered the visor and nose would free-fall with little or no damping action from the jacks.

##### B. Equipment and Materials

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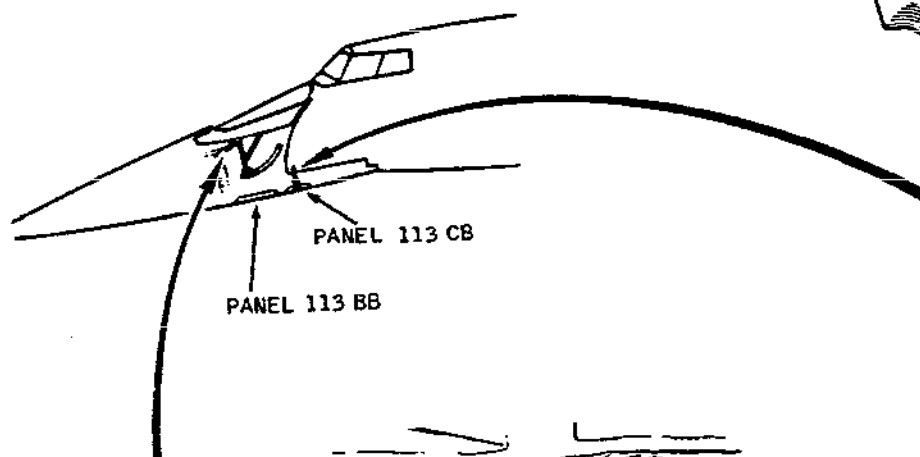
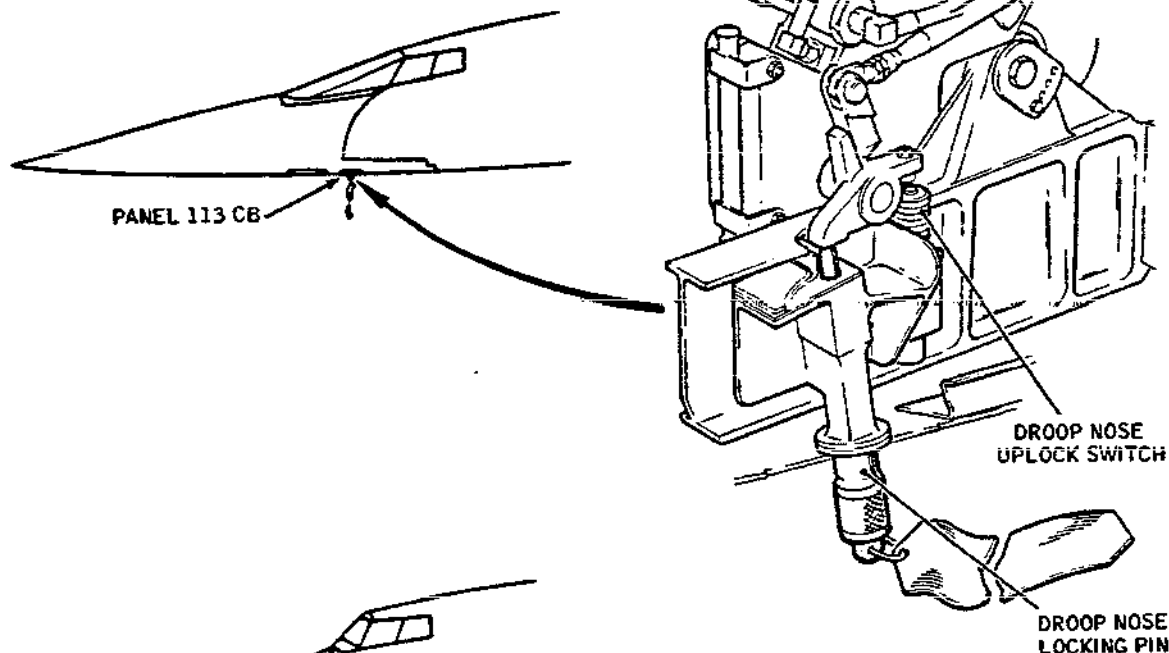
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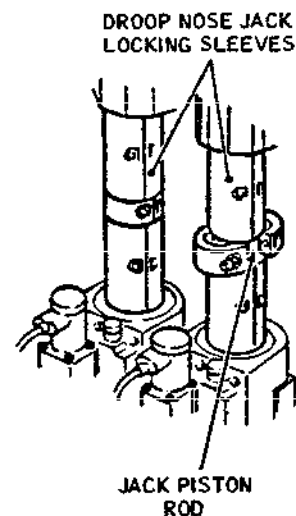
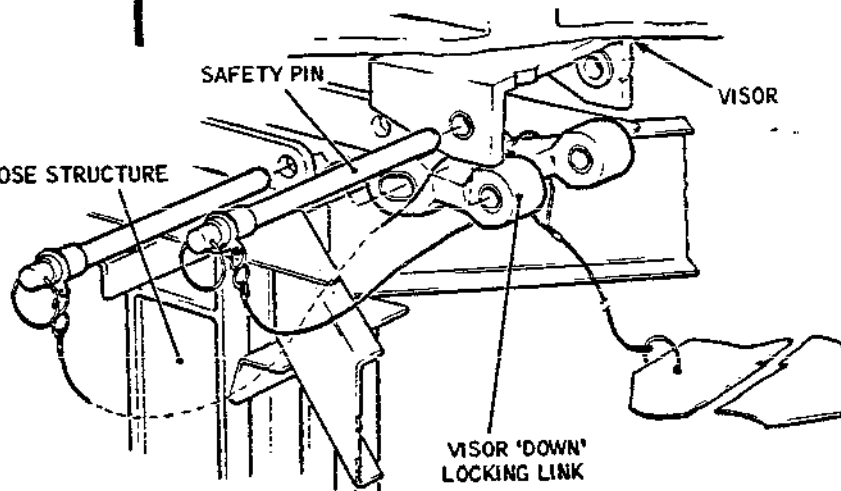
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Ground Equipment Safety Locks  
Figure 501

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### DESCRIPTION

### PART NO.

---

Hydraulic ground rig

-

Torque spanner range to cover  
80 to 120 lbf in (0.9 to 1.35  
mdaN).

-

Locking pins, nose uplocks

E925045031

Locking link, visor 'down'

D925468030

---

### C. Prepare to Bleed

- (1) Ensure that the visor and nose are both fully down and that both the normal control selector switch and the standby control switches are set to agree:  
Normal selector switch set to DOWN.  
Standby control switches set to OFF.  
(Ref. Fig. 502 ).
- (2) Connect the ground hydraulic test rig to the aircraft green and yellow systems (Ref. 29-20-00, Servicing). Do not pressurize.
- (3) Make available ground electrical power (Ref. 24-41-00).
- (4) Ensure the windshield wipers are parked.

### D. Bleed Droop Nose and Visor System (Ref. Fig. 503 and 502)

#### (1) Droop Nose (Green System)

- (a) Apply low hydraulic pressure to the normal (green) system and slowly operate the nose through two complete up and down movements.

NOTE: Internal leakage in the droop nose actuator jacks ensures satisfactory bleeding.

- (b) Using low hydraulic pressure, obtain a configuration of visor down, nose up.

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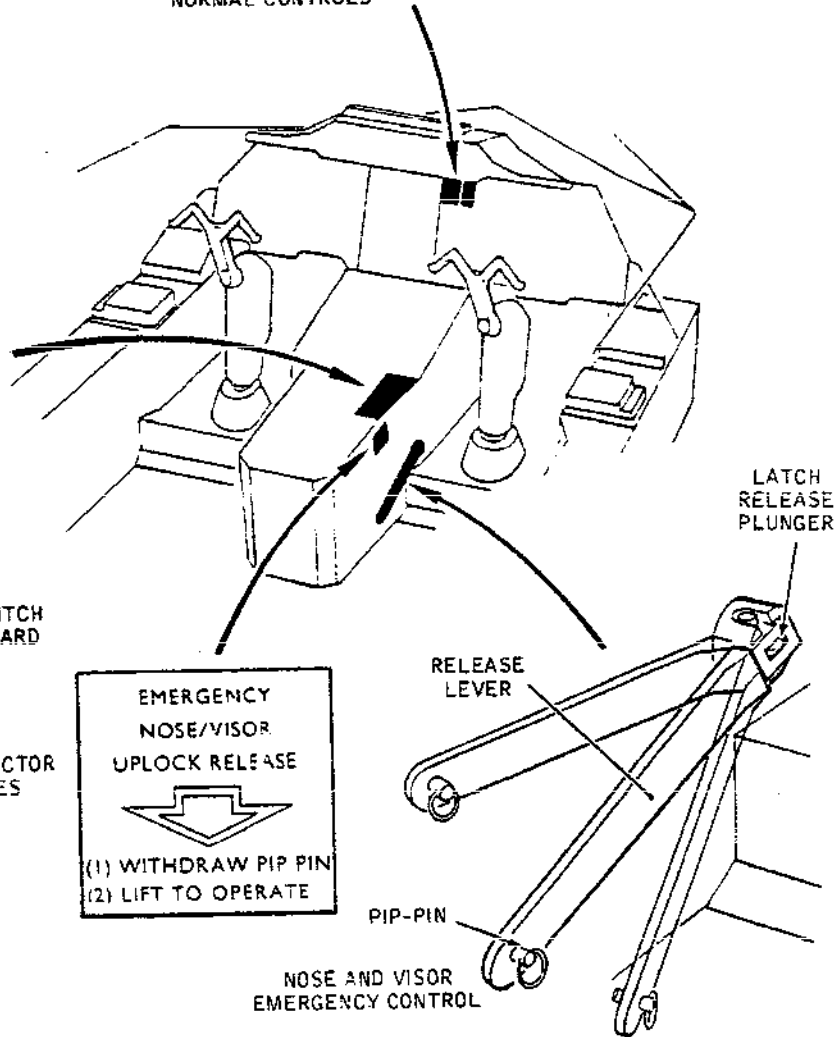
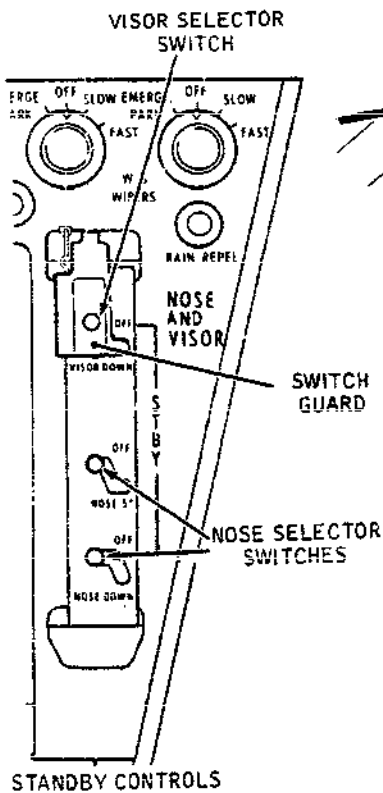
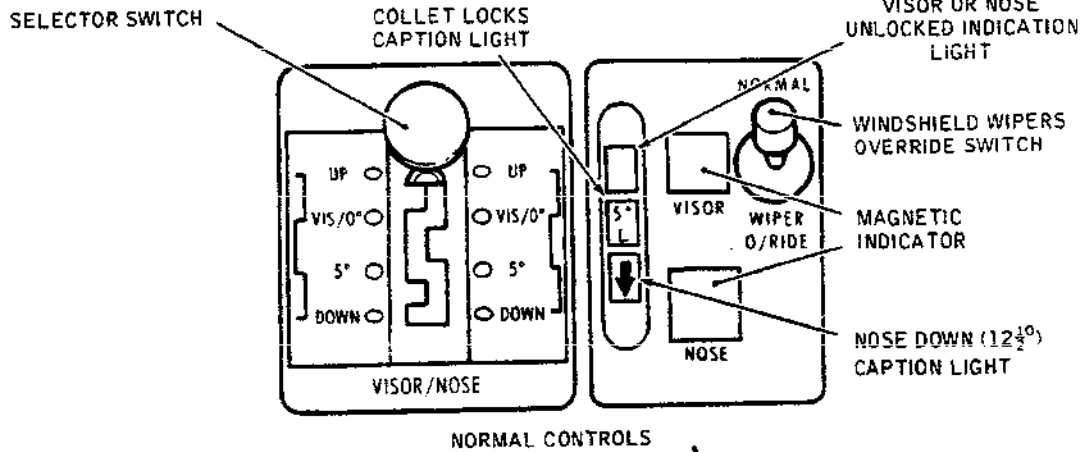
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Visor and Droop Nose Controls and Indicators  
Figure 502

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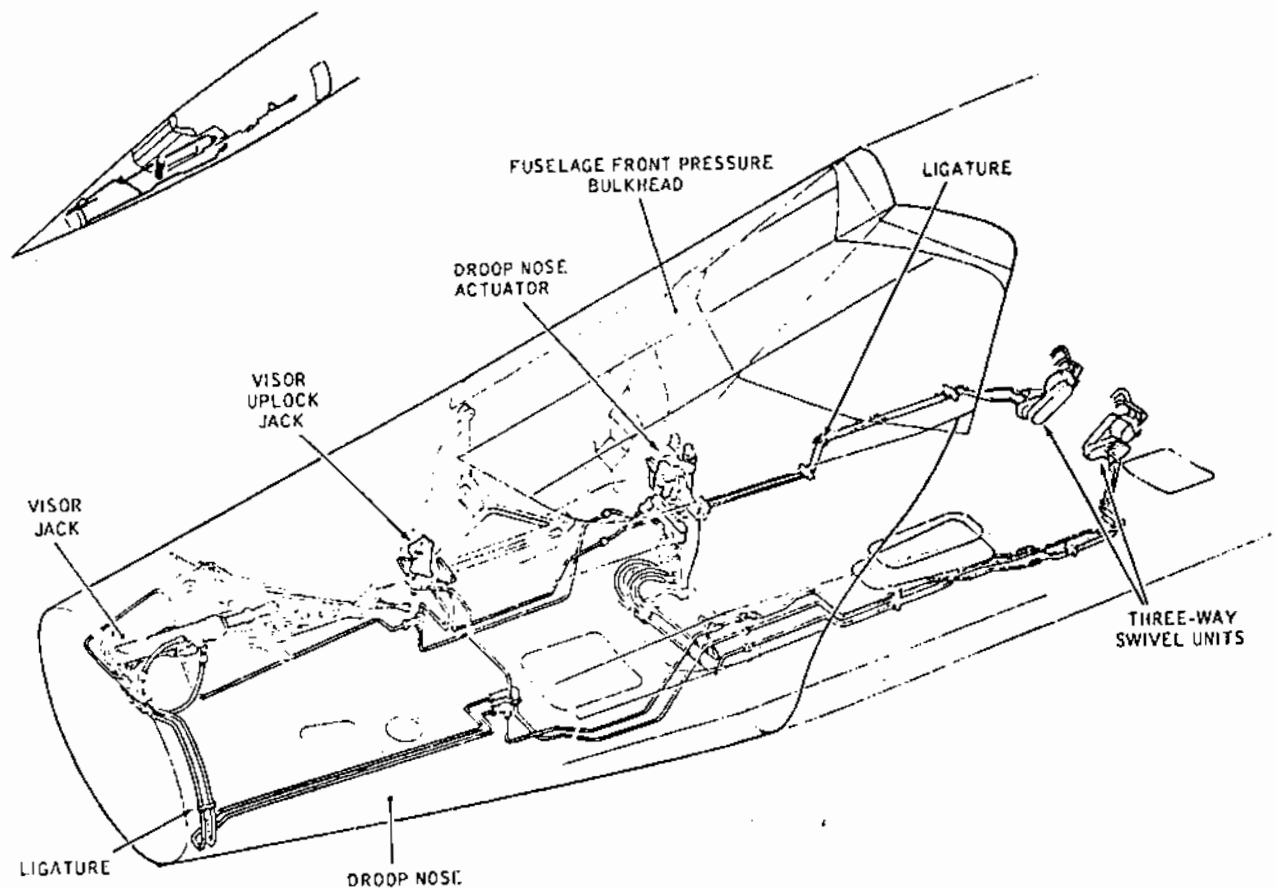
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Visor and Droop Nose Hydraulic System  
(Sheet 1 of 2)  
Figure 503

R

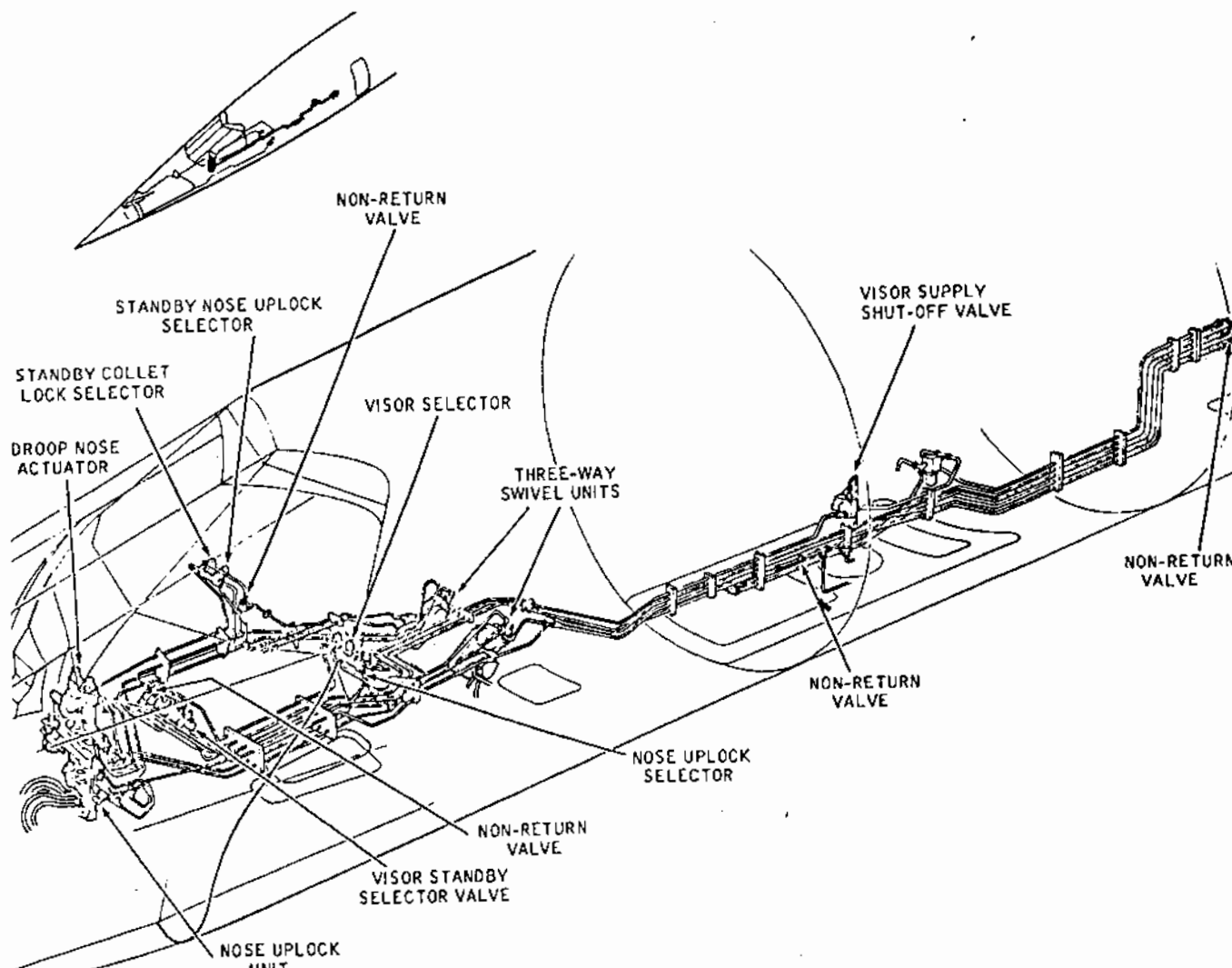
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Visor and Droop Nose Hydraulic System  
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Figure 503

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### (2) Visor (Green System)

- (a) Fit the safety locking pins to the droop nose uplocks; remove access panel 113BB and fit the visor down locking link.
- (b) With no hydraulic pressure, set the visor and nose controls as follows:  
Normal selector switch to VIS 0 deg.  
Standby control switches all at OFF.
- (c) Loosen pipe connection A of the visor uplock jack and apply sufficient pressure to bleed the connection until an air-free flow of fluid is obtained; retighten the connection to a torque figure of 90 to 115 lbf in (1.07 to 1.3 mdaN).
- (d) Loosen pipe connection B of the visor jack and apply sufficient pressure to bleed at the connection until an air-free flow of fluid is obtained; retighten the connection to a torque figure of 80 to 120 lbf in (0.9 to 1.35 mdaN).
- (e) With no hydraulic pressure, set the visor and nose controls as follows:  
Normal selector switch to "UP".  
Standby control switches all at "OFF".
- (f) Loosen connection A of the visor jack and apply sufficient pressure to bleed at the connection until an air-free flow of fluid is obtained; retighten the connection to a torque figure of 80 to 120 lbf in (0.9 to 1.35 mdaN).

### (3) Visor (Yellow System)

- (a) With no hydraulic pressure, set the visor and nose controls as follows:  
Normal selector switch to "UP".  
Standby control switches to "VISOR DOWN".  
"OFF", "OFF".
- (b) Loosen connection B of the visor uplock jack and connection C of the visor jack and apply sufficient pressure to bleed at the two connections until air-free flows of fluid are obtained; retighten the connections to a torque figure of 90 to 115 lbf in (1.07 to 1.3 mdaN).
- (c) Return the standby control switch to "OFF", and

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increase the yellow hydraulic pressure to 4000 psi (275.8 bars) to ensure that the visor standby selector valve is reinstated to its normal position. Reduce hydraulic pressure to zero.

- (4) Upon completion of bleeding the visor system, function the visor:

- (a) Remove the visor 'down' locking link and the nose uplock pins.
- (b) With no hydraulic pressure, set the visor and nose controls as follows:  
Normal selector switch to "UP"  
Standby control switches all at "OFF"
- (c) Apply low pressure to the green and the yellow systems using the ground hydraulic rig and slowly raise the visor to engage its uplock.  
uplock.

R  
R

- (5) Droop Nose Uplocks (Yellow and Green System)  
Nose Actuator Jack Collet Lock (Yellow System)

- (a) Prepare to Bleed (Ref. para.C).
- (b) Fit the safety locking pins to the nose uplocks and fit the visor 'down' locking link.
- (c) With no hydraulic power, set the visor and nose as follows:  
Normal selector switch to "UP".  
Standby control switches at "VISOR DOWN".  
NOSE 5 deg", "OFF".
- (d) Loosen the standby (yellow) system pipe from connection A of the R.H. uplock unit and apply sufficient yellow pressure to bleed at the connection until air free fluid flow is obtained; retighten the connection to a torque figure of 90-115 lbf in (1.07 to 1.3 mdaN). Repeat bleeding from connection B of L.H. uplock unit.
- (e) With no hydraulic pressure, set the visor and nose controls as follows:  
Normal selector switch to "5 deg".  
Standby control switches all at "OFF".
- (f) Loosen the normal (green) system, pipe from connection B of the R.H. uplock unit and

R

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R  
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R

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R

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R apply sufficient green pressure to bleed at  
R the connection until an air-free fluid flow  
R is obtained; retighten the connection to a  
R torque figure of 90 to 115 lbf in (1.07 to  
R 1.3 mdaN). Repeat bleeding from connection  
R A of L.H uplock unit.

(g) With no hydraulic power, set the visor and  
nose controls as follows:  
Normal selector switch to "UP".  
Standby control switches at "VISOR DOWN".  
"NOSE 5 deg.", "NOSE DOWN".

R (h) Loosen the standby (yellow) system pipe  
connection 'C' on the nose 7 1/2 deg jack for  
the collet lock (LH or RH as applicable) and  
apply sufficient yellow pressure to bleed at  
the connection until an air-free flow of fluid  
is obtained; retighten the connection to a  
torque figure of 60 to 80 lbf in (0.678 to  
R 0.904 mdaN). Repeat procedure for the other  
R 7 1/2 deg jack.

(6) Remove the visor 'down' locking link and the safety  
locking pins from the nose uplocks.

### 3. Function Test Visor Hydraulic System

#### A. Equipment and Materials

DESCRIPTION	PART NO.
Safety pin (2), droop nose uplocks	E925045031
Locking link, visor 'down'	D925468030
Safety clips, circuit breaker	-

#### B. Prepare for Test (Ref. Fig. 502 )

CAUTION: THESE TESTS COMMENCE WITH THE VISOR AND DROOP  
NOSE IN THE RAISED (UP) POSITIONS (NORMAL  
GROUND STATE). AN EXCEPTION TO THIS IS WHEN  
THE VISOR AND/OR NOSE HAVE BEEN OPERATED BY  
THE GROUND EQUIPMENT SCREWJACKS, AFTER WHICH  
BOTH THE VISOR AND NOSE MUST BE LEFT IN THE  
"DOWN" POSITION. IF LEFT IN THE UP POSITION

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THE HYDRAULIC JACKS MAY NOT BE FILLED WITH FLUID AND IF OPERATED FROM THIS POSITION THE VISOR AND NOSE WOULD FREE-FALL WITH INSUFFICIENT DAMPING ACTION FROM THE JACKS. IN THIS CASE TESTING OF THE NOSE AND VISOR MUST COMMENCE FROM THE LOWERED POSITION.

- (1) Ensure that all tools, loose articles and ground equipment are removed from the droop nose and that there is no equipment in the vicinity of the droop nose to obstruct its movement.
- (2) Before connecting ground electrical and hydraulic power check that the nose and visor controls agree with the nose and visor positions.
  - (a) VISOR/NOSE selector switch for normal operation on the co-pilot's dash panel, at UP.
  - (b) Visor and nose STBY (standby) control switches on the pilot's centre console for VISOR DOWN, NOSE 5 deg, and NOSE DOWN, all at OFF.
  - (c) EMERGENCY NOSE/VISOR UPLOCK RELEASE lever on the right hand side of the centre console, in the stowed position and secured with pip-pin.
- (3) Remove all access panels (Ref. Fig. 501 ) from the bottom of the nose fairing for access to the visor and droop nose hydraulic system components.
- (4) Display 'Function Test' warning notices in the test area.
- (5) Ensure that the windscreen wipers are 'parked'.
- (6) Check the levels of fluid in the green and yellow hydraulic reservoirs and top up if necessary (Ref. 12-12-29).
- (7) Make available electrical ground power (Ref. 24-41-00).
- (8) Pressurize the green and the yellow systems using the aircraft ground hydraulic check out system (Ref. 29-00-00, Servicing).

### C. Function Test Visor -

NOTE: In the event of any malfunction immediately

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switch off hydraulic power.

- (1) Lower and raise the visor using the normal control selector switch; check after each selection that:
  - (a) The visor moves smoothly, the damping of the jack is effective and there is no snatch at each end of travel.
  - (b) All indications are correct.
  - (c) The time taken to lower or raise the visor is between 4 and 8 seconds.
- (2) Lower the visor using the standby system by hinging the guard clear of the STBY visor lowering switch and setting the switch from "OFF" to "VISOR DOWN". Check visor lowering as in (1) (a), (b) and (c).
- (3) Check for leakage:
  - (a) Electrically isolate the visor and droop nose control system by tripping the circuit breakers; fit safety clips.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
VISOR & NOSE CONT	15-215	M11	F 8
NOSE 7 1/2 deg CONT	1-213	M12	Q16
NOSE/VISOR STBY LOWER SUP	1-213	M13	Q17

- (b) Fit the safety locking pins to the nose uplocks and fit the visor 'down' locking link (Ref. Fig. 501 ).
  - (c) Inspect the system pipe connections to the component(s) for leaks.
  - (d) Remove the visor 'down' locking link and the nose uplocks safety locking pins and reset the circuit breakers previously tripped.
- (4) Carry out the resetting procedure for use after lowering given in 21-61-00. Adjustment/Test, Para.8.

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### 4. Function Test Visor and Droop Nose Hydraulic System

#### A. Equipment and Materials.

DESCRIPTION	PART NO.
Safety clips, circuit breaker	-
Locking link, visor 'down'	D925468030
Locking sleeves, nose jacks	E925091000

#### B. Prepare to Test

- (1) Carry out the preparatory operations given in Para. 3.B.

#### C. Function Test Visor and Nose.

NOTE: In the event of malfunction immediately switch off hydraulic power.

- (1) Set the normal control selector switch to "VIS/0° (visor down, nose up); Check that:
  - (a) The visor lowers smoothly without judder and there is no snatch at the end of travel.
  - (b) The jack snubbing is effective at the end of travel.
  - (c) All indication is correct.
  - (d) The time taken for the visor to lower is between 4 and 8 seconds.
- (2) Set the selector switch to "5°" (visor down, nose 5 deg); Check that:
  - (a) The nose uplocks release correctly and the nose actuators are correctly sequenced so that the nose leaves the uplocks without snatch.
  - (b) The nose lowers smoothly without judder snatch or other undesirable effects.
  - (c) The jack snubbing is effective at the end of

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travel.

- (d) All indication is correct.
  - (e) The time taken to lower is between 2 and 5 seconds.
- (3) Set the selector switch to "DOWN" (visor down, nose down); Check that:
- (a) The collet locks disengage smoothly.
  - (b) The nose moves smoothly without judder, snatch or other undesirable effects.
  - (c) The jack snubbing is effective at the end of travel.
  - (d) All indication is correct.
  - (e) The time taken to lower is between 4 and 5.5 seconds.
- (4) Set the selector switch to "5°" (visor down, nose 5 deg); check that:
- (a) The nose rises smoothly without judder or other undesirable effects.
  - (b) The collet locks engage at 5 deg.
  - (c) All indication is correct.
  - (d) The time taken for the nose to rise is between 4.5 and 6.5 seconds.
- (5) Set the selector switch to "VIS/0°" (visor down, nose up); check that:
- (a) The nose rises smoothly without judder or other undesirable effects.
  - (b) The nose uplocks engage correctly.
  - (c) All indication is correct.
  - (d) The time taken to rise is between 3 and 5.5 seconds.
- (6) Set the selector switch to "UP" (visor up, nose up); check that:

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- (a) The visor rises smoothly without judder and there is no snatch at the end of travel.
  - (b) The jack snubbing is effective.
  - (c) All indication is correct.
  - (d) The time taken to raise the visor is between 4 and 8 seconds.
- (7) With the nose and visor up, hinge the guard clear of the STBY visor lowering switch and set the switch to "VISOR DOWN". Check the system operation as in (1).
- (8) Set the STBY nose lowering switch to "NOSE 5°". Check the system operation as in operation (2), but the time of operation is to be between 4 and 8 seconds.
- (9) Set the STBY nose lowering switch to "NOSE DOWN". Check the system operation as in operation (3), but the time of operation is to be between 4 and 8 seconds.
- (10) Check for leakage as in para. 3.C. (3).
- (11) Carry out the resetting procedure for use after standby lowering given in 27-61-00, Adjustment/Test, para. 8.

### 5. Emergency System Function Test

#### A. Equipment and Materials.

DESCRIPTION	PART NO.
Hydraulic test rig	-
Spring balance (25 lb; 11.3 kg)	-

#### B. Prepare to Test.

- (1) Carry out the preparatory operations given in para. 3.B., but do not pressurize the green and the yellow hydraulic systems.

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### C. Test.

- (1) With the visor and nose fully raised, withdraw the pip-pin securing the EMERGENCY NOSE/VISOR UPLOCK RELEASE lever, pivot the lever upward to operate the system. Ensure that:
  - (a) The lever automatically latches in the raised position.
  - (b) The force required to operate the lever does not exceed 25 lb.
  - (c) The nose uplocks release smoothly and the nose free-falls smoothly to the 5 deg. position with the final movement damped by the jacks.
  - (d) The time taken for the nose to lower is 4 to 8 seconds.
  - (e) All indication is correct.

NOTE: The visor will not lower owing to seal friction but for test purposes indication that the visor uplock has released is adequate.

- (2) Depress the latch release plunger in the end of the EMERGENCY NOSE/VISOR UPLOCKS RELEASE lever and return the lever to its normal stowed position.
- (3) With the normal control selector switch at UP set the standby control switch to "VISOR DOWN" and "NOSE 5 Deg".
- (4) Connect the ground hydraulic test rig (Ref. 29-00-00, Servicing) and pressurize the yellow hydraulic system sufficiently to overcome seal friction and move the visor to three-quarters down. The yellow system pressure to start the visor lowering is not to exceed 1000 psi and is to be switched off by setting the standby lowering switches to "OFF" before the visor reaches three-quarters down to check that the visor completes the lowering sequence to fully down under the pull of the spring assistor mechanism.
- (5) Carry out the resetting procedure for use after standby or emergency lowering (Ref. 27-61-00, Adjustment/Test, Para.8).

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## MAINTENANCE MANUAL

### VISOR SELECTOR VALVE - REMOVAL/INSTALLATION

WARNING: OBSERVE ELECTRICAL PRECAUTIONS AS DETAILED IN 24-00-00.

OBSERVE HYDRAULIC AND TECHNICAL PRECAUTIONS AS DETAILED IN CHAPTER 29.

FIT THE GROUND SAFETY LOCKING DEVICES (REF FIG.401) BEFORE COMMENCING WORK IN THE DROOP NOSE.

#### 1. General

The visor selector valve is located in the forward equipment bay (zone 121) beneath the flight compartment floor. The valve is connected to hydraulic and electrical supplies and is secured with wire-locked bolts. The valve may be removed or installed with the droop nose either fully raised or fully lowered.

#### 2. Visor Selector Valve

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Locking pins (2), droop nose	E925045031
Locking sleeve, nose actuator jacks	E925091000
Safety clips, circuit breakers	-
Receptacle for hydraulic oil	-
Torque spanner, 0 to 200 lbf in (0 to 2.26 mdaN) range	-
Non-corrodible steel wire 0.028 in (0.7 mm) dia.	-

##### B. Prepare to Remove

- (1) Electrically isolate the visor and droop nose control system by tripping the circuit breakers; fit safety clips.

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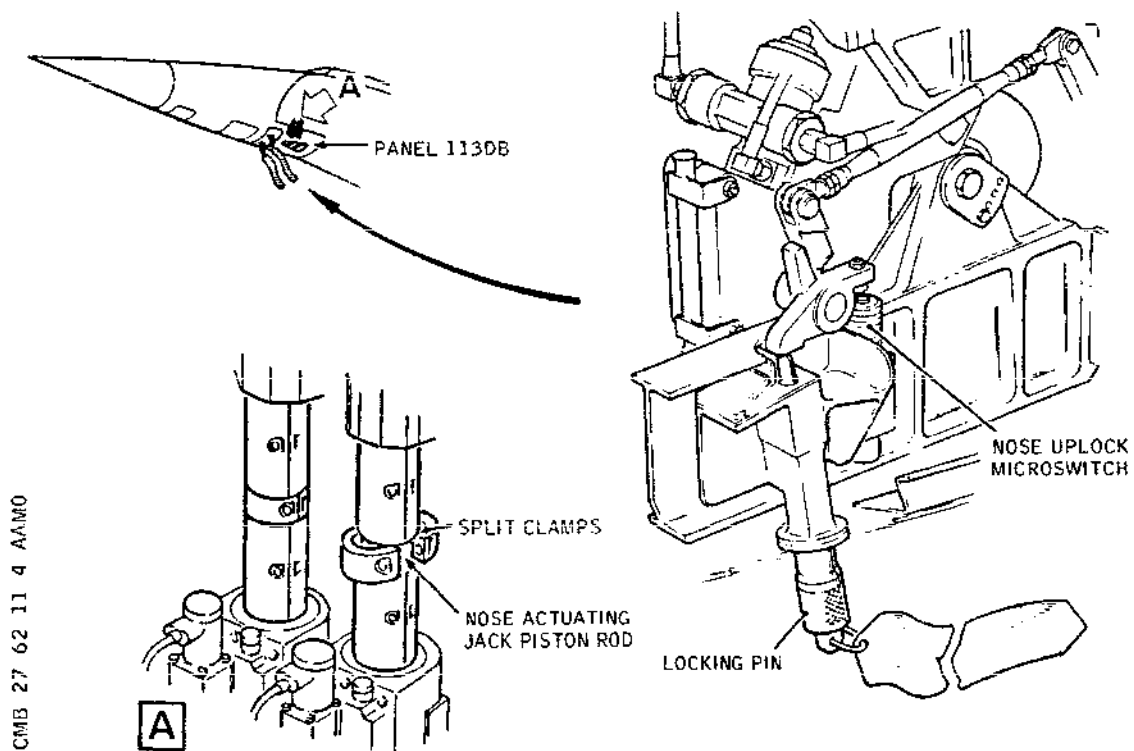
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SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
VISOR & NOSE CONT	15-215	M11	F 8
NOSE 7 1/2 DEG CONT	1-213	M12	Q16
NOSE/VISOR STBY LOWER SUP	1-213	M13	Q17

(2) Fit the appropriate droop nose ground safety locking devices (Ref. Fig. 401 ).

- (a) NOSE UP position - fit nose locking pins.
- (b) NOSE DOWN position - fit nose actuator locking sleeves.



Ground Safety Locking Devices  
Figure 401

(3) Depressurize the green hydraulic system by operating

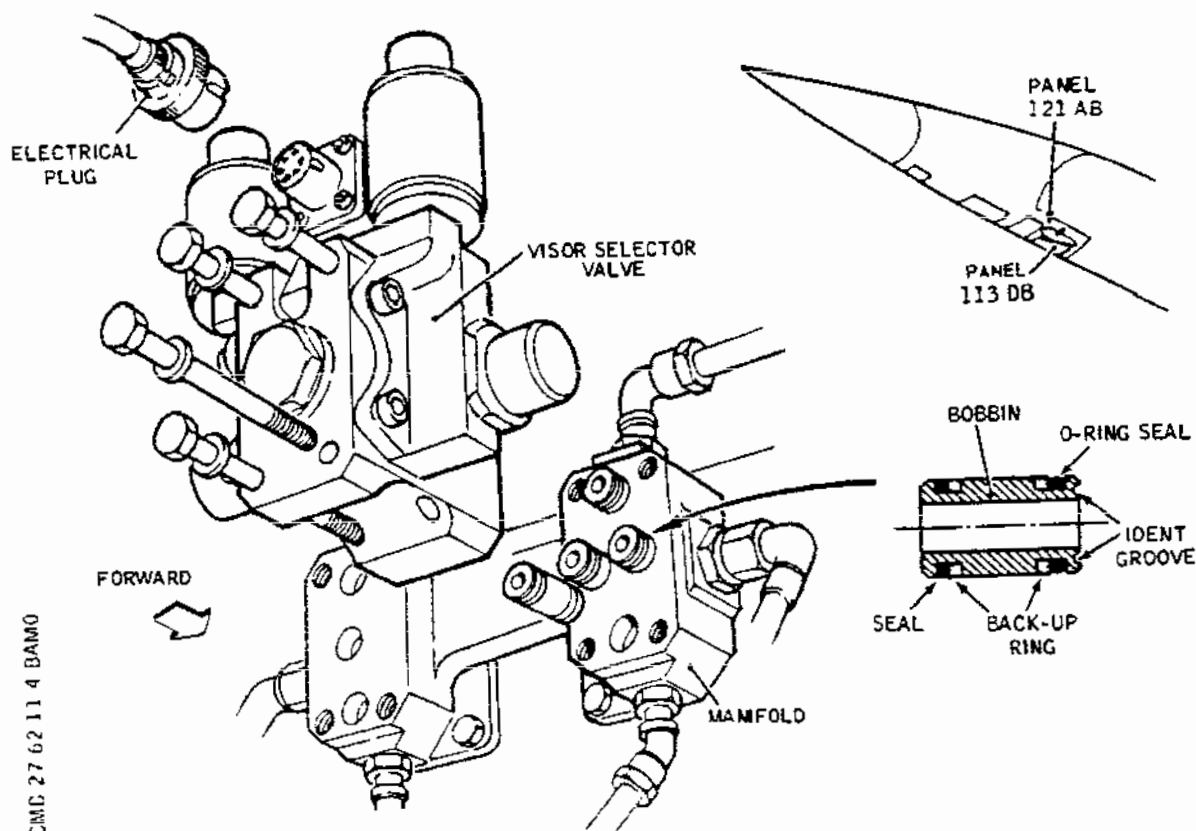
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## MAINTENANCE MANUAL



Visor Selector Valve - Installation  
Figure 402

the manual pressure relief unit located in zone 151 and the pressure relief valve fitted to the base of the green hydraulic reservoir in zone 153.

### B. Remove (Ref. Fig. 402)

- (1) Disconnect the electrical plug from the valve.
- (2) Remove the wire from the attachment bolts; remove the bolts. Be prepared with a clean container to catch fluid spilling from the valve and manifold and remove the valve and bobbins from the manifold.
- (3) Remove and discard the seals from each bobbin.

### C. Install (Ref. Fig. 402)

- (1) Fit new seals to the four bobbins and insert the bobbins into their ports in the valve.

NOTE: The end with the ident groove is inserted in

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the manifold.

- (2) Prime the selector valve with hydraulic fluid and place the valve in position on the manifold engaging the bobbins in the manifold orifices. Secure the valve with the four bolts and washers; torque load the bolts to 50 to 55 lbf in (0.56 to 0.62 mdaN) and lock them with wire.
- (3) Connect the electrical plug to the valve ensuring that the plug and receptacle mating surfaces are clean and undamaged.
- (4) Remove the droop nose ground safety locking device.
- (5) Remove the circuit breaker safety clips and reset the circuit breakers.
- (6) Function test the visor and droop nose hydraulic system (Ref. 27-62-00, Adjustment/Test).

R

NOTE: Complete the test with several visor up and down operations to bleed the system of air.

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## MAINTENANCE MANUAL

### VISOR STANDBY SELECTOR VALVE - REMOVAL/INSTALLATION

**WARNING:** OBSERVE ELECTRICAL PRECAUTIONS DETAILED IN 24-00-00.

OBSERVE HYDRAULIC AND TECHNICAL PRECAUTIONS DETAILED IN CHAPTER 29.

FIT THE GROUND SAFETY LOCKING DEVICES (Ref. Fig. 401 )  
BEFORE COMMENCING WORK IN THE DROOP NOSE.

#### 1. General

The visor standby selector valve (ident no.0478) is located in the forward equipment bay beneath the flight compartment floor. It is secured by three wire-locked bolts to a bracket in the rear face of the forward pressure bulkhead and is connected to the electrical and hydraulic supplies. The valve may be removed or installed with the droop nose either fully up or fully down.

#### 2. Visor Standby Selector Valve

##### A. Equipment and Materials

	DESCRIPTION	PART NO.
R	Locking pin (2), droop nose	E925045031
R	Locking sleeve, droop nose	E925091000
R	actuators	
R	Safety clips, circuit breakers	-
R	Clean receptacle for hydraulic	-
R	fluid	
R	Torque spanner, 0 to 400 lbf in	-
R	(0 to 4.5 mdaN) range	
R	Non-corrodible steel wire	-
R	0.028 in (0.77 mm) dia.	
R		

##### B. Prepare to Remove

- (1) Depressurize the green and the yellow hydraulic systems by operating the pressure release valves located on the relevant system manifolds in zones 151 and 152, and by rotating the knurled

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knob on the pressure relief valve fitted to the bottom of the hydraulic reservoirs in zones 153 and 154.

- (2) Electrically isolate the visor and droop nose control system by tripping the circuit breakers. Fit safety clips.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
VISOR & NOSE CONT	15-215	M11	F 8
NOSE 7 1/2 CONT	1-213	M12	Q16
NOSE/VISOR STBY LOWER SUP	1-213	M13	Q17

- (3) Fit the appropriate droop nose ground safety locking device (Ref. Fig. 401 ).

- (a) NOSE UP position - fit nose uplock safety pins.
- (b) NOSE DOWN position - fit nose actuator locking sleeves.

### C. Remove (Ref. Fig. 402 )

- (1) Disconnect the electrical plug from the selector valve.
- (2) Disconnect the hydraulic pipes from the standby selector valve; be prepared with a clean container to catch fluid spilling from the pipe ends. Fit blanks to the pipe ends and the selector valve ports.
- (3) Remove the locking wire from the three attachment bolts. Remove the bolts and withdraw the selector valve.

### D. Install (Ref. Fig. 402 )

- (1) If a new standby selector valve is to be fitted:
  - (a) Remove the unions and non-return valve from the old valve; discard the O-ring seals.
  - (b) Fit the five straight unions, each with a new

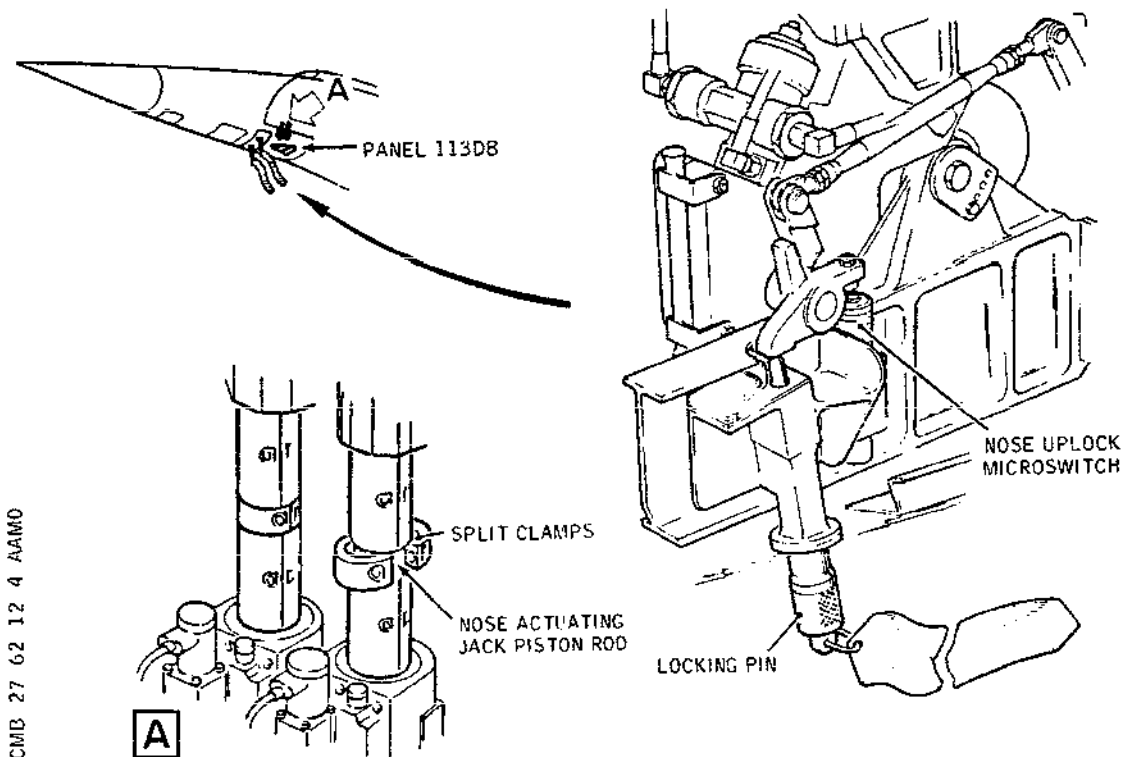
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## MAINTENANCE MANUAL



Ground Safety Locking Devices  
Figure 401

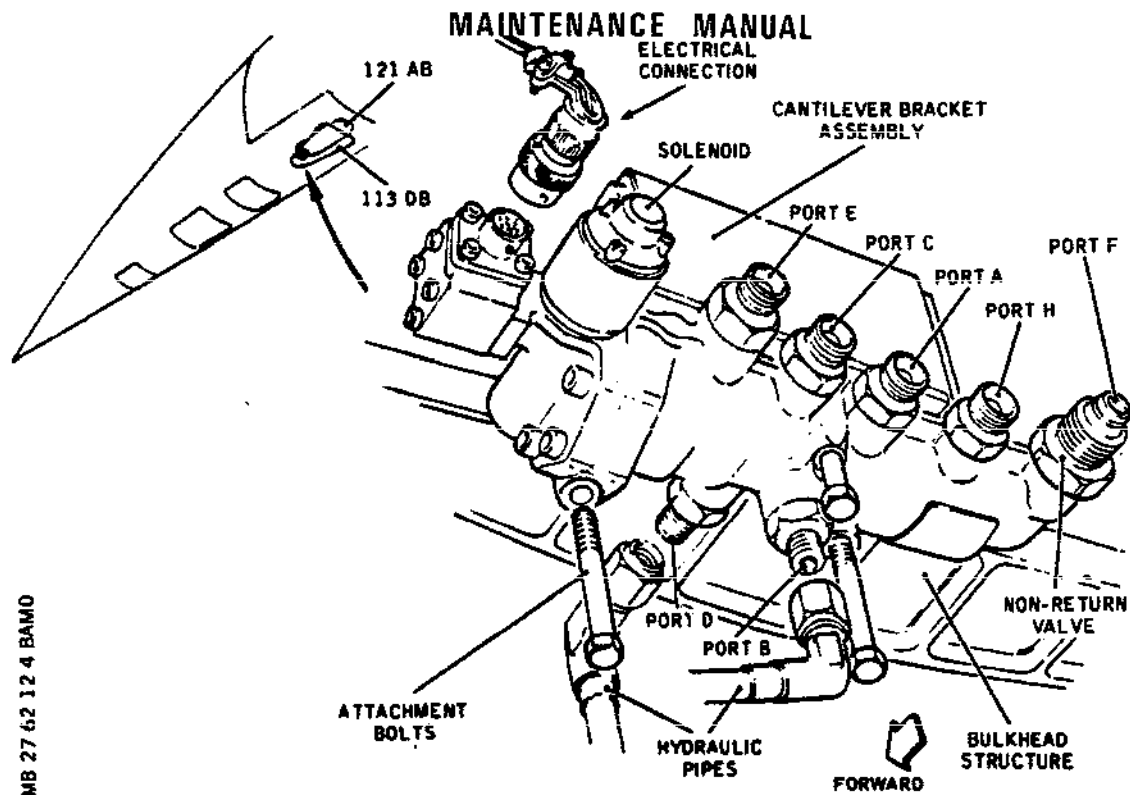
O-ring seal to the new selector valve at ports A, B, D, E and H. Torque tighten the unions to 350 to 370 lbf in (3.95 to 4.18 mdaN).

- (c) Fit the elbow union together with the locknut and new O-ring seal to port C. Correctly orientate the union and secure it with the locknut tightened to a torque value of 400 lbf in (4.5 mdaN).
- (d) Fit the non-return valve with a new O-ring seal to port F; tighten the valve to a torque value of 350 to 370 lbf in (3.95 to 4.18 mdaN).
- (2) Prime the standby selector valve with hydraulic fluid and replace the blanking caps.
- (3) Fit and bolt the valve to the bracket assembly. Torque load the bolts to between 40 and 45 lbf in (0.45 and 0.50 mdaN). Lock the bolts with wire.
- (4) Remove the blanks from the selector valve and the hydraulic pipe ends; be prepared with a clean

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Visor Standby Selector Valve - Installation  
Figure 402

container to catch fluid spilling from the pipe ends. Connect the pipes to the appropriate valve ports and torque load each connection to between 160 and 180 lbf in (1.8 and 2.0 mdaN).

- (5) Connect the electrical plug to the valve ensuring that the plug and receptacle mating surfaces are clean and undamaged.
- (6) Remove the droop nose ground safety locking device (Ref. Fig. 401 ).
- (7) Ensure the droop nose and visor selector controls on the co-pilots dash panel correspond to the droop nose and visor positions.
- (8) Remove the circuit breaker safety clips and reset the circuit breakers.
- (9) Carry out an operational test on the visor and droop nose hydraulic system (Ref. 27-62-00, Adjustment/Test) using the normal and the standby systems.

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NOTE: Complete the test with several visor up and down operations to bleed the system of air.

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## MAINTENANCE MANUAL

### VISOR JACK - REMOVAL/INSTALLATION

**WARNING:** OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS IN 24-00-00.  
OBSERVE THE HYDRAULIC AND TECHNICAL SAFETY PRECAUTIONS  
IN CHAPTER 29.

#### 1. General

R  
R

The visor jack is situated in the forward area of the droop nose fairing (Ref. Fig. 401 ). Accessibility is through a panel in the nose undersurface. The radome must also be opened for access to the jack forward attachment.

**NOTE:** To maintain the fatigue life of flexible hoses when they are disconnected from the jack no attempt must be made to straighten them from their acquired shape. They must be reconnected to this shape as near as possible with no undue reforming.

#### 2. Visor Jack

##### A. Equipment and Materials

R

R

DESCRIPTION	PART NO.
Locking pins (2), droop nose	E925045031
Safety clip, circuit breaker	-
Gauge, transfer and setting	D925153000
Torque spanner, 3/8 in (9.5 mm) square drive to measure between 80 and 120 lbf in (0.90 and 1.35 mdaN).	-
Spanner extension, 3/8 in (9.5 mm) square drive, radome latches	-
Torque spanner, 1 in (25.4 mm) hexagonal drive, to measure between 550 and 580 lbf in (6.2 and 6.55 mdaN)	-
Torque handle, Richmond type LTC-3 to measure between 1080 and 1200 lbf in (12.2 and 13.56 mdaN)	-

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### DESCRIPTION

### PART NO.

Torque spanner extension, jack eye end locknut )  
D925429100 )  
Non-corrodible steel locking wire, 0.028 in (0.77 mm), DTD 189 -

### B. Prepare to Remove

**NOTE:** Ensure that the nose is "up" and the visor down. A nose "up" configuration facilitates the handling of the radome. If it is required to remove the jack with the nose down the radome movement must be controlled using the radome sling.

- (1) Depressurize the green and yellow hydraulic systems by operating the pressure release valves located on the relevant system manifolds in zones 151 and 152, and by unscrewing the knurled knob on the pressure relief valves fitted to the bottom of the hydraulic reservoirs located in zones 153 and 154 (Ref. Chapter 29).
- (2) Electrically isolate the visor and nose control system by tripping the circuit breakers; fit safety clips.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
VISOR & NOSE CONT	15-215	M11	F 8
NOSE 7 1/2 CONT	1-213	M12	Q16
NOSE/VISOR STBY LOWER SUP	1-213	M13	Q17

- (3) If the nose is held in its uplocks fit the droop nose locking pins (Ref. Fig. 402 ).

- (4) Remove access panel 113AB.

EFFECTIVITY: ALL

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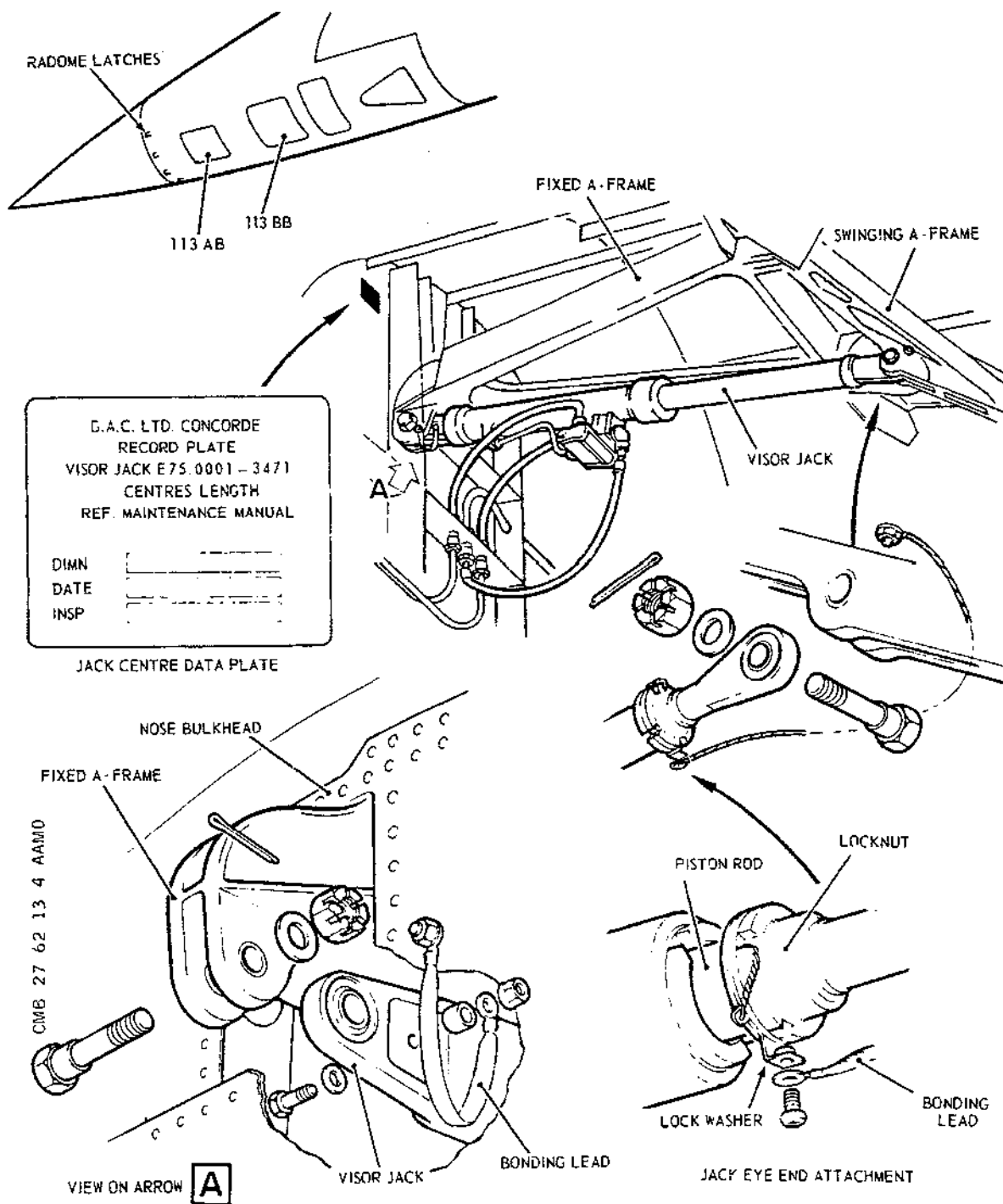
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Visor Jack - Installation  
Figure 401

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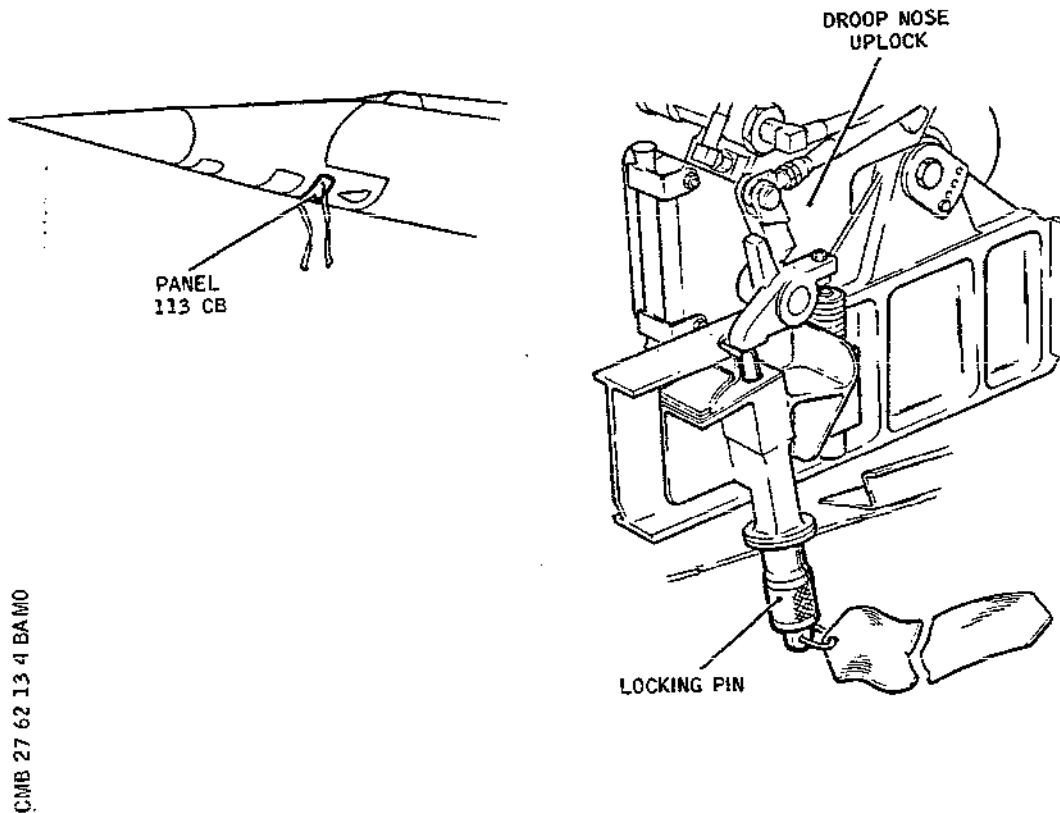
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## MAINTENANCE MANUAL



Droop Nose Ground Locking Pins  
Figure 402

- (5) Release the ten latches securing the radome to the droop nose fairing and manually open the radome.

**NOTE:** Movement of the radome must be under control at all times particularly in sloped parking areas.

### C. Remove (Ref. Fig. 401 )

- (1) Be prepared with a clean receptacle to catch escaping hydraulic fluid, then disconnect the three flexible hoses from the visor jack. Fit blanking caps to both the pipe end fittings and the jack adapters.
- (2) Disconnect the bonding leads from the visor jack. Remove the split pins, nuts and washers from the jack end attachment bolts.
- (3) Support the jack and withdraw the attachment bolts.

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## MAINTENANCE MANUAL

Remove the jack from the droop nose fairing.

CAUTION: IF THE JACK IS TO BE SUBSEQUENTLY RE-INSTALLED IN THE SAME DROOP NOSE FAIRING, ENSURE THAT THE JACK ATTACHMENT CENTRES LENGTH IS NOT ALTERED.

- (4) Clean off any hydraulic fluid that may have spilled onto the nose fairing.

D. Install (Ref. Fig. 401 )

- (1) If a replacement visor jack is to be fitted set the jack to the correct attachment centres length:
- (a) Remove the locking wire from the jack eye end locknut. Slacken the locknut and disengage the tabbed lock washer.
  - (b) Remove the blanking caps from the jack and drain off the hydraulic fluid. Refit the caps to finger tightness.
  - (c) Adjust the jack setting gauge to the centres length given on the data plate or to the fully retracted centres length of the jack being replaced.
  - (d) Slacken off the blanking caps of the replacement jack as necessary, manually retract it until the piston bottoms and fit it into the preset gauge, adjusting the eye-end as necessary.

NOTE: The gauge centres length may be increased or decreased by up to 0.030 in (0.8 mm) to allow for the limited half turn increment adjustment of the jack eye-end.

- (e) Reset the tabbed lock washer and torque tighten the eye-end locknut to between 1080 and 1200 lbf in (12.2 and 13.56 mdaN). Secure the locknut to the lock washer with wire (Ref. 20-21-13).
- (f) Fill the jack with hydraulic fluid and replace the blanking caps.

- (2) Fit the jack to the droop nose A-frame structure. Tighten the nuts to a torque loading between 550 and 580 lbf in (6.2 and 6.55 mdaN), and lock them with split pins. Reconnect the bonding leads.

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- (3) Connect the flexible hoses to the jack, ensuring minimum spillage of hydraulic fluid. Tighten the union nuts to a torque loading between 100 and 250 lbf in (1.13 and 2.825 mdaN). Clean off any spilt fluid.
- (4) Close the radome and latch it to the droop nose fairing. Use a torque spanner and extension and tighten the ten latches to a torque loading between 80 and 120 lbf in (0.9 and 1.35 mdaN). Ensure that the outer surface of each fastener is flush with the skin.
- (5) Remove the circuit breaker safety clips and reset the circuit breakers.
- (6) Remove the droop nose locking pins if fitted.
- (7) Carry out the complete function test for the visor given in 27-62-00 Adjustment/Test. Check for satisfactory operation and indication.

NOTE: Complete the test with several visor up and down operations to bleed air from the system. If it is necessary to bleed air at the visor jack connections refer to the procedures for bleeding given in 27-62-00, Adjustment/Test.

- R (8) Refit access panel 113AB.

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## MAINTENANCE MANUAL

### VISOR UPLOCK JACK - REMOVAL/INSTALLATION

WARNING: OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS IN 24-00-00.

OBSERVE THE HYDRAULIC AND TECHNICAL SAFETY PRECAUTIONS IN CHAPTER 29.

FIT THE DROOP NOSE LOCKING PINS BEFORE ENTERING THE DROOP NOSE FAIRING.

#### 1. General

The visor uplock jack (ident no. 3473) is bolted between the sideplates of the twin hooked uplock, mounted on the front face of the nose fairing mid bulkhead.

#### 2. Visor Uplock Jack

##### A. Equipment and Materials

R

R

DESCRIPTION	PART NO.
Locking pin (2), droop nose	E925045031
Visor down locking link	D925157002
Safety clips circuit breaker	-
Torque spanner, jack attachment bolts to measure between 50 and 60 lbf in (0.565 and 0.678 mdaN)	-
Torque spanner, hydraulic pipe union nut to measure between 95 and 115 lbf in (1.07 and 1.3 mdaN)	-
Clean receptacle for hydraulic fluid	-

##### B. Prepare to Remove

- (1) Ensure that the droop nose fairing is up and the visor down.
- (2) Depressurize the green and yellow hydraulic systems by operating the pressure release valves located

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on the relevant system manifolds in zones 151 and 152, and by unscrewing the knurled knob on the pressure release valve fitted to the bottom of the relevant system hydraulic reservoirs located in zones 153 and 154 (Ref. Chapter 29).

R

- (3) Electrically isolate the visor and droop nose control system by tripping the associated circuit breakers; fit safety clips.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
VISOR & NOSE CONT	15-215	M11	F 8
NOSE 7 1/2 DEG CONT	1-213	M12	Q16
NOSE/VISOR STBY LOWER SUP	1-213	M13	Q17
VISOR SERVICES 'A' SYS CONT	1-213	M14	Q18
VISOR & NOSE IND	15-215	M15	F 9
VISOR SERVICES 'B' SYS CONT	15-216	M16	D18

- (4) Remove the relevant access panels.
- (5) Fit the droop nose locking pins and the visor down locking link (Ref. Fig. 401 ).

### C. Remove (Ref. Fig. 402 )

- (1) Be prepared with a clean receptacle to catch spilling fluid, then disconnect the hydraulic pipes from the uplock jack. Fit blanking caps to the pipe union nuts and to the union adapters on the jack.
- (2) Remove the split pins, nuts and washers from the jack attachment bolts, remove the bolts and withdraw the jack from the uplock sideplates.
- (3) Clean off any spilled hydraulic fluid from the droop nose fairing.

EFFECTIVITY: ALL

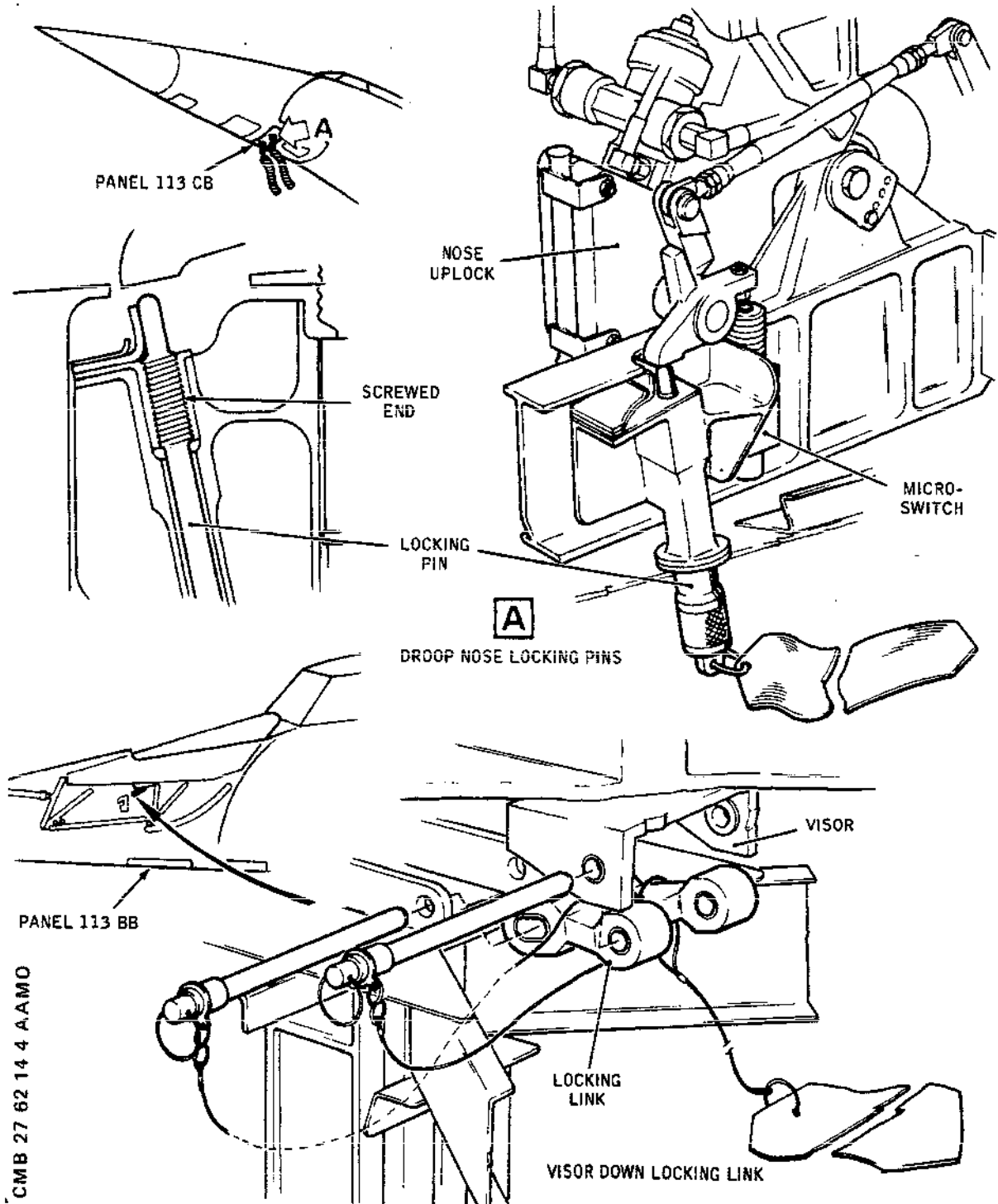
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Ground Safety Locking Equipment  
Figure 401

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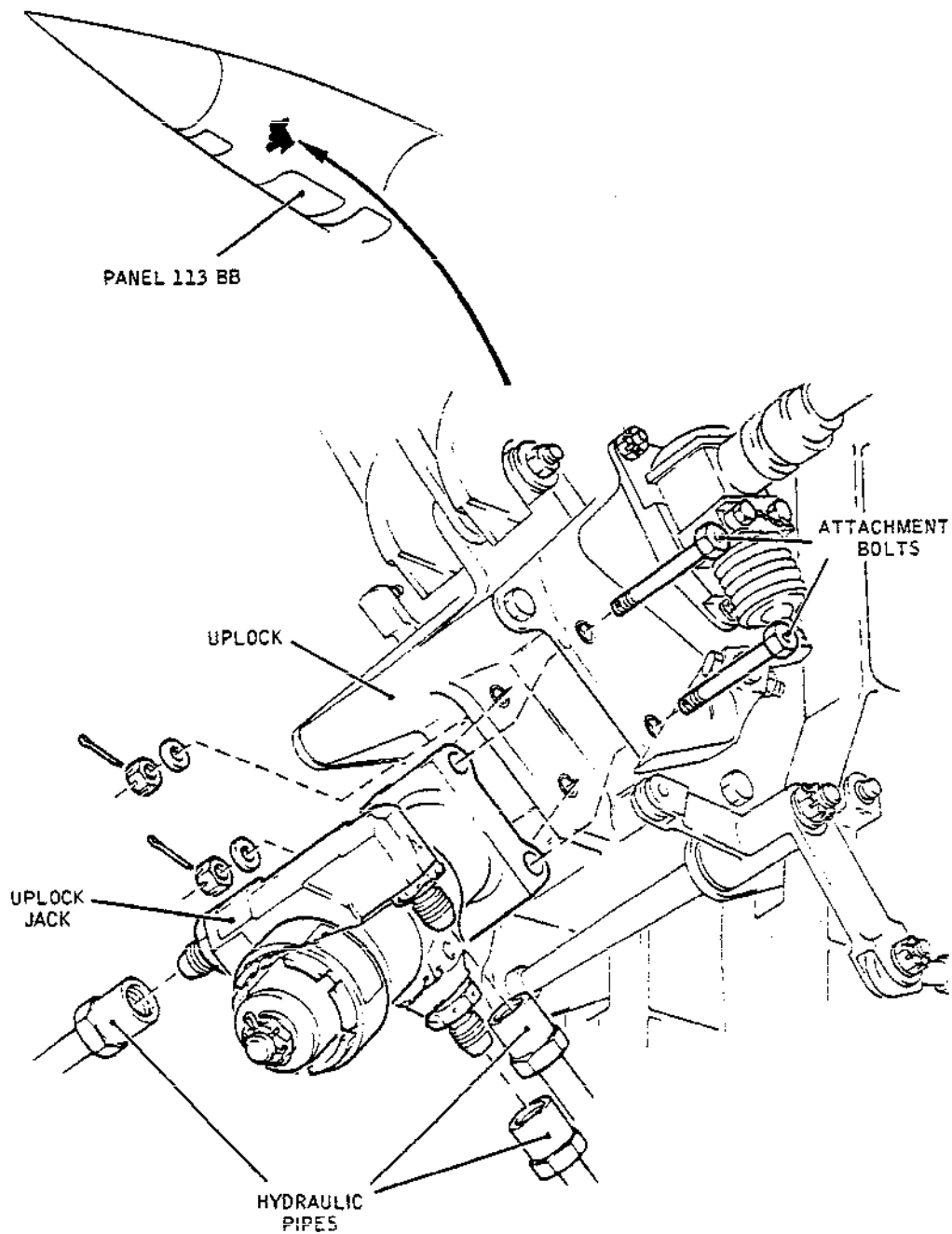
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Visor Uplock Jack - Installation  
Figure 402

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### D. Install (Ref. Fig. 402 )

- (1) Retract the jack, position it between the uplock sideplates and fit the attachment bolts, washers, and nuts. Torque tighten the nuts to between 50 and 60 lbf in (0.565 and 0.678 mdaN), and lock them with split pins.
- (2) Remove the blanking caps and connect the hydraulic pipes to the union adapters on the jack. Tighten the union nuts to a torque loading between 95 and 115 lbf in (1.07 and 1.3 mdaN).
- (3) Remove the visor 'down' locking link.
- (4) Remove the droop nose locking pins.
- (5) Remove the circuit breaker safety clips and reset the circuit breakers.
- (6) Carry out the visor bleeding procedure (green and yellow system) Ref. 27-62-00, Adjustment/Test.
- (7) Function test the visor (Ref. 27-62-00, Adjustment/Test).

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## MAINTENANCE MANUAL

### HYDRAULIC SWIVEL UNITS - REMOVAL/INSTALLATION

**WARNING:** OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS IN 24-00-00

OBSERVE THE HYDRAULIC AND TECHNICAL SAFETY PRECAUTIONS  
IN CHAPTER 29.

FIT THE GROUND SAFETY EQUIPMENT (Ref. Fig. 401 ) BEFORE  
ENTERING THE DROOP NOSE FAIRING.

#### 1. General

The upper swivel heads of both the left and right hand swivel units are bolted to the forward fuselage, just forward of the droop nose fairing hinge. The bolts pass through the bulkhead and screw into manifolds mounted on the rear face of the bulkhead. The lower swivel heads of the units are bolted to adjustable bracket assemblies on the droop nose fairing structure. The swivel units ident nos. are 4097 (RH) and 4098 (LH).

#### 2. Hydraulic Swivel Units

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Locking sleeves, nose actuator jacks	E925091000
Blanking plate	D925196000
Dummy bobbins (3)	-
Torque spanner, 21 to 180 lbf in (0.23 to 2.03 mdaN) range	-
Safety clips, circuit breaker	-
Clean receptacle for hydraulic fluid	-
Non-corrodible steel wire, 0.028 in (0.77 mm) dia	-

##### B. Prepare to Remove

EFFECTIVITY: ALL

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R

NOTE: The units are removed and installed with the nose and visor fully lowered.

- (1) Depressurize the green and yellow hydraulic systems by operating the pressure release valves located on the relevant system manifolds in zones 151 and 152, and by unscrewing the knurled knob on the pressure relief valves fitted to the bottom of the hydraulic reservoirs located in zones 153 and 154 (Ref. Chapter 29).
- (2) Electrically isolate the visor and nose control system by tripping the circuit breakers; fit safety clips.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
VISOR & NOSE CONT	15-215	M11	F 8
NOSE 7 1/2 DEG CONT	1-213	M12	Q16
NOSE/VISOR STBY LOWER SUP	1-213	M13	Q17

- (3) Remove access panel 113 DB.
- (4) Fit the locking sleeves to the droop nose fairing actuator (Ref. Fig. 401 )

### C. Remove (Ref. Fig. 402 )

- (1) Be prepared with a receptacle to catch spilling fluid, then disconnect the hydraulic pipes from the lower swivel head. Fit blanks to the pipe ends and the swivel head ports.

NOTE: The right hand unit has one port permanently blanked off.

- (2) Remove the lower swivel head attachment bolts and support the mounting.
- (3) Remove the four bolts securing the upper swivel head to the manifold and disengage the unit from the bulkhead.

EFFECTIVITY: ALL

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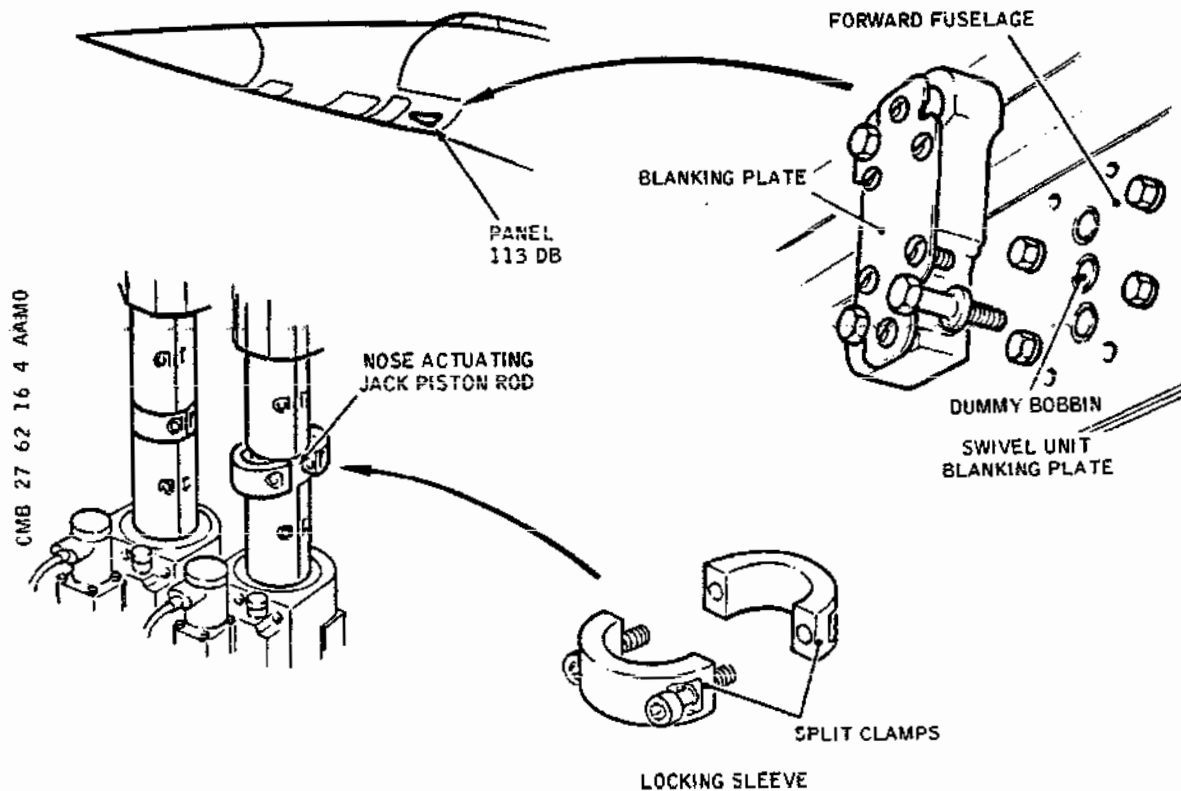
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Ground Equipment  
Figure 401

- (4) Withdraw the bobbins from the swivel unit and fit a blanking cover. Fit dummy bobbins and blank off the manifold with a blanking plate (Ref. Fig. 401).

### D. Install (Ref. Fig. 402 )

- (1) Prime the swivel unit with hydraulic fluid and replace the blanking caps.
- (2) Remove the blanking plate and dummy bobbins from the manifold (Ref. Fig. 401 ).
- (3) Fit new seals to the system bobbins ensuring that they are correctly positioned. Remove the blanking cover from the upper swivel head ports and insert the bobbins.

**NOTE:** Fit the end of the bobbin with the square seal in the unit. The end with the ident groove will be inserted in the manifold (Ref. 20-22-16).

EFFECTIVITY: ALL

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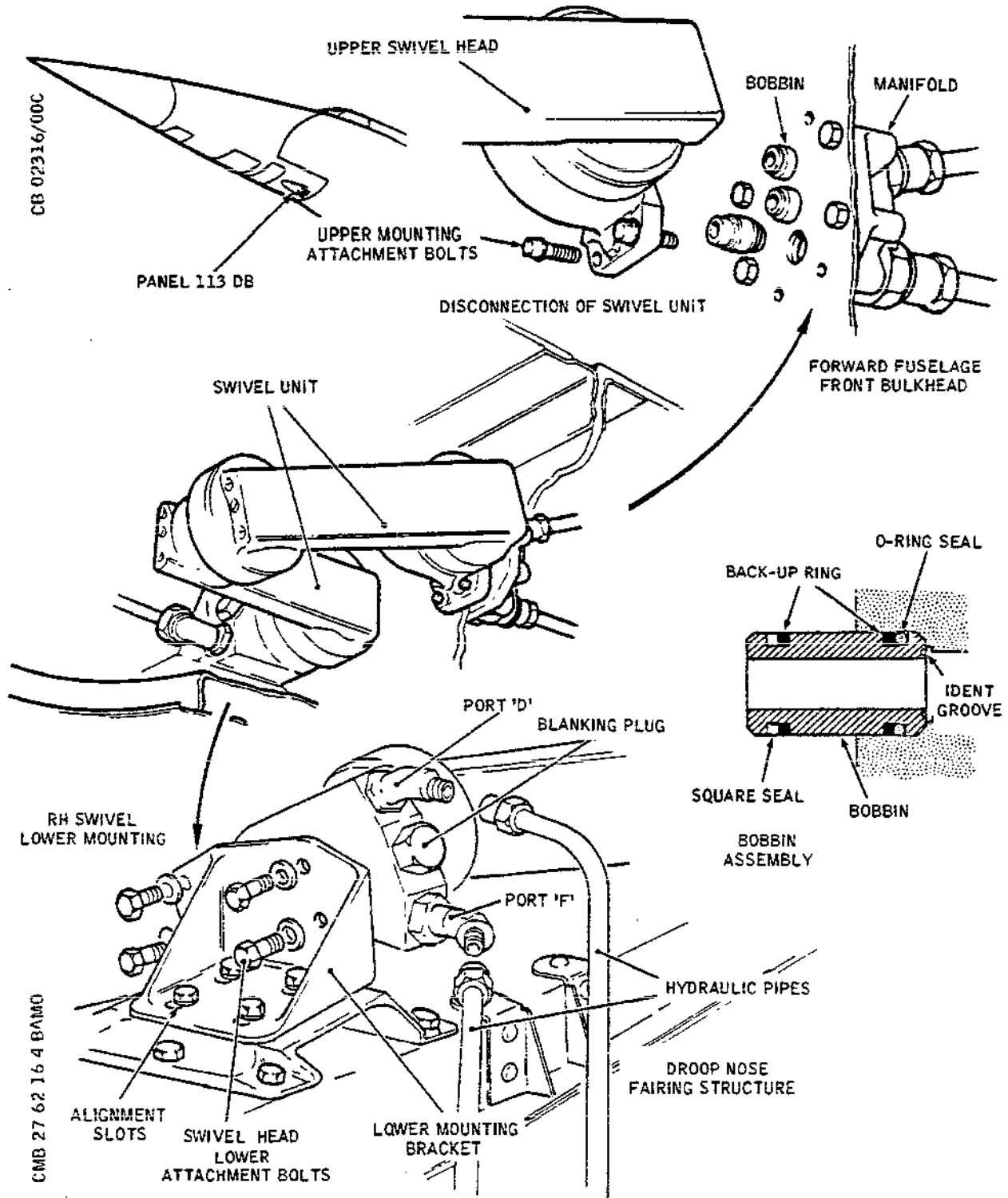
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Hydraulic Swivel Unit Installation  
Figure 402

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- (4) Bolt the swivel unit complete with bobbins to the manifold. Torque load the bolts to between 55 and 60 lbf in (0.62 and 0.68 mdaN) and lock them with wire.
- (5) Check the lateral alignment of the lower swivel head attachment bracket, adjust if necessary, and torque load the bolts to between 35 and 40 lbf in (0.39 and 0.45 mdaN).

NOTE: The lateral movement between the upper and lower swivel heads must not exceed  $\pm 0.010$  in.

- (6) Remove the blanking cover from the lower swivel head and bolt the head to the attachment bracket. Torque load the bolts to between 21 and 26 lbf in (0.23 and 0.29 mdaN) and lock them with wire.
- (7) Remove the blanks and connect the hydraulic pipes to the lower swivel head. Torque load all three connections on the left side head and connection D on the right side unit to between 160 and 180 lbf in (1.808 and 2.03 mdaN). Torque load connection F of the right side unit to between 95 and 115 lbf in (1.07 and 1.3 mdaN).
- (8) Remove the droop nose actuator locking sleeve.
- (9) Remove the circuit breaker safety clips and reset the circuit breakers.
- (10) Function test the visor and droop nose hydraulic system (Ref. 27-62-00).

NOTE: Complete the test with several visor up and down operations to bleed air from the system.

- (11) Replace access panel, 113 DB.

EFFECTIVITY: ALL

R

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### HYDRAULIC SWIVEL UNITS - ADJUSTMENT/TEST

**WARNING:** OBSERVE THE HYDRAULIC SAFETY PRECAUTIONS IN CHAPTER 29.

#### 1. General

The swivel units connect the hydraulic pipes in the fuselage to the pipes in the hinged droop nose. There are two: one (ident no. 4098) for the LH pipe run, and one (ident no. 4097) for the RH pipe run. Both are located beneath the flight compartment pressure floor and are accessible through a panel in the droop nose trough.

R A pressure/leakage test for the units is given.

#### R 2. Hydraulic Swivel Units Pressure/Leakage Test

##### A. Equipment and Materials

R

R

DESCRIPTION	PART NO.
Hydraulic ground generation rig	-
Blanking plate (2) and dummy bobbins (6)	D925196000
Safety clips, circuit breakers	-
Locking sleeves, nose actuator jacks	E925087000
Torque spanner (0 to 180 lbf in (0 to 2.03 mdaN) range)	-
Clean receptacle, hydraulic fluid	-
Non-corrodible steel wire 0.28 in (0.7 mm) dia	-

R

R

##### B. Prepare to Test

**NOTE:** This test is made with the nose in the fully lowered position to provide greater access to the swivel units.

(1) If the nose is not already in the fully down position, lower it as follows:

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- (a) Make available ground electrical power (Ref. 24-41-00).
  - (b) Connect the ground hydraulic test rig to the aircraft hydraulic system (Ref. 29-00-00) and pressurize the green hydraulic system.
  - (c) Operate the VISOR/NOSE normal control lever on the co-pilot's dash panel to set the nose down.
- (2) Depressurize the green and the yellow hydraulic systems by operating the manual pressure relief units in zone 151 and the pressure relief valves fitted to the bases of the green and the yellow system reservoirs in zone 153 (Ref. Chapter 29).
- (3) Electrically isolate the visor and droop nose control system by tripping the circuit breakers; fit safety clips.

R

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
VISOR & NOSE CONT	15-215	M11	F 8
NOSE 7 1/2 DEG CONT	1-213	M12	Q16
NOSE/VISOR STBY LOWER SUP	1-213	M13	Q17

R

- (4) Remove access panel 113DB.

R

- (5) Fit the ground safety locking sleeves to the nose actuator jacks (Ref. Fig. 501 ).

### C. Test Unit (Ref. Fig. 502 )

- (1) Detach the upper swivel head:
- (a) Remove the four bolts securing the swivel head to the bulkhead.
  - (b) Be prepared with a clean container to catch hydraulic fluid spilling from the joint and detach the swivel head from the bulkhead; remove the three bobbins.

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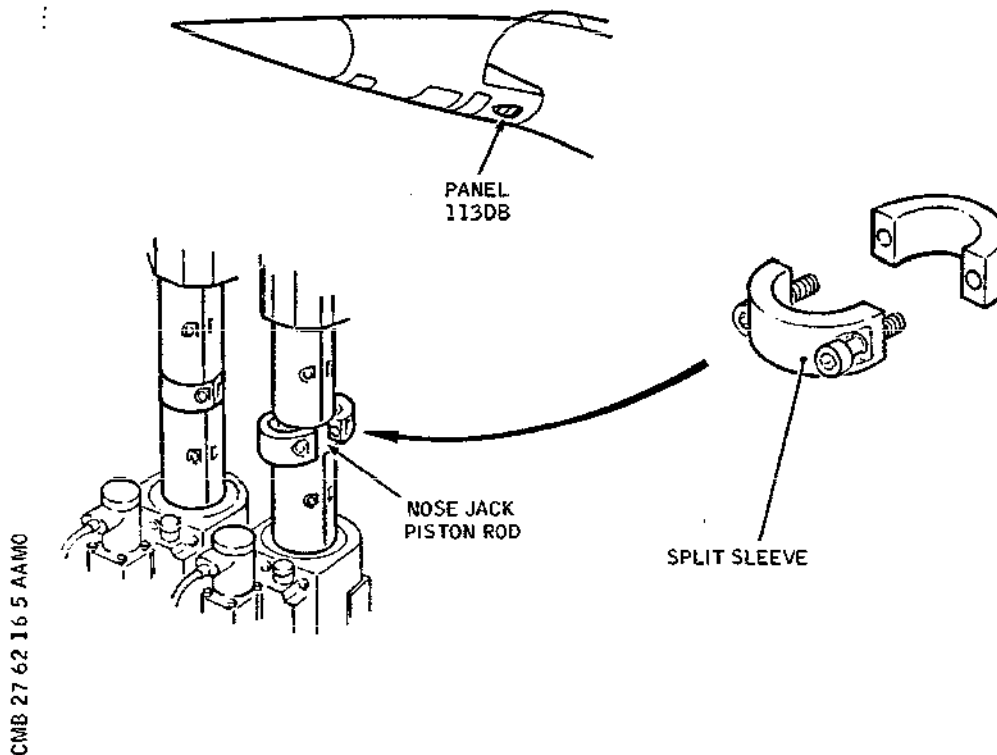
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## MAINTENANCE MANUAL



Ground Equipment  
Figure 501

- (c) Blank-off the three hydraulic ports in the bulk-head to prevent the ingress of foreign matter using three dummy bobbins and a blanking plate.
- (2) Blank-off the three hydraulic ports in the swivel head using three dummy bobbins, a blanking plate and four nuts (1/4 - 28 UNF).
- (3) Disconnect the hydraulic pipes from ports D and F on the lower swivel head. Be prepared with a clean container to catch fluid spilling from the open ports and pipe ends; fit blanks to the pipe ends.
- (4) Connect a hydraulic ground rig to port F.
- (5) With port D open, apply a pressure of 4000 psi (272 bars) to port F and check that leakage from port D does not exceed 50 cc per min.

**WARNING:** DO NOT PRESSURIZE PORTS D AND F TOGETHER AS THIS WILL DAMAGE THE SWIVEL UNITS.

EFFECTIVITY: ALL

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R

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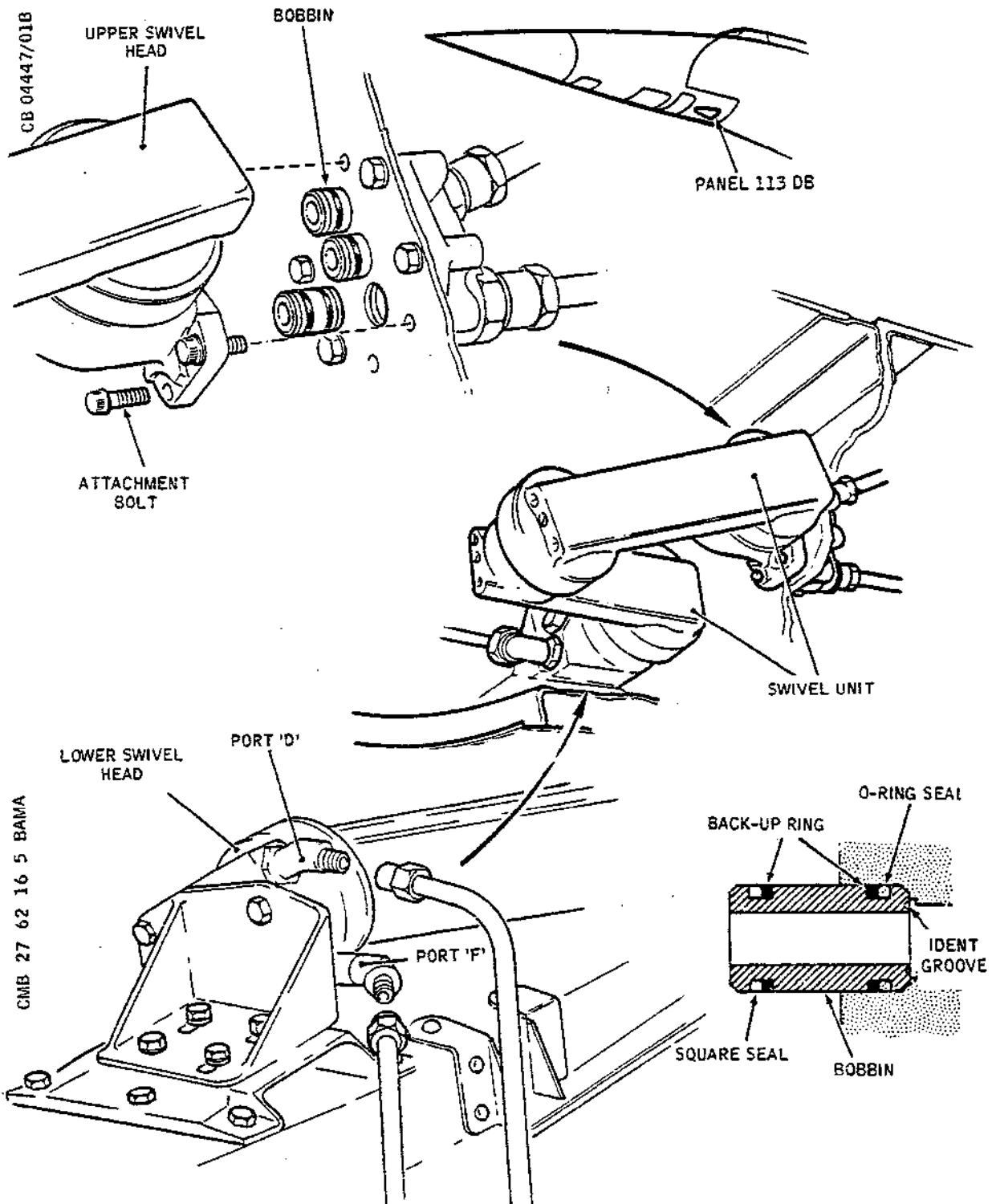
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## MAINTENANCE MANUAL



Hydraulic Swivel Units (Sheet 1 of 2)  
Figure 502

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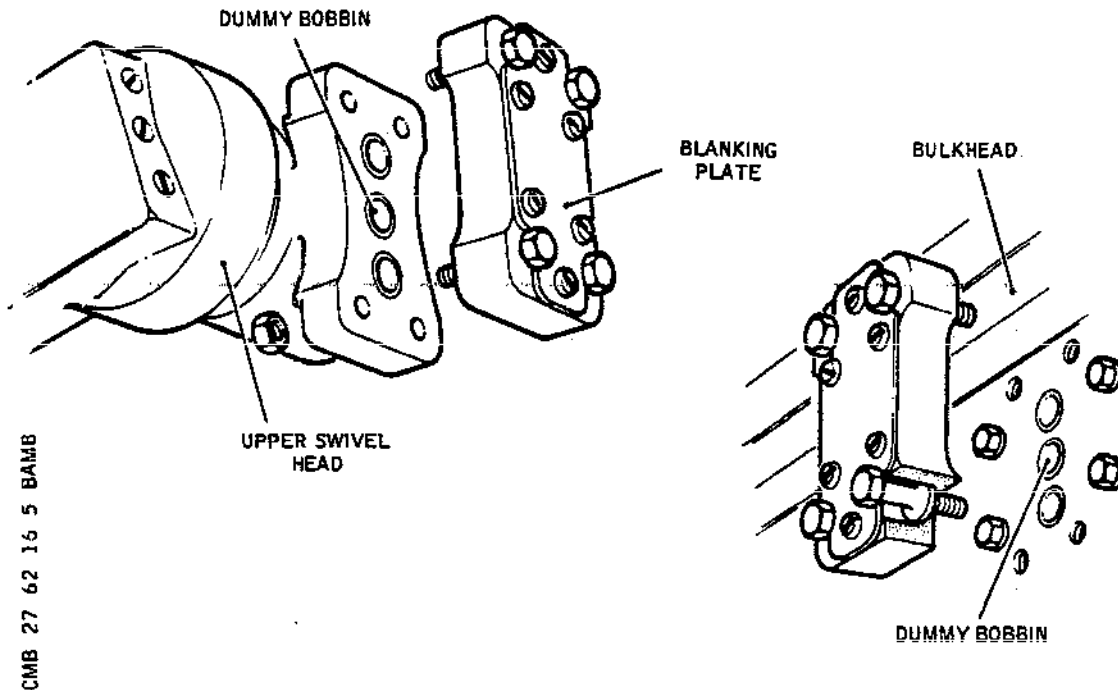
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## MAINTENANCE MANUAL



Hydraulic Swivel Units (Sheet 2 of 2)  
Figure 502

- (6) Disconnect the hydraulic ground rig from port F and connect it to port D.
- (7) With port F open, apply a pressure of 4000 psi (272 bars) to port D and check that leakage from port F does not exceed 50 cc per min.
- (8) At the completion of the test:
  - (a) Depressurize and disconnect the ground hydraulic rig.
  - (b) Reconnect the hydraulic pipes to ports D and F. Torque load the LH pipe couplings to between 160 and 180 lbf in (1.80 and 2.03 mdaN). Torque load the RH pipe coupling at port D to between 160 and 180 lbf in and that at port F to between 95 and 115 lbf in (1.07 and 1.3 mdaN).
  - (c) Fit new seals to the system bobbins ensuring that they are correctly positioned. Remove the

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R

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## MAINTENANCE MANUAL

blanking plates and dummy bobbins from the swivel head and the bulkhead and insert the system bobbins into the swivel head.

NOTE: Fit the end of the bobbin with the square seal in the unit. The end with the ident groove will be inserted in the bulkhead.

- (d) Fit the swivel head complete with bobbins to the manifold and secure it with bolts torque loaded to between 55 and 60 lbf in (0.62 and 0.68 mdaN). Lock the bolts with wire.
- (e) Remove the safety locking sleeves from the nose actuator jacks.
- (f) Remove the safety clips and reset the circuit breakers.
- (g) Function test the visor and droop nose hydraulic system (Ref. 27-62-00, Adjustment/Test).

NOTE: Complete the test by operating the visor up and down several times to bleed air from the system.

R

- (h) Fit access panel 113DB.

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### DROOP NOSE ACTUATOR - REMOVAL/INSTALLATION

WARNING: OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS IN 24-00-00.

OBSERVE THE HYDRAULIC AND TECHNICAL SAFETY PRECAUTIONS IN CHAPTER 29.

BEFORE ENTERING THE DROOP NOSE FAIRING FIT THE SAFETY PINS TO THE UPLOCKS AND FIT THE VISOR GROUND SAFETY LOCKS.

#### 1. General

R The droop nose actuator jacks, ident.nos.4397 (LH), 4398 (RH) are mounted side by side, each being trunnion mounted both on the front pressure bulkhead and the droop nose fairing structure. Removal and installation is the same for each jack and the procedure given includes the use of the nose actuator ground handling equipment. Access to both jacks is through panel apertures in the rear bulkhead and the bottom skin of the droop nose fairing.

Commence operations with the nose up and visor lowered. The visor can be in the raised position, but this will necessitate the fitting of the visor screwjack to lower the visor at the end of installation as function testing must start with visor and nose in the lowered positions. By lowering the visor initially, the need to fit the screwjack is avoided.

To maintain the fatigue life of flexible hoses when they are disconnected from the jack no attempt must be made to straighten them from their acquired shape. They must be reconnected to retain this shape as near as possible with no undue reforming.

#### 2. Droop Nose Actuator

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Safety clips, circuit breaker	-
Safety locking pin (2), droop nose uplock	E925045031
Locking link, visor 'down'	D925468030

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DESCRIPTION	PART NO.
Checking sling droop nose	D935085000
Spring balance (2 ton)	-
Bracket, sling	D935083000
Actuator handling equipment	E935023001
Minilift 5 cwt (254 kg) use with handling gear	-
Handle, 6 in (152 mm) use with Minilift	-
Locking wire, chromium-nickel, 0.028 in (0.71 mm) diameter and	-
Torque spanner, with 7/8 in (22.2 mm) hexagon socket drive, 85 to 145 lbf in (0.96 to 1.6 mdaN) range	-
Torque spanners, 0 to 400 lbf in (0 to 4.5 mdaN) range	-

### B. Prepare to Remove

- (1) Depressurize the green and yellow hydraulic systems by operating the pressure release valves located on the relevant system manifolds in zones 151 and 152, and by unscrewing the knurled knob on the pressure relief valves fitted to the bottom of the hydraulic reservoirs located in zones 153 and 154.
- (2) Electrically isolate the visor and control system by tripping the circuit breakers. Fit safety clips.

	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
R	VISOR & NOSE CONT	15-215	M11	F 8
R	NOSE 7 1/2 CONT	1-213	M12	Q16

EFFECTIVITY: ALL

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	SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
R	NOSE/VISOR STBY LOWER SUP	1-213	M13	Q17
R	VISOR SERVICES 'A' SYS CONT	1-213	M14	Q18
R	VISOR & NOSE IND	15-215	M15	F 9
R R	VISOR SERVICES 'B' SYS CONT	15-216	M16	D18

- (3) Remove the access panels. Fit the nose uplock safety pins and the visor down locking link.  
Remove the access panel 113BZ from the droop nose fairing bulkhead. (Ref. Fig. 401 ).
- (4) Fit the checking sling to the droop nose fairing (Ref. Fig. 401 ), then connect it to a suitable hoist and adjust it to take the weight of the nose fairing.

NOTE: The indicated load on the spring-balance must not exceed 1500 lb when lowering or raising the droop nose fairing.

### C. Remove

- (1) Disconnect the jack fittings (Ref. Fig. 402 ).
- (a) Disconnect the electrical supply cables from the jack solenoids, and disconnect the bonding leads from their attachments to the gimbal and the surrounding structure.
- (b) Be prepared with a receptacle to catch spilling fluid, then disconnect the flexible hydraulic hoses from the lower cylinder selector valve. Fit pressure blanks to the pipe ends and protective blanks to the selector valve ports.
- (c) Be prepared with a receptacle to catch spilling fluid, then disconnect the rigid hydraulic pipes from the union adapters on the upper cylinder, and disconnect the flexible hoses from the union adapters on the pipe support bracket. Fit pressure blanks to the flexible pipe ends and protective blanks to the rigid pipe ends and to the ports.

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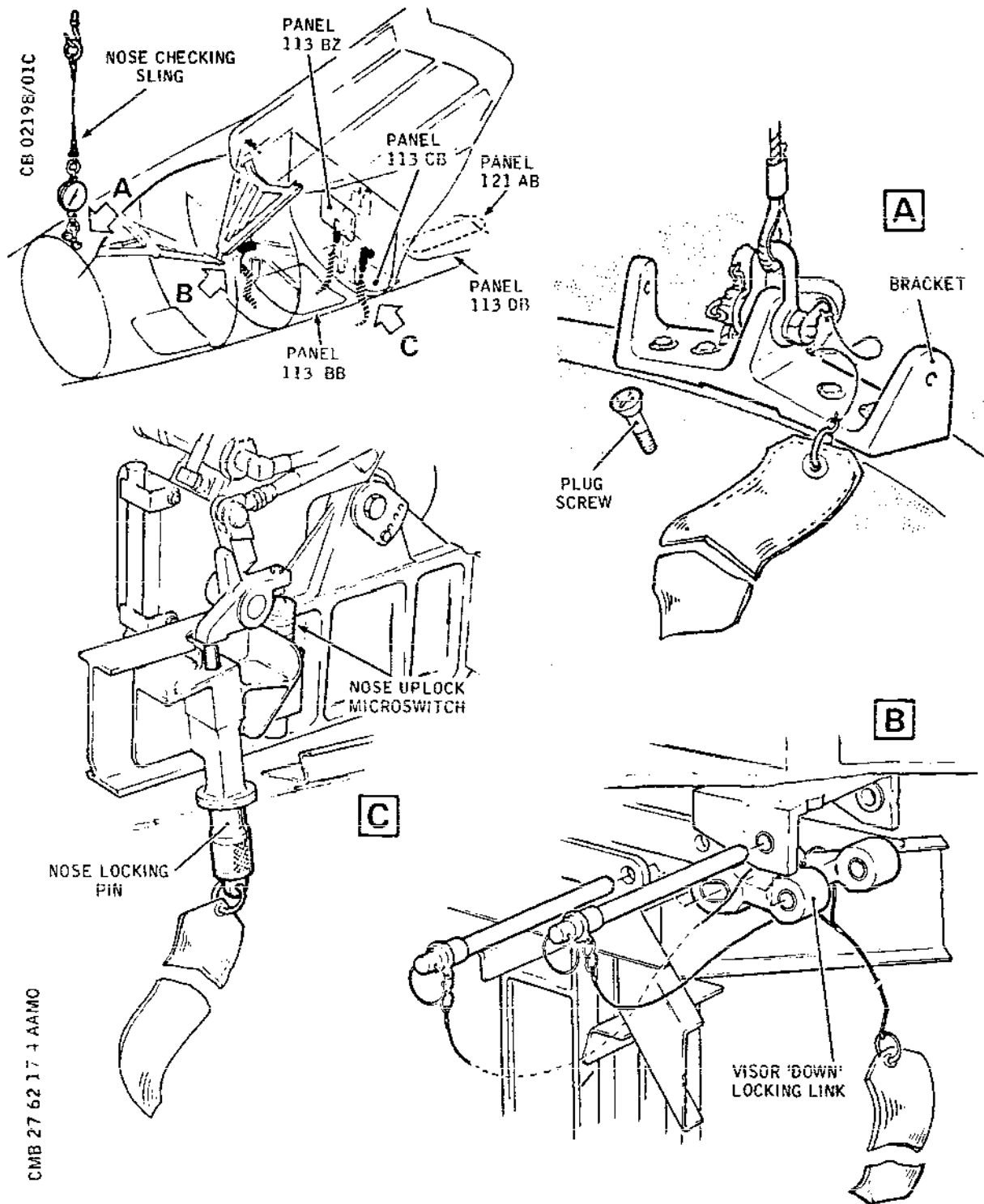
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Ground Equipment  
Figure 401

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- R (d) Remove the four bolts securing the hydraulic pipe support bracket to the upper cylinder selector valve. Withdraw the support bracket complete with the rigid pipes.
- (2) Fit the droop nose actuator handling equipment (Ref. Fig. 403 ).
- R (a) Fit the upper and lower skid plates to the jack.
- R (b) Fit the rubber restraining cord. Ensure that the cord does not foul the fittings of the other jack.
- (c) Fit the pulley assembly to the appropriate bracket on the nose bulkhead.
- (d) Fit the mini-hoist support assembly to the aperture frame of access panel 113BB and adjust it to suit the relevant left or right position.
- (e) Connect the mini-hoist to the support assembly. Locate the cable over the pulley and attach the lifting fork to the cable end fitting.
- R (f) Attach the lifting fork to the jack lifting lug and winch up the cable to support the weight of the jack.
- R
- NOTE: All items of the equipment have captive pip pins or bolts.
- R (3) Remove the upper cross beam (Ref. Fig. 404 ) from the actuator left and right hand support members. Ensure that the trunnion bushes are retained with the beam.
- (4) Fit the jack retainer plate (Ref. Fig. 403 ) to the support member of the jack that is not being removed.
- (5) Suitably pack the gap between the left and right hand jack upper bodies to prevent gimbal rotation.
- (6) Remove the relevant lower cross beam (Ref. Fig. 404 ) complete with the trunnion bush. Re-attach the other cross beam to the centre beam with the bolts and nuts.
- R
- R (7) Remove the restraining cord and manually withdraw the jack from its rear trunnion mountings. Ensure that the bushes are retained in the mountings. Remove the packing fitted in operation (5).

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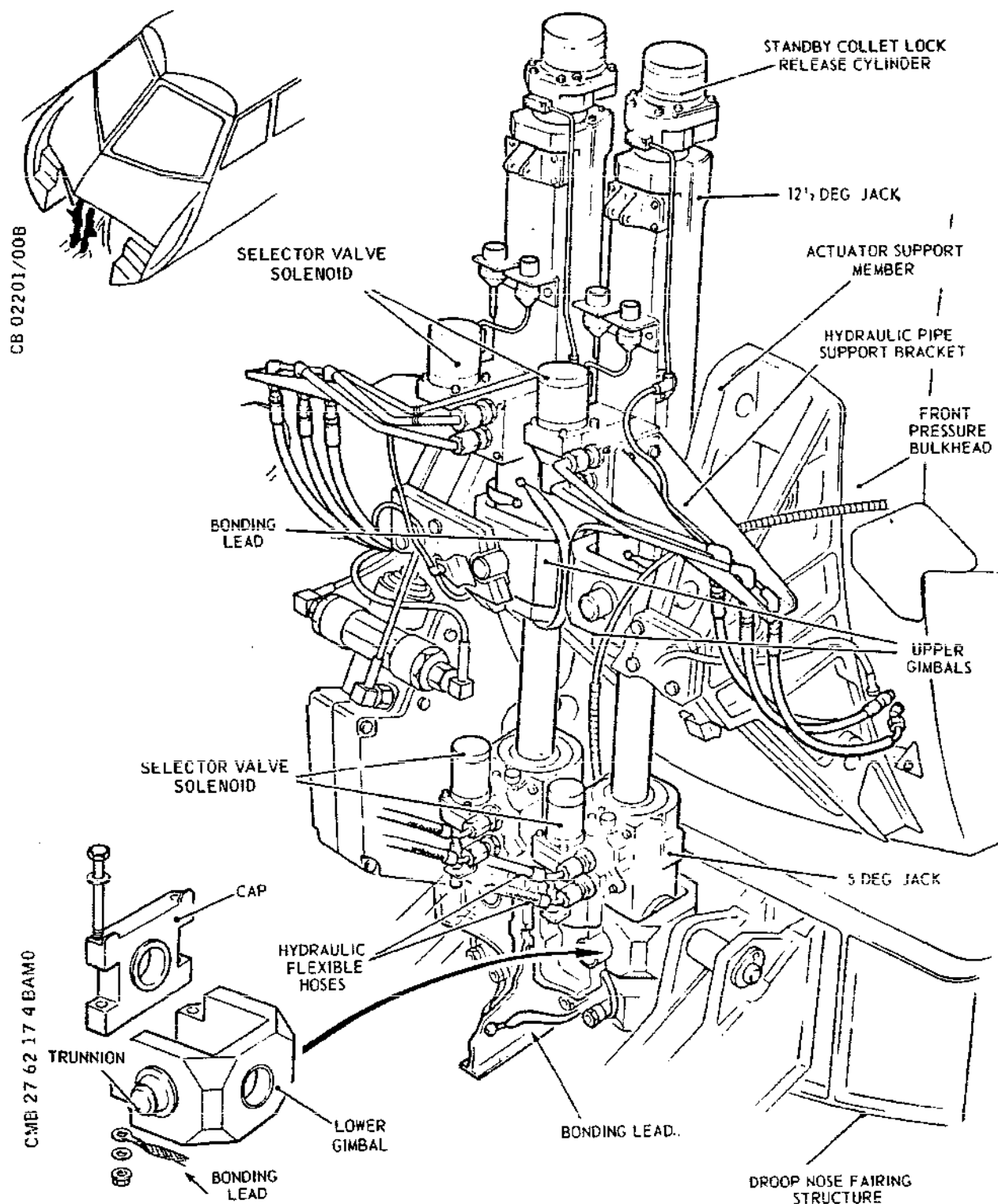
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Droop Nose Actuator - Installation  
Figure 402

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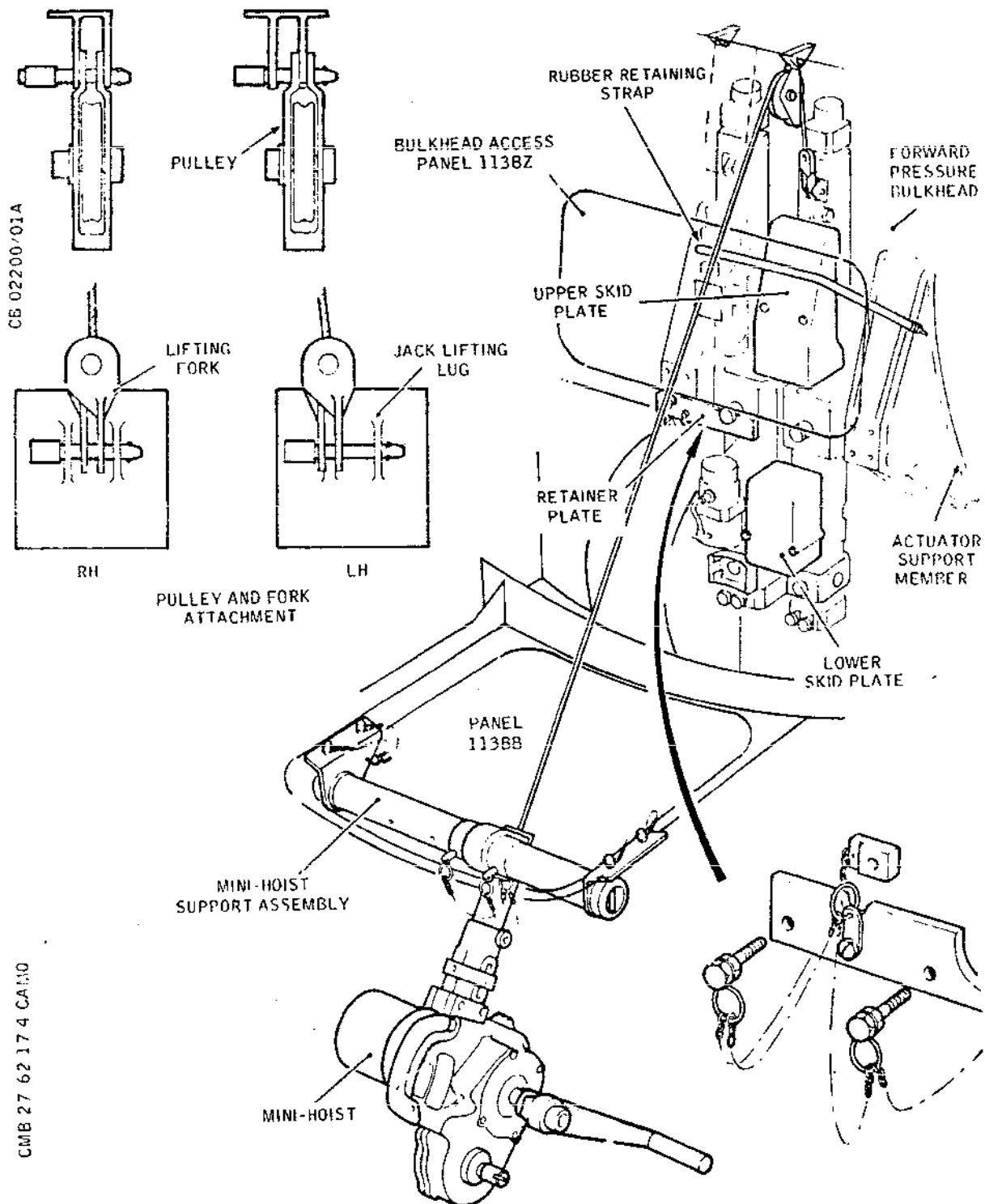
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Actuator Handling Equipment  
Figure 403

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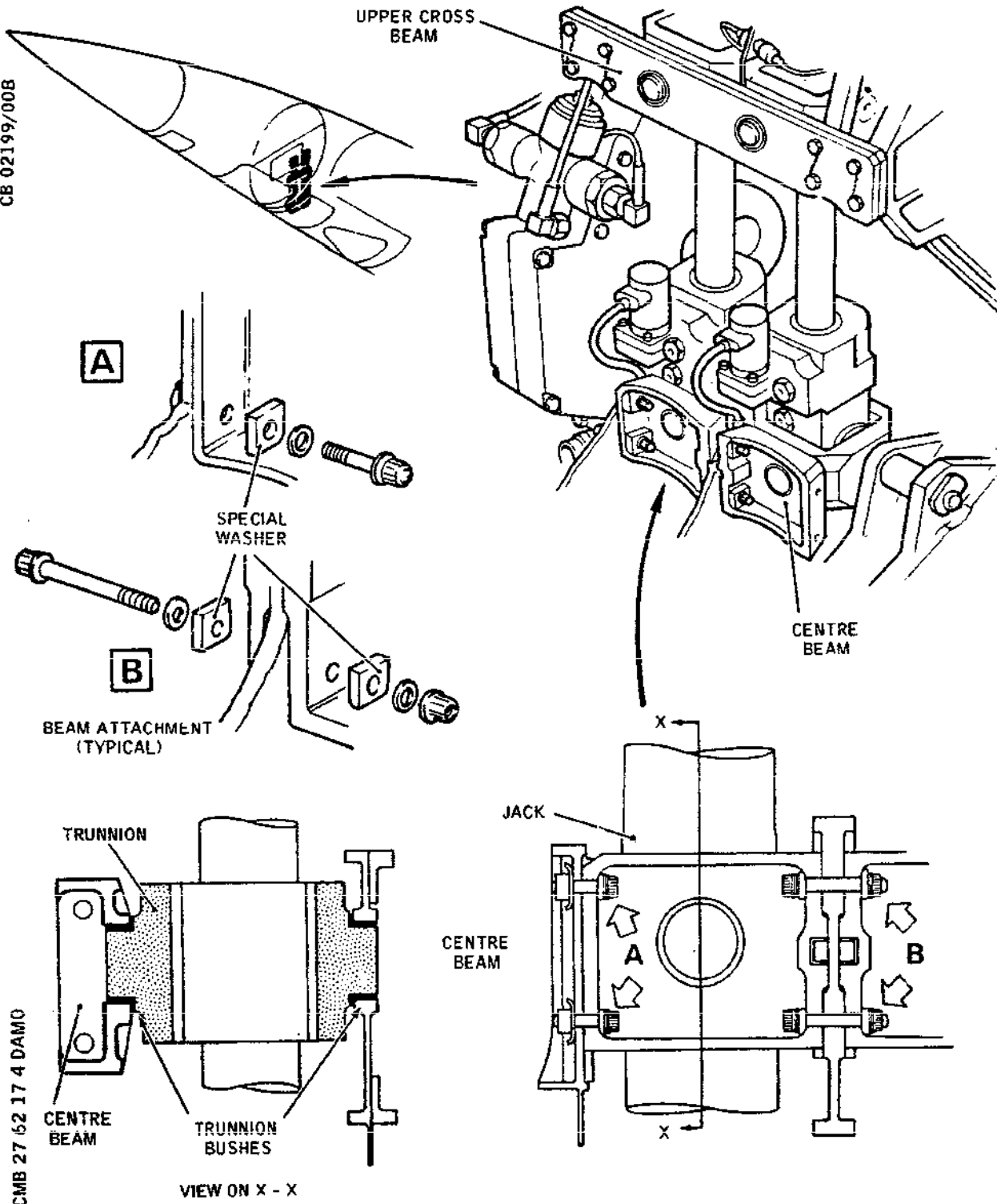
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Cross Beam Installation  
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NOTE: The jacks have an off-set centre of gravity.

- (8) Operate the mini-hoist to lower the jack through the access door aperture. Hand guide the jack during the lowering operation.
- (9) Remove the skid plates from the jack.
- (10) Remove the upper and lower gimbal assemblies (Ref. Fig. 402 ) from the jack. Temporarily fit the gimbal caps to the relevant gimbal.

### D. Prepare to Install

R NOTE: Before installation ensure:

- R (1) That the actuator mounting structure, suppose
- R members and crossbeams have been inspected for
- R wear, damage and corrosion.
- R (2) That the jack is fully retracted and that the
- R 12 1/2 deg cylinder collet lock is engaged.

- (1) Ensure that the safety precautions given in para.2B are still applied and that the actuator hoisting gear is still in position.
- (2) Fit the upper and lower gimbal assemblies (Ref. Fig. 402 ) to the jack. Position each bonding lead under the relevant nut and washer, and torque tighten the nuts to between 160 and 180 lbf in (1.8 to 2.0 mdan).

NOTE: Fit each assembly with the chamfered edge to the left hand side of the jack.

- (3) Fit the bushes (Ref. Fig. 404 ) to the upper and lower rear trunnion mountings. Lightly smear the bore and exposed faces of the bushes with Aeroshell Grease 16.
- (4) Fit the upper and lower skid plates of the nose actuator handling equipment to the jack (Ref. Fig. 403 ).

### E. Install

- (1) Attach the lifting fork to the relevant jack lifting lug (Ref. Fig. 403 ). Winch up the jack to align the trunnions with the trunnion mountings. Guide the jack by hand during the raising operation.

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- R (2) Locate the jack in the rear trunnion mountings, fit the rubber restraining cord ensuring that it does not foul the fittings on the other jack and remove the retainer plate fitted during removal.
- (3) Fit the bushes to the upper and lower cross beams (Ref. Fig. 404 ). Lightly smear the bore and exposed faces of the bushes with Aeroshell Grease 16.
- R (4) Fit the upper cross beam to the actuator left and right side support members. Torque tighten the attachment bolts to between 170 and 200 lbf in (1.9 and 2.26 mdaN). Lock the bolts together in pairs with wire.
- (5) Fit the jack lower crossbeam (Ref. Fig. 404 ):
- R (a) Fit the crossbeam in position and secure it to the centre beam with the bolts, washers (fitted beneath the bolt head with chamfer over bolt head radius), special washers, fitted with radius locating in radius of flange, and nuts.
- R (b) Using bolts, washers and special washers secure the crossbeam to the outer beam in a similar manner as in (a).
- R (c) Torque tighten the nuts (centre beam) to between 145 and 160 lbf in (1.63 and 1.8 mdaN) and the bolts (outer beam) to between 125 and 140 lbf in (1.41 to 1.58 mdaN).
- (6) Remove the actuator handling equipment.
- (7) Fit the hydraulic pipe support bracket and retain it loosely in position with the four bolts and washers. Remove the blanks and connect the rigid hydraulic pipes to the union adaptors on the jack; tighten the pipe union nuts to the following torque-loadings:
- (a) Green return (5/16 in dia pipe):  
between 130 and 150 lbf in (1.469 and 1.695 mdaN).
- R (b) Green pressure (1/4 in dia pipe):  
between 95 and 115 lbf in (1.073 and 1.3 mdaN).
- (c) Yellow pressure (3/16 in dia pipe):

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between 60 and 80 lbf in (0.678 and 0.904 mdaN).

- R (8) Tighten the pipe support bracket attachment bolts to a torque loading between 25 and 30 lbf in (0.28 and 0.34 mdaN), and lock them together in pairs with wire.
- (9) Remove the blanks and connect the flexible hoses to the union adapters on the support bracket; tighten the hose union nuts to the following torque-loadings:
- (a) Green return (5/16 in dia pipe):  
between 85 and 180 lbf in (0.96 and 2.03 mdaN).
- R (b) Green pressure )  
R Yellow pressure ) (1/4 in dia pipes):  
R between 70 and 120 lbf in (0.79 and 1.35 mdaN).
- (10) Remove the blank covers and fit the hydraulic flexible hoses to the jack lower cylinder selector ports. Torque tighten the 1/4 in diameter hose union nut to between 70 and 120 lbf in (0.79 and 1.35 mdaN), and the 5/16 in diameter hose union nut to between 85 and 180 lbf in (0.96 and 2.03 mdaN).
- (11) Connect the electrical supply cables to the jack solenoids. Connect the bonding leads to the frame structure (Ref. Fig. 402 ).
- R (12) Lower the nose fairing to the DOWN position (Ref. Fig.401 and 405).

NOTE: After the installation of a jack hydraulic operation of the actuator MUST commence from the nose down position.

- (a) Remove the nose uplock safety pins.
- R (b) Check that the positions of the visor and droop  
R nose normal and standby control switches conform  
R with the positions of the visor and nose and  
R reset the circuit breaker M13.
- R (c) Make available ground electrical power (Ref.24-  
R 41-00).
- R (d) Pressurize the yellow hydraulic system using the  
R aircraft ground hydraulic checkout system  
R (Ref.29-00-00, Servicing).
- R (e) Set the visor and droop nose standby control

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R switches to "VISOR DOWN", "NOSE 5°" and "NOSE  
R DOWN" to release the nose uplocks and the collet  
R locks.

R (f) Lower the nose on the checking sling to the  
R fully down position.

R (g) Reset the standby switches using the resetting  
R procedure given in 27-61-00, Adjustment/Test.

(13) Remove the checking sling assembly.

(14) Remove the visor 'down' locking link (Ref. Fig. 401 )

(15) Bleed the visor and droop nose hydraulic system  
(Ref.27-62-00, Adjustment/Test).

(16) Check the fluid level in the green hydraulic reservoir  
and fill it if necessary (Ref. 12-12-29).

(17) Function test the visor and droop nose hydraulic  
system (Ref. 27-62-00, Adjustment/Test).

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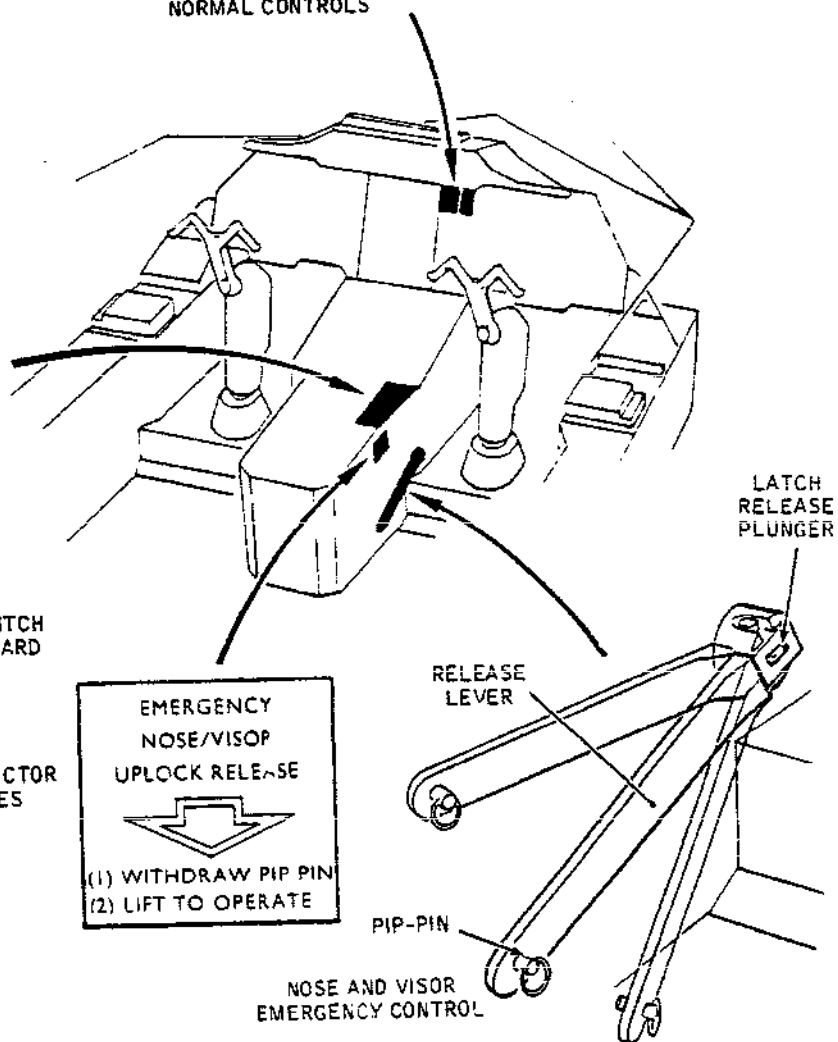
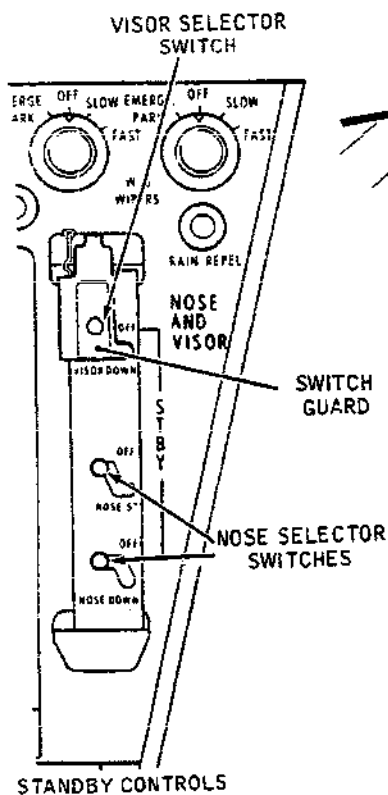
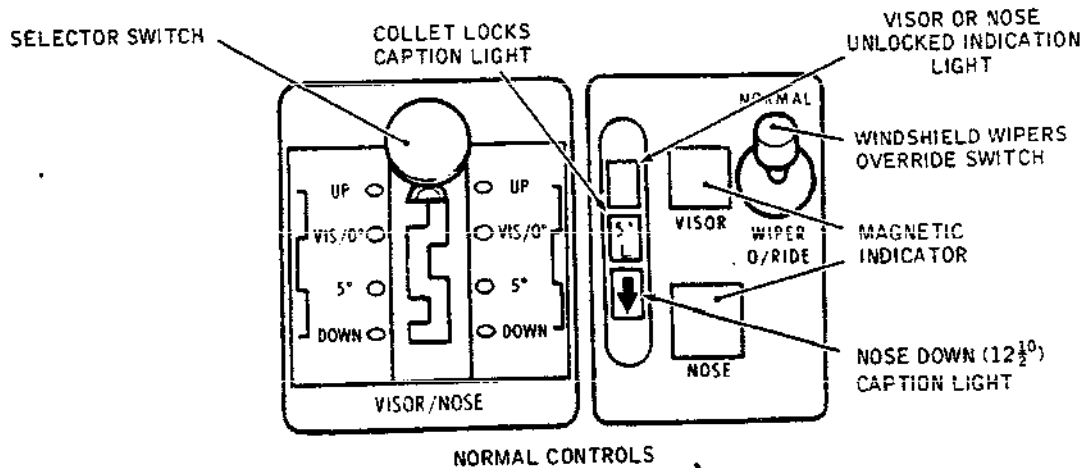
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# Concorde

## MAINTENANCE MANUAL

CB 01995/01D



Visor and Droop Nose Controls and Indicators  
Figure 405

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# *Concorde*

## MAINTENANCE MANUAL

### DROOP NOSE UPLOCK JACK - REMOVAL/INSTALLATION

#### 1. General

A hydraulic jack (ident No. 3468 (LH), 3469 (RH)) is bolted to each of the nose uplocks on the forward pressure bulkhead. Each jack is connected to the Green and the Yellow hydraulic systems and can be removed from the uplock in-situ.

#### 2. Droop Nose Uplock Jack

##### A. Equipment and Material

DESCRIPTION	PART NO.
Locking sleeve, droop nose actuators	E925091000
Safety clips, circuit breaker	-
Receptacle, hydraulic fluid	-
Ground power unit, hydraulic power and preliminary testing	EMH398E
Torque spanner, 25 to 150 lbf in (0.28 to 1.70 mdaN) range	-

##### B. Prepare to Remove

- (1) If the nose is not already in the fully down position, lower it as follows:
  - (a) Make available ground electrical power (Ref. 24-41-00, Servicing).
  - (b) Connect the ground hydraulic test rig to the aircraft hydraulic system (Ref. 29-00-00) and pressurize the Green and Yellow hydraulic systems.
  - (c) Operate the VISOR/NOSE normal control lever on the co-pilot's dash panel to set the nose down.

NOTE: If the uplock jack has failed, lower the nose to the 5 deg position by operating the EMERGENCY NOSE/VISOR UPLOCK RELEASE lever, and to the 12 1/2 deg position using the normal selector switch.

EFFECTIVITY: ALL

# *Concorde*

## MAINTENANCE MANUAL

- (2) Depressurize the Green and the Yellow hydraulic systems by operating the manual pressure relief units in zone 151 and the pressure relief valves fitted to the bases of the Green and the Yellow system reservoirs in zone 153.
- (3) Trip, safety and tag the following circuit breakers to electrically isolate the visor and the droop nose control system:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
NOSE 7 1/2 DEG CONT	1-213	M 12	Q16
NOSE/VISOR STBY LOWER SUP		M 13	Q17
VISOR & NOSE CONT	15-215	M 11	F 8

- (4) Fit the locking sleeves E925091000 to the nose actuator jacks (Ref. Fig. 401).

### C. Remove (Ref. Fig. 402)

- (1) Disconnect the hydraulic pipes from the uplock jack. Be prepared with a clean container to catch hydraulic fluid spilling from the open pipe ends, and fit blanks to the pipe end and jack ports.
- (2) Remove the two bolts securing the jack to the uplock.

### D. Install (Ref. Fig. 402)

- (1) Secure the hydraulic jack to the uplock with two bolts washers and nuts. Tighten each nut to a torque value of 25 to 30 lbf in (0.27 to 0.33 mdaN) and secure it with a split pin.
- (2) Connect the hydraulic pipes to the jack. When removing the blanks from the jack ports and pipe ends be prepared to catch fluid spilling from the open ends.
- (3) Bleed the jack at the Green and the Yellow hydraulic systems connections A and B using a ground test rig with hand pump:
  - (a) Remove the circuit breakers safety clips and reset the circuit breakers.
  - (b) With the normal selector switch at UP, set the standby switches to VISOR LOWER and NOSE 5 deg.

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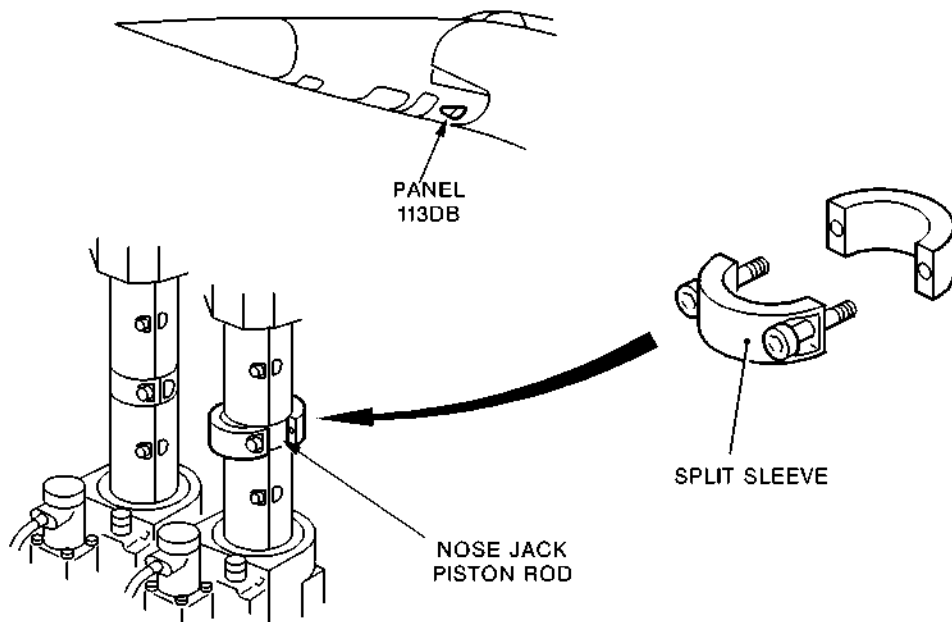
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# Concorde

## MAINTENANCE MANUAL



Nose Actuator Jack Locking Sleeves  
Figure 401

- (c) Slacken the standby (Yellow) pipe coupling nut at uplock and apply sufficient pressure with the hand pump to bleed until an air free flow of fluid is obtained, then retighten the nut.
- (d) Set the standby switches to OFF and set the normal selector switch to 5 deg.
- (e) Slacken the normal (Green) pipe coupling nut at the uplock and apply sufficient pressure with hand pump to bleed until an air free flow of fluid is obtained then retighten the nut.
- (f) Tighten the coupling nuts to a torque value of between 95 and 115 lbf in (1.05 and 1.13 mdaN) on 1/4 in (6.35 mm) dia pipes and between 130 and 150 lbf in (1.45 and 1.7 mdaN) on 5/16 in (7.9 mm) dia pipes.

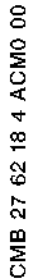
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UPLOCK JACK	CONNECTION		
	A	B	C
LH	GP	YP	GR
RH	YP	GP	GR

- NOTE: Complete the test with several visor and nose up and down operations to bleed the system of air.

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# Concorde

## MAINTENANCE MANUAL

### HYDRAULIC NON-RETURN VALVES - REMOVAL/INSTALLATION

**WARNING:** OBSERVE ELECTRICAL PRECAUTIONS AS DETAILED IN 24-00-00.

OBSERVE HYDRAULIC AND TECHNICAL PRECAUTIONS AS DETAILED IN CHAPTER 29.

FIT THE GROUND SAFETY LOCKING DEVICES (Ref. Fig. 401 )  
BEFORE COMMENCING WORK IN THE DROOP NOSE.

#### 1. General

R Four non-return valves are situated in the underfloor  
R equipment compartment of the front fuselage. One is fitted  
R to the green system return port of the visor standby selector  
R valve, one in the yellow system return pipeline from the nose  
R uplocks and collet locks selector valves manifold  
R (Ref. Fig. 402 ) and one in each of the green and the yellow  
R system return pipelines (Ref. Fig. 403 ). The valves are  
R spring-loaded and have different sized end fittings,  
R assisting correct assembly. Rigid pipes connect to each  
R valve.

#### 2. Non-return Valve (Ident No.1157) Hydraulic Green System

##### A. Equipment and Materials

R		
R	<u>DESCRIPTION</u>	<u>PART NO.</u>
R		
R	Droop nose locking pin (2 off)	E925045031
R	Locking sleeve, droop nose	E925091000
R	actuators	
R	Clean receptacle, hydraulic fluid	-
R	Safety clips, circuit breaker	-
R	Torque spanner (0 to 400 lbf in	
R	(0 to 4.52 mdaN) range))	-
R		

##### B. Prepare to Remove

**NOTE:** The valves may be removed or installed with the  
droop nose either fully raised or fully lowered.

When disconnecting hydraulic pipes be prepared with

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## MAINTENANCE MANUAL

R  
R

a clean container to catch fluid spilling from the pipe ends; fit blank covers to the open pipe ends and component parts.

- (1) Electrically isolate the visor and droop nose control system by tripping the circuit breakers.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
VISOR & NOSE CONT	15-215	M11	F 8
NOSE 7 1/2 CONT	1-213	M12	Q16
NOSE/VISOR STBY LOWER SUP.	1-213	M13	Q17

- (2) Fit the appropriate droop nose ground safety locking device (Ref. Fig. 401 ).

- (a) NOSE UP position - fit droop nose locking pins.  
(b) NOSE DOWN position - fit nose actuator locking sleeves.

- (3) Depressurize the green or the yellow (as appropriate) hydraulic system by operating the applicable manual pressure relief unit in zone 151 and the pressure relief valve fitted to the base of the green or the yellow system reservoir in zone 153.

C. Remove (Ref. Fig. 402 )

- (1) Disconnect the hydraulic pipe from the non-return valve at port F on the visor standby selector valve (ident no.0478).  
(2) Unscrew and withdraw the non-return valve; discard the O-ring seal.

D. Install (Ref. Fig. 402 )

NOTE: Fit coupling nuts to 20-23-11.

R

- (1) Remove the blank covers from the visor standby selector valve and the non-return valve. Fit a new O-ring seal to the non-return valve.  
(2) Fit the non-return valve to port F of the standby

EFFECTIVITY: ALL

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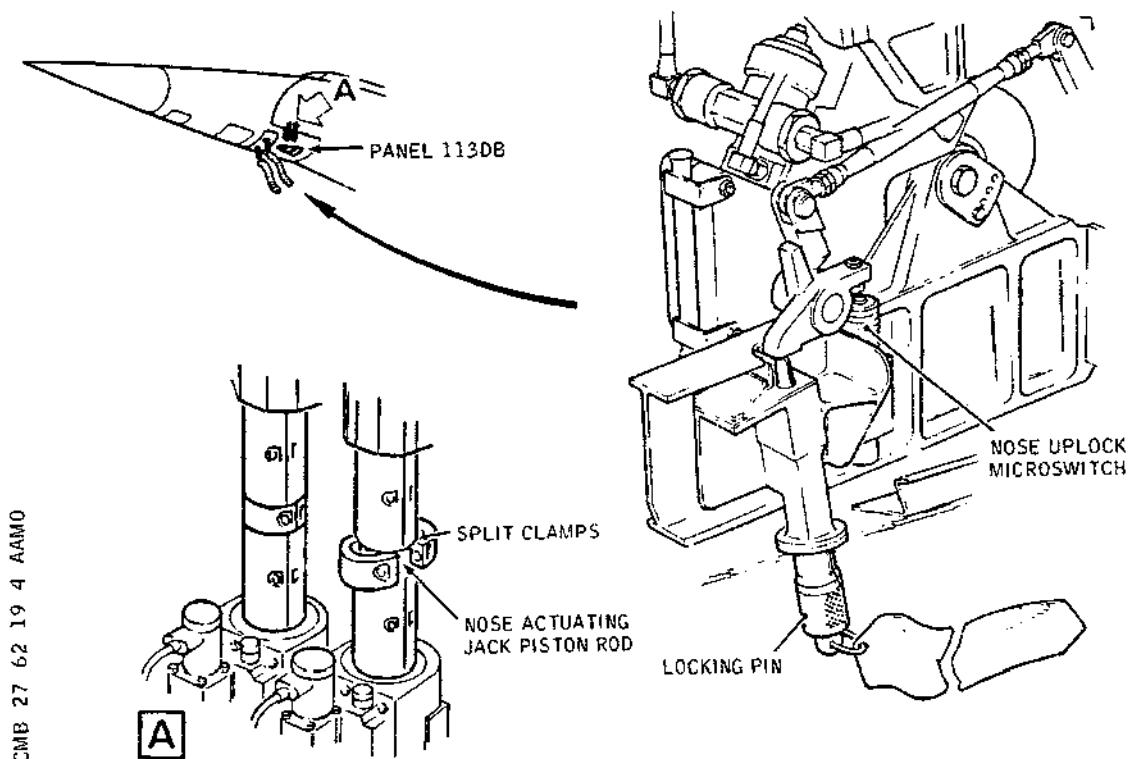
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## MAINTENANCE MANUAL



Ground Safety Locks  
Figure 401

selector valve. Torque load the valve to between 350 and 370 lbf in (3.95 and 4.18 mdaN).

- R
- (3) Remove the blank cover from the hydraulic pipe end fitting. Fit the pipe to the non-return valve. Torque load the connection to between 160 and 180 lbf in (1.80 and 2.03 mdaN).
  - (4) Remove the droop nose ground safety locking device (Ref. Fig. 401 ).
  - (5) Remove the circuit breaker safety clips and reset the circuit breakers previously tripped.
  - (6) Function test the visor and droop nose hydraulic system (Ref. 27-62-00, Adjustment/Test).

**NOTE:** Complete the test with several visor and droop nose up and down operations to bleed the system of air.

R 3. Non-return Valve (Ident No.5137) Hydraulic Yellow

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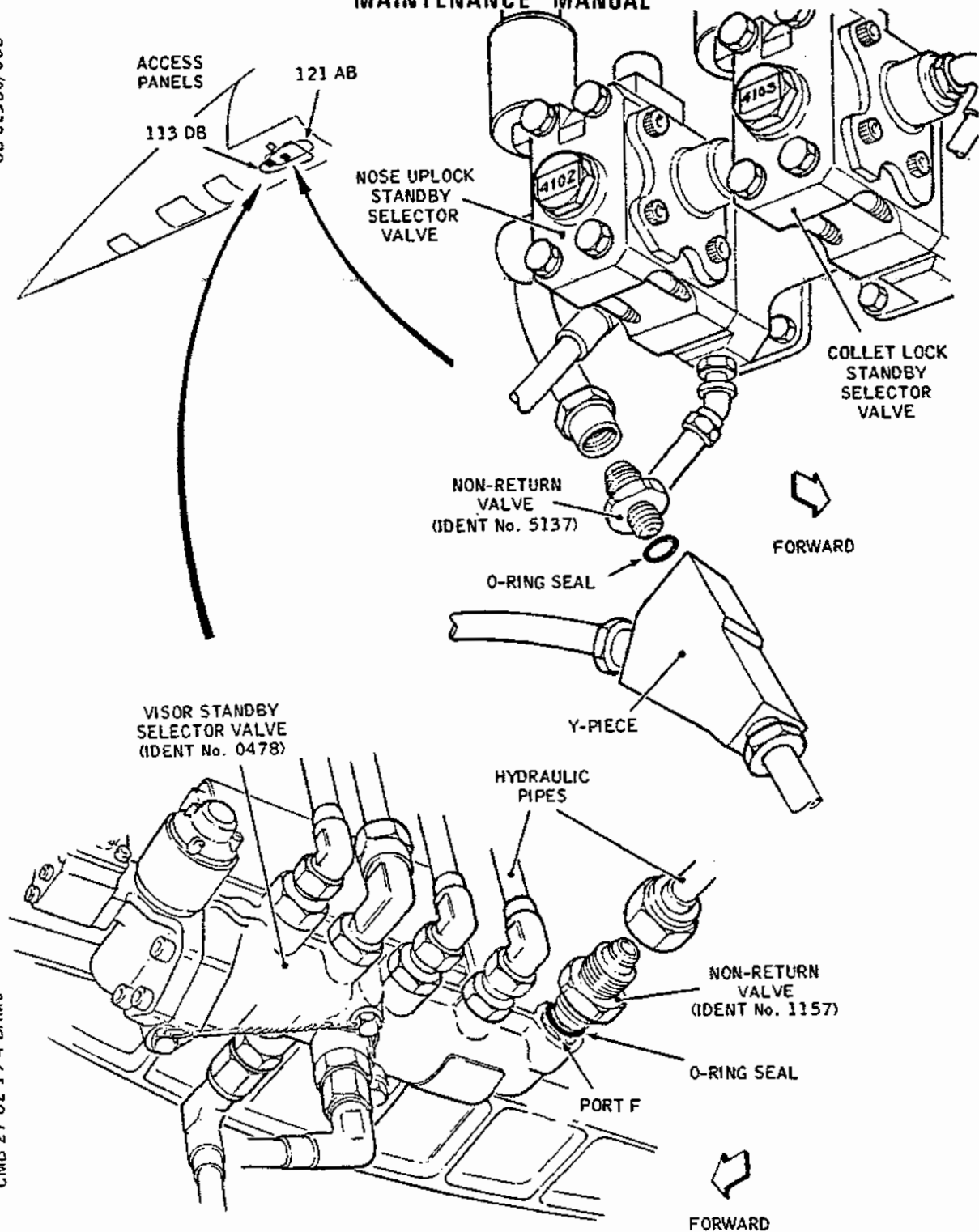
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Non-return Valves - Installation  
Figure 402

R

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

### R System

#### R A. Remove (Ref. Fig. 402 ).

R (1) Carry out the preparatory procedure (Ref. para  
R 2A and B).

R (2) Disconnect the hydraulic pipe from the non-return  
R valve. Unscrew the valve from the Y-piece and  
R discard the O-ring seal.

#### R B. Install (Ref. Fig. 402 )

R NOTE: Fit coupling nuts to 20-23-11.

R (1) Remove the blank covers from the Y-piece and the  
R non-return valve.

R (2) Fit a new O-ring seal to the non-return valve and  
R screw the valve into the Y-piece. Torque tighten  
R the valve to between 150 and 250 lbf in  
R (1.7 and 2.8 mdaN).

R (3) Remove the blank cover from the hydraulic pipe end  
R fitting and connect the pipe to the non-return valve.  
R Torque-tighten the connection to between 145 and  
R 155 lbf in (1.64 and 1.75 mdaN).

R (4) Remove the droop nose ground safety locking  
R devices (Ref. Fig. 401 ).

R (5) Remove the circuit breakers safety clips and reset  
R the circuit breakers.

R (6) Function test the visor and droop nose hydraulic  
R system (Ref.27-62-00, Adjustment/Test).

R NOTE: Complete the test by lowering and raising  
R the visor and droop nose several times to  
R bleed the system of air.

#### R 4. Non-return Valve (Ident No.0489) Hydraulic Yellow System

##### A. Remove (Ref. Fig. 403 )

(1) Carry out the preparatory procedure (Ref. para.2A  
and B).

(2) Disconnect the hydraulic pipes from each end of the  
non-return valve and remove the valve.

EFFECTIVITY: ALL

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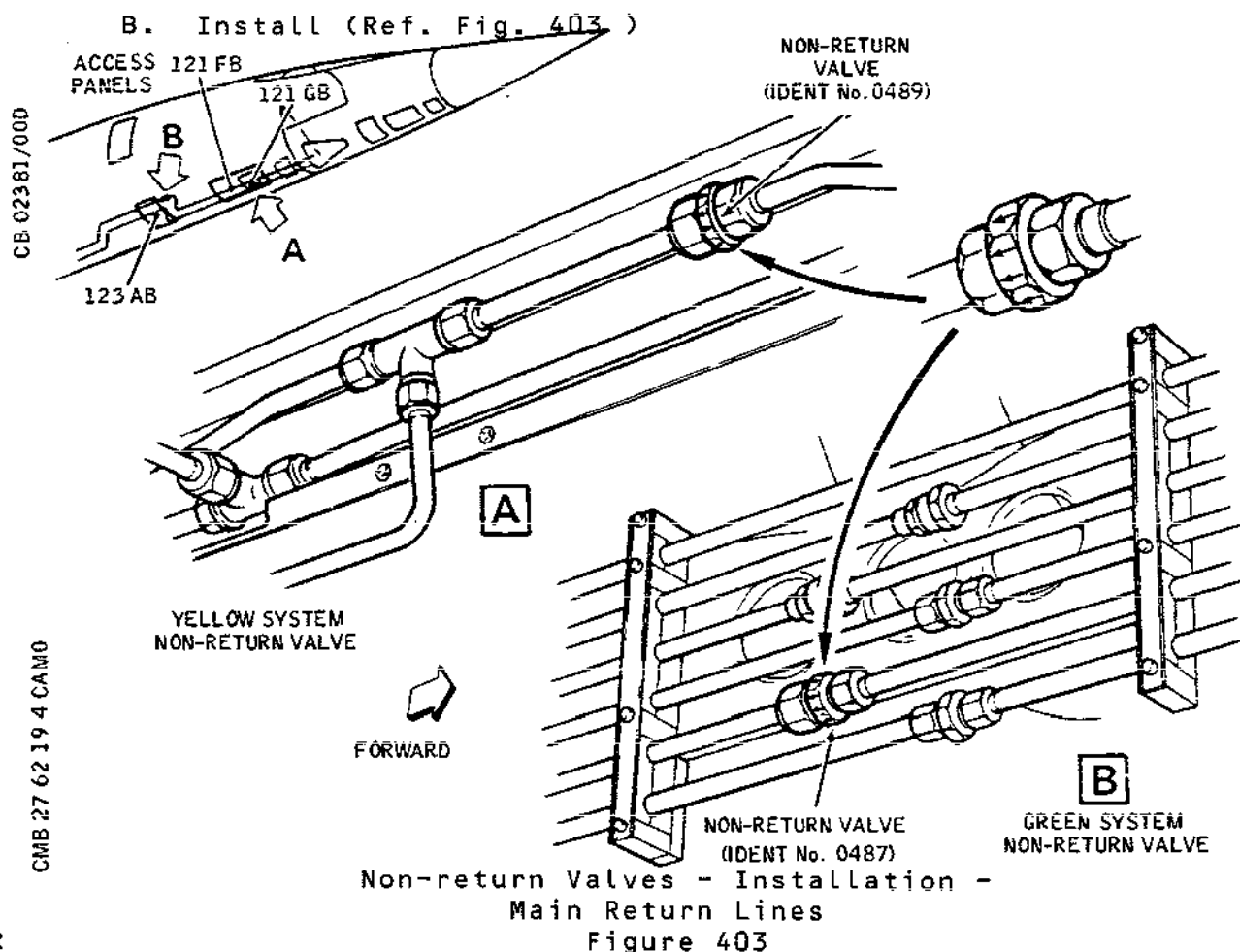
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# Concorde

## MAINTENANCE MANUAL



**NOTE:** Fit coupling nut to 20-23-11.

- (1) Remove the blank covers from the non-return valve and pipe ends and connect the pipes to the valve. Torque tighten the smaller pipe coupling nut to between 145 and 155 lbf in (1.64 and 1.75 mdaN) and the larger coupling nut to between 150 and 250 lbf in (1.7 and 2.8 mdaN).

**CAUTION:** RESTRAIN NRV WHEN APPLYING LARGER TORQUE LOAD.

- (2) Remove the droop nose ground safety locking devices (Ref. Fig. 401).
- (3) Remove the circuit breaker safety clips and reset the circuit breakers.

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## MAINTENANCE MANUAL

- (4) Function test the visor and droop nose hydraulic system (27-62-00, Adjustment/Test).

NOTE: Complete the test with several visor and droop nose up and down operations to bleed the system of air.

R 5. Non-return Valve (Ident No.0487) Hydraulic Green System

A. Remove (Ref. Fig. 403 )

- (1) Carry out the preparatory procedure (Ref. para. 2A and B).
- (2) Disconnect the hydraulic pipes from each side of the non-return valve and remove the valve.

B. Install

NOTE: Fit coupling nuts to 20-23-11.

- (1) Remove the blanks from the hydraulic pipes and connect the pipes to the non-return valve. Torque tighten the smaller coupling nut to between 145 and 155 lbf in (1.64 and 1.75 mdaN) and the larger coupling nut to between 150 and 250 lbf in (1.7 and 2.8 mdaN).

CAUTION: RESTRAIN NRV WHEN APPLYING LARGER TORQUE LOAD.

- (2) Remove the droop nose ground safety locking device (Ref. Fig. 401 ).
- (3) Remove the circuit breaker safety clips and reset the circuit breakers.
- (4) Functionally test the visor and droop nose hydraulic system (27-62-00, Adjustment/Test).

NOTE: Complete the test by raising and lowering the visor and droop nose several times to bleed the system of air.

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

### LOCK SELECTOR VALVES - REMOVAL/INSTALLATION

WARNING: OBSERVE ELECTRICAL PRECAUTIONS AS DETAILED IN 24-00-00.

OBSERVE HYDRAULIC AND TECHNICAL PRECAUTIONS AS DETAILED IN CHAPTER 29.

FIT THE GROUND SAFETY LOCKING DEVICES (Ref. Fig. 401 ) BEFORE COMMENCING WORK IN THE DROOP NOSE.

#### 1. General

The lock selector valves (ident nos. 4101, 4102 and 4103) are located in the forward equipment bay (zone 121) beneath the flight compartment floor. Each is secured to a hydraulic manifold with wire-locked bolts and is connected to electrical supplies. The following procedure is the same for each valve.

#### 2. Lock Selector Valves

##### A. Equipment and Materials

R		
R	DESCRIPTION	PART NO.
R		
R	Locking pins, droop nose (2 off)	E925045031
R	Locking sleeve, nose actuator jacks	E925091000
R	Safety clips, circuit breaker	-
R	Clean receptacle for hydraulic fluid	-
R		
R	Torque spanner, 0 to 55 lbf in (0 to 62 mdaN) range	-
R		
R	Locking wire non-corrodible steel, 0.028 in (0.7 mm) dia	-
R		

##### B. Prepare to Remove

NOTE: The valve may be removed or installed with the droop nose either fully raised or fully lowered.

(1) Electrically isolate the visor and droop nose control system by tripping the associated circuit breakers;

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## MAINTENANCE MANUAL

fit safety clips.

R  
R  
R  
R  
R  
R  
R  
R

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
VISOR & NOSE CONT	15-215	M11	F 8
NOSE 7 1/2 CONT	1-213	M12	Q16
NOSE/VISOR STBY LOWER SUP	1-213	M13	Q17

- (2) Remove the access panels. Fit the appropriate droop nose ground safety locking device (Ref. Fig. 401 ).
  - (a) NOSE UP position - fit nose uplock safety pins.
  - (b) NOSE DOWN position - fit nose actuator locking sleeves.
- (3) Depressurize the appropriate hydraulic system by operating the manual pressure relief unit located in zone 187 and the pressure relief valve fitted to the base of the applicable hydraulic reservoir in zone 188.
  - (a) Nose uplock normal selector valve - depressurize green system.
  - (b) Nose uplock standby selector valve - depressurize yellow system.
  - (c) Standby collet lock selector valve - depressurize yellow system.

### C. Remove (Ref. Fig. 402 )

- (1) Disconnect the electrical plug from the valve.
- (2) Remove the locking wire from the attachment bolts and remove the bolts. Be prepared with a clean container to catch fluid spilling from the valve and manifold and remove the valve and bobbins from the manifold.

### D. Install (Ref. Fig. 402 )

- (1) Fit new seals to the three bobbins ensuring that they

EFFECTIVITY: ALL

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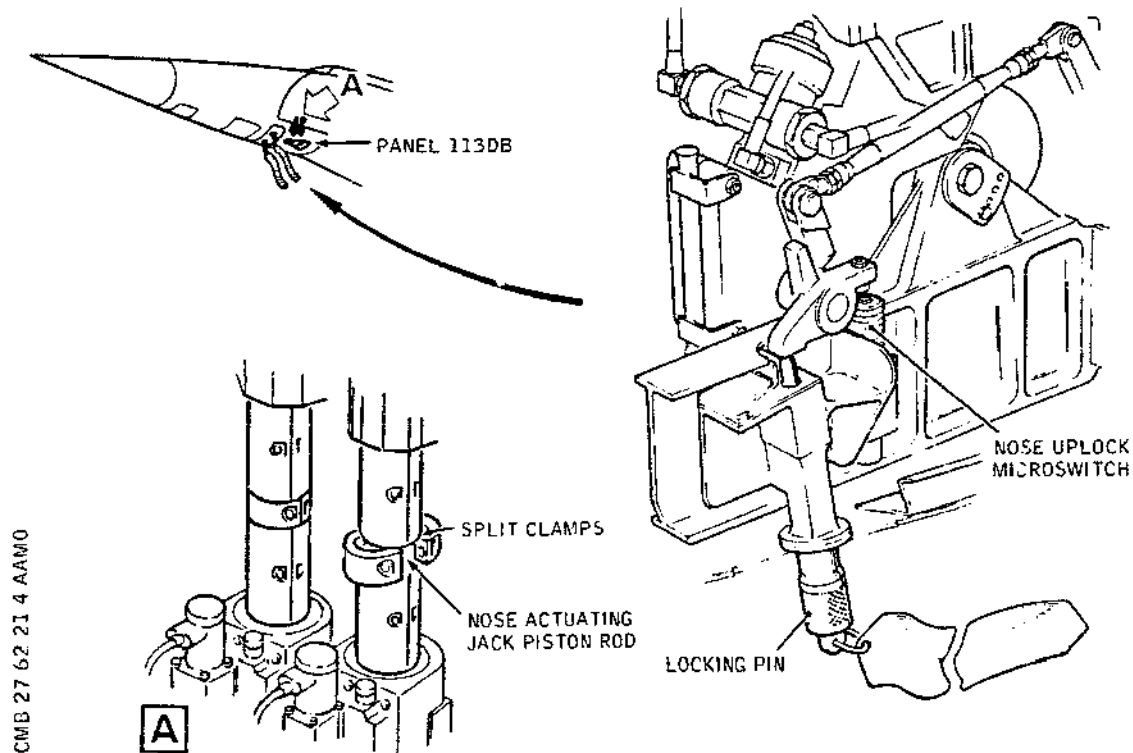
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## MAINTENANCE MANUAL



Ground Safety Locks  
Figure 401

are correctly positioned, and insert the bobbins in the valve.

**NOTE:** Fit the end of the bobbin with the square seal in the valve. The end with the ident groove will be inserted in the manifold.

- (2) Prime the selector valve with the hydraulic fluid and place the valve in position on the manifold engaging the bobbins in the manifold orifices. Secure the valve with the four bolts and washers; tighten the bolts to a torque value of 50 to 55 lbf in (0.56 to 0.62 mdaN) and lock them with wire.
- (3) Re-connect the electrical plug to the lock selector valve ensuring that the plug and receptacle mating surfaces are clean and undamaged.
- (4) Remove the ground safety locking device (Ref. Fig. 401 ).
- (5) Remove the circuit breaker safety clips and reset the

EFFECTIVITY: ALL

**27-62-21**

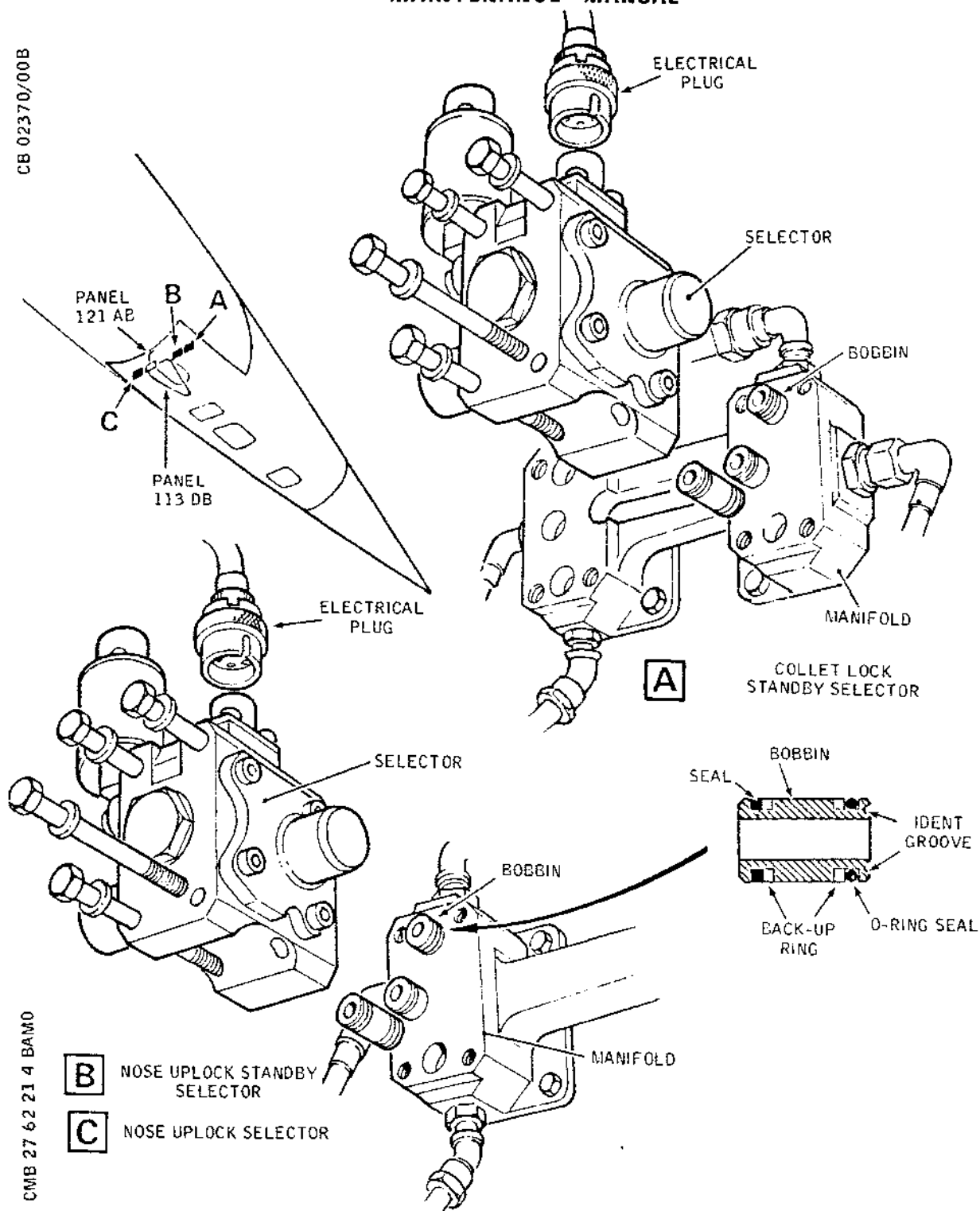
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Lock Selector Valves  
Figure 402

R

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## MAINTENANCE MANUAL

circuit breakers.

- (6) Function test the visor and droop nose hydraulic system (Ref. 27-62-00, Adjustment/Test).

NOTE: Complete the test with several visor and droop nose up and down operations to bleed the system of air.

EFFECTIVITY: ALL

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# Concorde

## MAINTENANCE MANUAL

### VISOR SUPPLY SHUT-OFF VALVE - REMOVAL/INSTALLATION

**WARNING:** OBSERVE THE ELECTRICAL PRECAUTIONS AS DETAILED IN 24-00-00.  
OBSERVE THE HYDRAULIC PRECAUTIONS AS DETAILED IN CHAPTER 29.

#### 1. General

R The visor supply shut-off valve (ident no.5116) is located on the LH side in the forward underfloor equipment bay (zone 121). It is secured to a hydraulic manifold with four wire-locked bolts and is connected to electrical supplies. The valve may be removed with the visor and nose in any configuration.

#### 2. Visor Supply Shut-off Valve

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Locking pins, visor 'up' (2)	E925045030
Locking pins, droop nose 'up' (2)	E925045031
Locking sleeves, droop nose 'down'	E925091000
Safety clips, circuit breaker	-
Non-corrodible steel wire 0.028 in (0.7 mm) dia	-

##### B. Prepare to Remove

- (1) Electrically isolate the visor and droop nose control system by tripping the associated circuit breakers; fit safety clips.

SERVICE	PANEL	CIRCUIT BREAKER	MAP MAP
VISOR & NOSE CONT	15-215	M11	F 8
NOSE 7.1/2 DEG CONT	1-213	M12	Q16
NOSE/VISOR STBY	1-213	M13	Q17
LOWER SUP			

- (2) Fit the appropriate droop nose ground safety locking device (Ref. Fig. 401):

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## MAINTENANCE MANUAL

- (a) Visor up - fit visor 'up' locking pins.
- (b) Nose up - fit nose 'up' locking pins.
- (c) Nose down - fit nose 'down' locking sleeves.

R (3) Depressurize the green hydraulic system by operating the manual pressure relief valve located in zone 151 and the pressure relief valve fitted to the base of the system hydraulic reservoir in zone 153 (Ref. Chapter 29).

R (4) Remove access panel 121FB in the bottom of the forward equipment bay to gain access to the valve (Ref. Fig. 402 ).

### C. Remove (Ref. Fig. 402 ).

- (1) Disconnect the electrical supply plug from the valve.
- (2) Remove the locking wire from the attachment bolts and remove the bolts. Be prepared with a clean container to catch fluid spilling from the valve and manifold and remove the valve and bobbins from the manifold.

### D. Install (Ref. Fig. 402 ).

- R (1) Comply with the electrical precautions taken prior to removal and ensure that the ground safety locking devices are fitted (Ref. Fig. 401 ).
- (2) Fit new seals to the bobbins ensuring that they are correctly positioned and insert the bobbins in the valve.

NOTE: Fit the end of the bobbin with the square seal in the valve. The end with the ident groove will be inserted in the manifold.

- (3) Prime the shut-off valve with hydraulic fluid and place the valve in position on the manifold, engaging the bobbins in the manifold orifices. Secure the valve with the four bolts and washers; torque tighten the bolts to between 50 and 55 lbf in (0.56 and 0.62 mdaN) and lock with wire.
- (4) Reconnect the electrical plug to the shut-off valve ensuring that the plug and receptacle mating surfaces are clean and undamaged.

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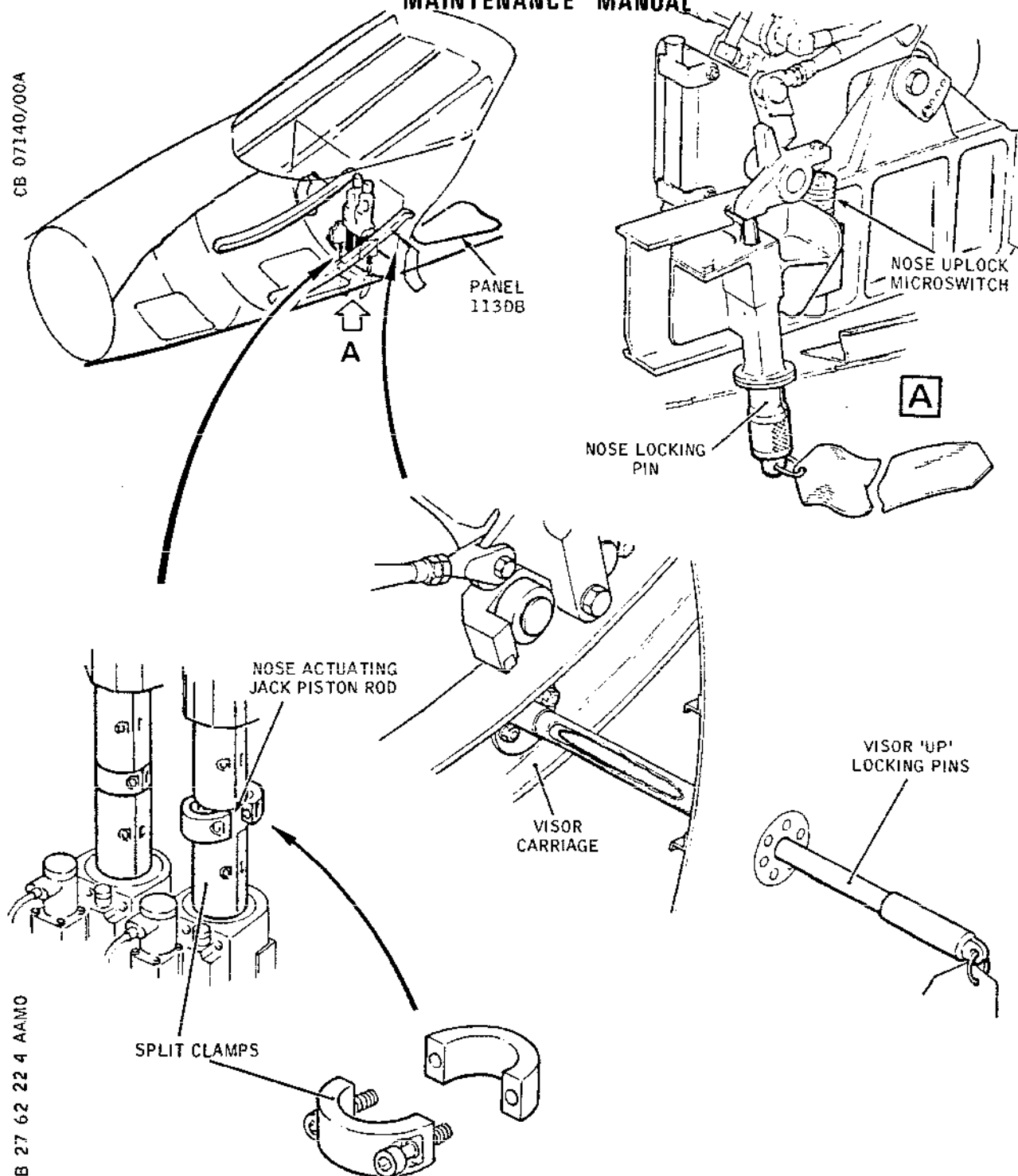
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## MAINTENANCE MANUAL

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Ground Equipment  
Figure 401

EFFECTIVITY: ALL

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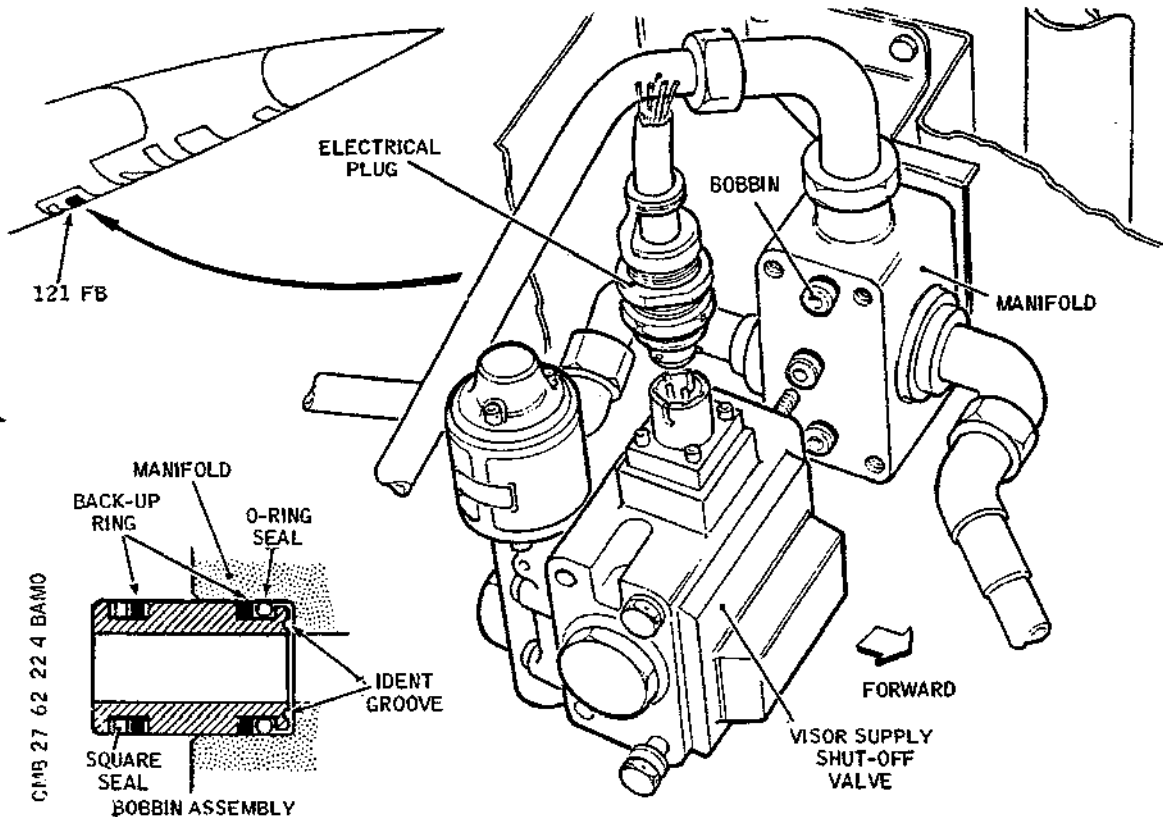
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Visor Supply Shut-off Valve - Installation  
Figure 402

### E. Conclusion.

- (1) Remove the ground safety locking device(s).
- (2) Remove the circuit breaker safety clips and reset the circuit breakers.
- (3) Function test the visor hydraulic system (Ref. 27-62-00, Adjustment/Test).

**NOTE:** Complete the test with several visor up and down movements to bleed the system of air. If this is unsatisfactory refer to the instructions for bleeding the system given in 27-62-00, Adjustment/Test.

- (4) Fit access panel 121FB.

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## MAINTENANCE MANUAL

### VISOR SUPPLY SHUT-OFF VALVE - INSPECTION/CHECK

#### 1. General

R The visor supply shut-off valve (ident no.5116) is located on the LH side in the forward underfloor equipment compartment. The following procedure includes a check to determine that the valve has not failed in the open position and requires the visor and nose fully raised.

#### 2. Inspection/Check

##### A. Equipment and Materials

DESCRIPTION	PART NO.
Hydraulic ground generation rig.	-

##### B. Preparation

- (1) Remove access panel 121FB to gain access to the forward equipment compartment.
- (2) Ensure that the visor is raised.
- (3) Illuminate the service lights, if required, as follows:
  - (a) Make available ground electrical power (Ref.24-41-00).
  - (b) Set the GRD LIGHTING CONTROL switch on the oxygen panel in the flight compartment to "ON".

##### C. Inspect.

- (1) Inspect the valve for security of attachment, freedom from external leakage and damage, and ensure that the pipe joints to the valve manifold are secure.

##### D. Check.

- (1) Check that the visor supply shut-off valve has not failed in the open position.
  - (a) Electrically isolate the electrical supply to

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## MAINTENANCE MANUAL

the valve by tripping circuit breaker M11 on panel 15-215, map ref. F8; fit a safety clip.

- (b) Disconnect the electrical supply plug from the valve.
- (c) Reset circuit breaker M11.
- (d) Connect the hydraulic generation ground rig and pressurize the green and the yellow hydraulic systems (Ref.29-00-00, Servicing).
- (e) With the visor in the raised position, set the visor and nose normal control switch on the co-pilot's dash panel to "VIS 0 DEG", and check that the visor does not lower.

**NOTE:** When the valve solenoid is de-energized the valve is shut. If the visor lowers then the valve must be failed in the open position.

- (f) Return the control switch to "UP".
- (g) Trip circuit breaker M11, re-connect the electrical plug to the shut-off valve and reset the circuit breaker.
- (h) Function test the visor (Ref.27-62-00, Adjustment/Test).

### E. Conclusion.

- (1) Refit the access panel.

**END OF THIS  
SECTION**

**NEXT**